MITIGATION POLICY MANUAL FOR WELL STIMULATION TREATMENT PERMITS

California Department of Conservation
Division of Oil, Gas, and Geothermal Resources

Prepared Pursuant to

Senate Bill 4 (2013 Pavley)

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INTRODUCTION

Pursuant to Senate Bill 4 (Pavley 2013) (SB 4), the Division of Oil, Gas, and Geothermal Resources (DOGGR), acting as Lead Agency under the California Environmental Quality Act (CEQA), prepared an Environmental Impact Report (EIR) for subject matter described as "Analysis of Oil and Gas Well Stimulation Treatments in California" (State Clearinghouse Number 2013112046). (Pub. Resources Code, § 3161, subd. (b)(3).) On July 1, 2015, DOGGR certified the Final EIR. This Mitigation Policy Manual includes all of the mitigation measures formulated in the SB 4 EIR.

Early in the process of preparing its statutorily-mandated EIR, DOGGR decided to use the document in a manner that provided additional practical real-world benefits beyond simply looking generically at the environmental effects of well stimulation treatments in California in the abstract. One of DOGGR's goals was to provide programmatic environmental analysis that would assist DOGGR in the processing of individual well stimulation treatment permits, or groups of permits, under Public Resources Code section 3160, subdivision (d). Another goal was to develop mitigation measures that, with possible modifications, could be imposed on well stimulation treatment permits as necessary, appropriate, and feasible under the various circumstances facing individual permit applicants. The "project" analyzed in the EIR was well stimulation in the State of California and all physical acts that are associated with hydraulic fracturing, acid fracturing, and acid matrix stimulation as they apply to both existing and future oil and gas wells within the State. (Pub. Resources Code, §§ 3157, 3161, subd. (b).) Where the EIR found that the well stimulation regulations mandated to become effective on July 1, 2015, might not minimize potentially significant environmental effects to the extent feasible, the EIR recommended mitigation measures intended to achieve such a heightened level of mitigation. (Pub. Resources Code, § 3161, subd. (a) [requirement that regulations become effective on July 1, 2015].)

During the public comment period on the Draft EIR, the Court of Appeal issued a decision entitled, *Center for Biological Diversity v. Department of Fish and Wildlife* (2015) 234 Cal.App.4th 214, which held that, in some circumstances at least, mitigation measures adopted by a State lead agency after preparation of an EIR for a statewide program could constitute illegal "underground regulations" adopted in violation of the California Administrative Procedure Act (APA). In light of this court opinion, and after much deliberation, DOGGR determined that several of the mitigation measures developed in the EIR should be converted into formal regulations. The seven Mitigation Measures in question are GW-1a (Use Alternative Water Sources to the Extent Feasible), GW-4b (Install a Well Seal across Protected Groundwater for New Wells Subject to Well Stimulation Treatments), SWR-1b (Surface Water Protection), GEO-1a (Avoid Active Faults if Necessary), GEO-1b (Implement an Appropriate Setback if Necessary), GEO-1e (Include an Earthquake Response Plan within the Spill Contingency Plan), and HAZ-1a (Ensure that Spill Contingency Plan Provides Adequate Protection Against Leaks or Discharges of Dangerous Fluids and Other Potentially Dangerous Materials). What these measures have in common is that they are intended to be applied without change throughout the State; they address the direct environmental effects of well stimulation treatment; they relate to activities that occur physically very close to oil and gas

wells; and they already reflect the lessons of a considerable amount of scientific input and empirical experience.

DOGGR further concluded, however, that the rest of the mitigation measures in the EIR do not meet the definition of "regulations" that can only be approved and implemented after a formal rulemaking process. DOGGR therefore determined that these other measures should instead be placed within a "Mitigation Policy Manual" that DOGGR will use for determining the exact mitigation measures that might be necessary for particular proposed well stimulation treatment permits, or groups of permits, depending on circumstances and the potential severity of impacts that might occur. In contrast to existing or future regulations, the mitigation measures in this Mitigation Policy Manual are not "generally applicable" because the final decision whether to impose the mitigation measures, and in exactly what form, will only be made on a case-by-case basis. The measures in this Manual represent DOGGR's starting point for determining what level of site-specific mitigation will be required for individual well stimulation treatment permits or groups of permits. Particular measures will not be required absent the kinds of significant impacts to which they are addressed, unless DOGGR determines that the measures are otherwise necessary "to prevent, as far as possible, damage to life, health, property, [or] natural resources" pursuant to Public Resources Code section 3106, subdivision (a). Furthermore, even where a particular proposed permit or group of permits would cause significant impacts of the kind at which DOGGR's mitigation measures are aimed, DOGGR may not impose the measures exactly as they are written herein. In particular, DOGGR will ascertain whether site-specific revisions to the mitigation measures might be appropriate.

In order to ensure that all significant environmental effects will be adequately mitigated during the above-described rulemaking process, this Mitigation Policy Manual currently includes all seven of the above-described mitigation measures that are proposed for rulemaking. These measures will remain in this Manual until such time as formal regulations are duly adopted and in place (possibly with changes made in response to stakeholder input through the Administrative Procedure Act process). The inclusion of such measures in this Manual will therefore be only temporary. DOGGR will issue a new edition of this Manual when the new regulations are in place. Some of the other measures in this Manual may also be removed at some point if they are superseded by the adoption of regulations, standards, or other binding policies of sister agencies such as the Air Resources Board, the State Water Resources Control Board, and air quality management and air pollution control districts. All of these measures, though in modified form perhaps, will remain binding; but they will appear in enforceable form in documents other than this Mitigation Policy Manual. The measures in this category are AQ 2a (Reduce Hydrocarbon Emissions from Well Stimulation Treatments), GHG 1a (Prevent Methane Emissions from Associated Gas and Casinghead Gas), GHG 1b (Reduce Emissions by Implementing Clean Development Mechanism [CDM] Strategies), and GHG 1c (Detect and Quantify Fugitive and Vented Methane and Carbon Dioxide).) As with the seven measures subject to rulemaking, DOGGR will issue a modified version of this Manual if and when one or more of these four measures are superseded by actions of other agencies.

There are two additional scenarios under which DOGGR would revise the mitigation measures presented herein, necessitating further revisions to this Manual. First, as DOGGR accumulates practical experience and empirical information from working with other agencies in the processing of applications for well stimulation treatment permits, DOGGR may choose to modify and update this Manual. Second, after reviewing the final two volumes of the California Council on Science and Technology's Independent Scientific Study, DOGGR may amend this Manual and/or propose additional permanent regulations that may be warranted based upon the conclusions of those final two volumes.

Although not legally binding in the same sense as regulations or measures found in an adopted mitigation reporting or monitoring program, the measures in this Mitigation Policy Manual represent DOGGR's best thinking as of July 1, 2015, on the subject of how best to mitigate the direct and reasonably foreseeable indirect effects of well stimulation treatment. Importantly, the mitigation measures in this Manual are enforceable to the extent that they "set a floor," albeit a somewhat flexible one, for future mitigation that DOGGR will impose as permit conditions. In their final form after input from various stakeholders, the mitigation measures for individual permits or groups of permits will have to be substantially consistent with the measures as they appear in this Manual. In determining whether a particular measure in its final form is substantially consistent with the mitigation measures as they appear herein, DOGGR will take full account of the following: (i) any other lead agency's analysis as to whether a particular impact of a proposed permit is significant and requires mitigation; and (ii) the extent to which the level of any impact reduction that would be achieved by the measure would be reasonably comparable to the level of mitigation that would have been achieved by the imposition of the pertinent mitigation measure or measures as they appear herein.

One reason why DOGGR has chosen to maintain flexibility in the imposition of mitigation measures is the incredible variety of physical conditions in which well stimulation currently occurs or could occur in the future around California, with its enormous variety of different landscapes and physical conditions. Most well stimulation is currently occurring in existing developed oil fields, in which any originally pristine physical conditions have already been substantially modified, in some cases many decades ago. Future well stimulation, however, could occur in much more sensitive environments, including new fields being developed for production for the first time. In general, more extensive mitigation is likely to be required in newly developing areas than in already impacted existing fields.

Another reason why DOGGR has chosen to maintain flexibility with respect to the final form of the mitigation measures included herein is DOGGR's strong preference is to act as a CEQA responsible agency where a city or county is available to act as lead agency for an oil or gas project anticipated to include well stimulation treatment. Where DOGGR will function as a responsible agency, DOGGR will work with the lead agency to ensure adequate mitigation for all impacts that can be seen as direct or reasonably foreseeable indirect effects of well stimulation treatment. Where the lead agency is a local agency (e.g., a county), DOGGR will remain cognizant of the traditional areas of concern typically under the jurisdiction of local agencies (e.g., aesthetics, traffic and circulation, noise, etc.). In all situations in which DOGGR will function as a responsible

agency, DOGGR will encourage the lead agency to include in its draft environmental document circulated for public review proposed mitigation measures similar or identical to those included herein, where such measures are relevant and applicable. DOGGR will communicate such suggestions to the lead agency through one or more of the following means: informal consultation on a pending Negative Declaration or Mitigated Negative Declaration; comments on a publicly circulated Negative Declaration or Mitigated Negative Declaration; comments on a Notice of Preparation; comments on a Draft or Final EIR; or comments on a draft or final document prepared by a State Lead Agency as the "functional equivalent" of a Negative Declaration, Mitigated Negative Declaration, or Draft or Final EIR pursuant to a certification granted under PRC Section 21080.5.

When acting as a responsible agency in the issuance of well stimulation treatment permits, DOGGR will impose as conditions of approval any proposed mitigation measure(s) or condition(s) of approval recommended to DOGGR by the lead agency that are feasible and meet or are substantially consistent with the mitigation measures included herein, though DOGGR may modify the proposed language in order to better achieve the results it seeks. Alternatively, where the lead agency has already imposed mitigation measure(s) or condition(s) of approval that meet or are substantially consistent with the mitigation measures included herein, DOGGR need not impose duplicative condition(s) of approval in the well stimulation treatment permit, and may conclude that the lead agency's adopted measure(s) or condition(s) are sufficiently effective and protective.

When warranted by circumstances and necessary to prevent damage to life, health, property, or natural resources, DOGGR may include condition(s) of approval requiring compliance with requirements very similar to the mitigation measures set forth herein, even where DOGGR determines that approval of a particular well stimulation treatment permit is exempt from CEQA. In such circumstances, however, the conditions of approval should not be called "mitigation measures," as that expression is a CEQA term of art only applicable where the measures are necessary to avoid or reduce a significant environmental effect.

For the vast majority of applications for well stimulation treatment permits, DOGGR expects that the SB 4 EIR will simply function as a first tier data base on which DOGGR and other agencies can build in order to allow future publicly circulated CEQA documents to focus on site-specific issues. When acting as lead agency, DOGGR will have the option of using Appendix D to the Final EIR ("Guidelines and the Environmental Checklist for Future Environmental Reviews and Clearances") to determine the extent to which the potential impacts of such activities have already been addressed in this EIR. DOGGR will not conclude, however, that a particular proposed permit is "within the scope of the project covered by the program EIR" unless the applicant is willing to accept without material change any and all mitigation measures from this Mitigation Policy Manual relevant to any significant effects that might be caused by the proposed permit. For the convenience of DOGGR staff, staff of other agencies that might act as lead agencies in projects involving well stimulation treatment, and applicants for well stimulation treatment permits, Appendix D to the Final EIR is included herein as Exhibit A to this Manual.

Aesthetics

Impact AES-1: Substantially adversely affect scenic vistas

Impact AES-2: Substantially alter or damage scenic resources

Impact AES-3: Substantially degrade the existing visual character or quality of a site and its surroundings

Impact AES-4: Create new sources of substantial light and glare

MM AES-1a **Prepare and Implement a Site Plan to Reduce Visual Impacts to Sensitive Receptors.** Depending on circumstances, the unmitigated visual effects of temporary, one-time well stimulation treatment activities may or may not be significant. Therefore, prior to approval of a well stimulation treatment permit authorizing activities that would be plainly visible to sensitive visual receptors on nearby properties, DOGGR shall consider whether such activities could result in significant visual effects, and whether any mitigation measures may be necessary and feasible. As part of the application for a well stimulation treatment permit, DOGGR shall require that the applicant submit information regarding whether the proposed well stimulation treatment activities would be plainly visible to nearby properties, and whether any sensitive visual receptors are present within such properties. Where DOGGR determines that the proposed activities would be plainly visible to sensitive visual receptors on nearby properties, DOGGR shall require the applicant to provide, as part of a complete permit application, additional detailed site-specific information on the subject of visual impacts. In determining the adequacy of the additional information submitted by the applicant, DOGGR shall consider factors such as the level of existing disturbance at the proposed project site, the magnitude of the proposed well stimulation operation, the topography of the project site and adjacent areas, the sensitivity of the local visual setting, and the intensity of related activities at the subject well site and in immediately surrounding areas, including the occurrence of multiple well stimulation treatment operations. Where DOGGR determines, after considering all such information and factors, that there is a substantial likelihood that the proposed well stimulation treatment activities could cause significant visual impacts to sensitive visual receptors on nearby properties, DOGGR shall require mitigation by the applicant, in part as described below.

In approving a well stimulation treatment permit authorizing operations that would cause significant visual impacts to sensitive visual receptors on nearby properties, DOGGR shall impose a condition that requires the applicant to prepare and, where necessary, submit for approval by local authorities having jurisdiction a site or field development plan designed to reduce or eliminate visual impacts to offsite locations. The plan should:

- Establish what areas within the site or field would be visible from offsite locations within 5 miles and use this viewshed information to identify onsite areas to avoid or screen from view, if feasible
- Locate well stimulation equipment so as to not damage trees, rock outcroppings, historic structures, and other features contributing to a coherent visual landscape
- Use low-profile or submersible pumps where technically feasible in locations visible from residences, recreation areas, or a scenic road or highway within 1 mile of the outer limit of the site or field.
- Consolidate pipelines to minimize visual clutter
- Remove abandoned equipment located adjacent to the well where well stimulation activities will occur that do not have a future onsite use and consolidate materials for future use in yards
- Locate tanks and yards in locations not visible from public roads or parks, or screen them from view using vegetation and/or acceptable fencing or walls to the extent feasible
- Position equipment to avoid skylining (whereby objects are silhouetted against the sky)when viewed from off site
- Use non-reflective coatings on piping, tanks, and buildings in colors and hues consistent with the surrounding landscape
- Minimize grading, vegetation removal, road development, and earthwork
- Re-vegetate or otherwise stabilize disturbed areas not otherwise required for operations or safety
- Maintain facilities, coatings, ground cover, and vegetation in good condition.

MM AES-1b **Minimize Lighting Visibility Offsite.** In approving a well stimulation treatment permit for a project that would cause significant visual impacts of the project to sensitive visual receptors on nearby properties, DOGGR shall impose a condition that requires the applicant to use downward focused, shielded lighting at a well stimulation treatment site where night lighting is required. Where lighting may be required from time to time, but not at all times, motion or manual control switches should be installed. If a local ordinance or conditions of approval apply to lighting, these must be implemented by the applicant. During nighttime drilling activities, lighting shall be consistent with industry practice and as required for safe operations as determined by site operators. Glare and offsite spillage of lighting should be avoided by use of appropriately shielded and focused lighting.

Agriculture and Forestry Resources

Impact AGF-1: Convert Prime Farmland, Unique Farmland, or Farmland of statewide Importance (Important Farmland), as designated by the Farmland Mapping and Monitoring Program, to non-agricultural use

MM AGF-1a **Minimize Impacts to Important Farmland.** As part of the application for a well stimulation treatment permit, DOGGR shall require that the applicant submit information regarding whether the proposed well stimulation treatment activities would occur on-Important Farmland. DOGGR shall not approve a well stimulation treatment permit for activities occurring on or adjacent to Important Farmland absent permit conditions requiring that the applicant:

- Minimize paving and ground-disturbing activities to the maximum extent feasible within agricultural fields in order to retain agricultural soil characteristics;
- Consult with applicable departments or divisions of the local jurisdiction with jurisdiction over the affected site to consider options to avoid, minimize, and/or mitigate impacts to Important Farmland and adjacent agricultural operations; and
- Provide documentation of actions taken and actions planned to minimize disturbance of agricultural land at least 30 days prior to the start of ground-disturbing activities.

DOGGR shall not allow ground-disturbing activities on or adjacent to Important Farmland to begin unless it has determined that the applicant has consulted with the city or county with land use jurisdiction over the affected site regarding protection of agricultural resources and has identified means acceptable to the city or county to reduce effects from ground-disturbing activities on Important Farmland to less than significant levels.

MM AGF-1b **Develop an Agricultural Resources Protection Plan.** In approving a well stimulation treatment permit for which well stimulation treatment activities would occur on or adjacent to Important Farmland, DOGGR shall impose a condition requiring the applicant to develop an Agricultural Resources Protection Plan consistent with any relevant standards of the city or county with land use jurisdiction over the affected site. The Agricultural Resources Protection Plan shall provide, to DOGGR's satisfaction, detailed strategies and performance standards for restoring temporarily disturbed areas and for vegetation and soil management during project construction, operations, and decommissioning in order to minimize potential long-term damage to agricultural soils. Performance standards could include specific thresholds for soil nutrient levels, weed containment, and topsoil salvage procedures. Where the city or county has adopted policies or

standards addressing these issues, compliance with such policies or standards should suffice. In assessing the adequacy of the proposed Agricultural Resources Protection Plan, DOGGR shall consider factors such as the level of existing disturbance at the proposed project site, the magnitude of the proposed well stimulation operation, the condition of the Important Farmland at issue, and the intensity of related activities at the subject well site and in immediately surrounding areas, including the occurrence of multiple well stimulation treatment operations. The Agricultural Resources Protection Plan (Plan) may address, where relevant and necessary, any of the following:

- **Use of Produced Water.** The Plan may address whether any well stimulation wastewater would be used on crops, and if so, how the water would be tested and treated beforehand. The Plan may include specific performance standards for water quality for any produced water that may be used for agricultural purposes.
- **Maintaining Soil Nutrients.** The Plan may describe strategies for maintaining soil nutrients through vegetation management strategies developed in consultation with local fire departments and CAL FIRE.
- **Weed Management.** The Plan may include allowable weed management strategies and a list of prohibited herbicides and pesticides. General properties of prohibited herbicides and pesticides shall also be included.
- **Topsoil Salvage.** The Plan may outline areas within the construction footprint where topsoil is present and can be salvaged and stockpiled for replacement during subsequent construction activities and site restoration.
- **Reporting.** One (1) year after project implementation and every five (5) years after that until the end of decommissioning, reports shall be submitted to the Lead Agency detailing soil quality and vegetation management activities and results of required soil assessments.
- **Decommissioning.** The Plan may also outline requirements for revegetation after decommissioning. The Plan may outline performance standards to be met for site soils and revegetation after the removal of all structures and facilities related to the well stimulation activity.

MM AGF-1c **Compensate for Loss of Important Farmland.** In unusual circumstances, the effects of well stimulation treatment activities on Important Farmland may be so severe as to amount to the equivalent of a permanent loss of key agricultural values that render it commercially viable for crop production. In unusual circumstances which well stimulation treatment activities would have the practical consequence of converting Important Farmland to non-agricultural use, DOGGR shall impose a condition requiring the applicant to mitigate for the loss of farmland through permanent preservation of off-site farmlands of equal or

greater quality according to the California Department of Conservation's Farmland Mapping and Monitoring Program or other more site-specific assessment of farmland quality approved by the city or county with land use authority over the affected site, provided that the ratio is at least 1:1. Prior to the start of ground disturbance for such a well stimulation treatment project, the applicant shall provide evidence to DOGGR and the city or county with land use jurisdiction over the affected site that an acceptable Agricultural Conservation Easement has been granted in perpetuity to the city or county or a qualified Agricultural Land Trust.

A qualified Agricultural Land Trust may not hold the Agricultural Conservation Easement unless it has demonstrated to DOGGR or the city or county that the Trust: (1) has adopted the Land Trust Alliance's Standards and Practices; (2) has substantial experience creating and stewarding Agricultural Conservation Easements; and (3) has a stewardship endowment to help pay for its perpetual stewardship obligations.

Prior to the commencement of ground disturbing activities for such a well stimulation treatment project, the applicant shall also provide appropriate funds (as determined by DOGGR or the city or county with land use jurisdiction over the affected site) to compensate for reasonable administrative costs incurred by the local jurisdiction or land trust that holds the Agricultural Conservation Easement (easement holder), including an endowment to cover the cost of monitoring and enforcing the easement in perpetuity.

Impact AGF-2: Conflict with existing zoning for agricultural use or with Williamson Act contracts

MM AGF-2a **Ensure Compatibility with Agricultural Zoning.** As part of the application for a well stimulation treatment permit, DOGGR shall require that the applicant submit information regarding whether the site associated with proposed well stimulation activities is designated for agricultural use in the applicable local general plan and zoning. DOGGR shall not approve a well stimulation treatment permit for activities occurring on land designated for agricultural use unless the proposed activities are compatible with zoning regulations. Compatibility with zoning regulations may be ensured through measures such as establishing buffers between well stimulation activities and agricultural uses; implementation of Right to Farm ordinances; or other measures enacted by local authorities.

MM AGF-2b **Ensure Compatibility with Williamson Act Contracts or Terminate Williamson Act Contracts.** As part of the application for a well stimulation treatment permit, DOGGR shall require that the applicant submit information regarding whether the site associated with proposed well stimulation activities is enrolled in a Williamson Act contract and specifying any land use limitations associated with any such contract. DOGGR shall not approve a well stimulation treatment permit for

activities occurring on land enrolled in a Williamson Act contract unless the well stimulation treatment activities are compatible with State and local Williamson Act provisions.

Impact AGF-3: Conflict with existing zoning for, or cause rezoning of, forest land, timberland, or timberland zoned Timberland Production

MM AGF-3a **Ensure Compatibility with Zoning for Forest and Timberland.** As part of the application for a well stimulation treatment permit, DOGGR shall require that the applicant submit information regarding whether the site associated with proposed well stimulation activities is zoned as forest land, timberland, or Timberland Production. DOGGR shall not approve a well stimulation treatment permit for activities occurring on land zoned as forest land, timberland, or Timberland Production unless the proposed activities are compatible with such zoning regulations. Measures ensuring compatibility may include buffers between well stimulation activities and forestry uses or other measures enacted by local authorities.

Impact AGF-4: Result in the loss of forest land or conversion of forest land to non-forest use

MM AGF-4a **Minimize Impacts to Forest Land.** As part of the application for a well stimulation treatment permit, DOGGR shall require that the applicant submit information regarding whether the proposed well stimulation treatment activities would be sited on forest land. DOGGR shall not approve a well stimulation treatment permit for activities occurring on or adjacent to forest land absent permit conditions requiring that the applicant shall:

- Minimize paving and ground-disturbing activities to the maximum extent feasible;
- Coordinate with the applicable departments or divisions of the local jurisdiction early in the planning process to consider options to avoid, minimize, and/or mitigate impacts to forest land.

MM AGF-4b **Develop a Forest Land Protection Plan.** In approving a well stimulation treatment permit for which well stimulation treatment activities would occur on or immediately adjacent to forest land, DOGGR shall impose a condition requiring the applicant to develop a Forest Land Protection Plan consistent with any relevant standards of the city, county, or other agency with land use jurisdiction over the affected site. The Forest Land Protection Plan shall provide, to DOGGR's satisfaction, detailed strategies and performance standards for restoring temporarily disturbed areas, and vegetation and soil management during all phases of the activities associated with proposed well stimulation activities to

minimize potential long-term damage to forest land. Performance standards could include specific thresholds for soil nutrient levels, weed containment, and topsoil salvage procedures. The specifics of these standards may be determined by any adopted standards of approval of the city, county, or other agency with land use authority over the affected site, if acceptable to DOGGR. In assessing the adequacy of the proposed Forest Land Protection Plan, DOGGR shall consider factors such as the level of existing disturbance at the proposed project site, the magnitude of the proposed well stimulation operation, the ecological value of the forest land at issue, and the intensity of related activities at the subject well site and in immediately surrounding areas, including the occurrence of multiple well stimulation treatment operations. The Forest Land Protection Plan (Plan) may address, where relevant and necessary, any of the following:

- **Maintaining Soil Nutrients.** The Plan may describe strategies for maintaining soil nutrients through vegetation management strategies developed in consultation with local fire departments and CAL FIRE.
- **Weed Management.** The Plan may include allowable weed management strategies and a list of prohibited herbicides and pesticides. General properties of prohibited herbicides and pesticides shall also be included.
- **Topsoil Salvage.** The Plan may outline areas within the construction footprint where topsoil is present and can be salvaged and stockpiled for replacement during subsequent construction activities and site restoration.
- **Performance Standards and Testing.** The Plan may include performance standards for on-site soils one year after implementation of the well stimulation activities and then every five years after that until decommissioning. Soil assessments shall be conducted by a professional agricultural soil scientist, and the Plan shall include detailed requirements for the types of soil testing required.
- **Reporting.** One year after implementation of the well stimulation activities and every five years after that until decommissioning, reports shall be submitted to DOGGR and the applicable local jurisdiction detailing soil quality and vegetation management activities and results of required soil assessments.
- **Decommissioning.** The Plan may also outline requirements for mulch and/or cover crops to be used after decommissioning of all activities associated with the well stimulation activities. The Plan shall outline performance standards to be met for site soils and restoration after removal of well stimulation structures and facilities.

MM AGF-4c **Compensate for Loss of Forest Land.** In unusual circumstances, the ecological effects of well stimulation treatment activities on forest land may be so severe as to cause permanent ecological damage to such forest land. In unusual circumstances in which well stimulation treatment activities would have the

practical consequence of converting forest land to non-forest use, DOGGR shall impose a condition requiring the applicant to mitigate for the loss of forest land through permanent preservation of off-site forest land of equal or greater quality as determined by a Registered Professional Forester. Appropriate ratios of compensation ratios would typically be determined by the city, county, or other agency with land use authority over the affected site, provided that the ratio is at least 1:1. Prior to the start of ground disturbance for such a well stimulation treatment project, the applicant shall provide evidence to DOGGR and the city, county, or other agency with land use jurisdiction over the affected site that an acceptable conservation easement has been granted in perpetuity to a public agency with experience managing conservation easements or a qualified Land Trust.

A qualified Land Trust may not hold the conservation easement unless it has demonstrated to DOGGR that it: (1) has adopted the Land Trust Alliance's Standards and Practices; (2) has substantial experience creating and stewarding conservation easements on forest/timberland; and (3) has a stewardship endowment to help pay for its perpetual stewardship obligations.

Prior to commencement of any ground disturbing activities, the applicant shall also provide appropriate funds (as determined by DOGGR or the city, county, or other agency with land use jurisdiction over the affected site) to compensate for reasonable administrative costs incurred by the easement holder, including an endowment to cover the cost of monitoring and enforcing the easement in perpetuity.

Impact AGF-5: Directly or indirectly impair the use of agricultural land or forest land

MM AGF-1a Minimize Impacts to Important Farmland.

MM AGF-1b Develop an Agricultural Resources Protection Plan.

MM AGF-4a Minimize Impacts to Forest Land.

MM AGF 4b Develop a Forest Land Protection Plan.

MM AQ-2c Reduce Emissions from Dust-Causing Activities.

MM BIOT-2a Prevent Hazards to Fish and Wildlife.

MM HAZ-1a Ensure that Spill Contingency Plan Provides Adequate Protection Against Leaks or Discharges of Dangerous Fluids and Other Potentially Dangerous Materials.

MM GW-4b Install a Well Seal Across Protected Groundwater for New Wells Subject to Well Stimulation Treatments.

MM SWR-1a Require Stormwater Pollution Prevention Plan.

MM SWR-2a Implement Erosion Control Plan.

MM SWR-3a Ensure Adequate Water Availability.

MM TR-1a Prepare Traffic Plan.

Air Quality

Impact AQ-1: Conflict with or obstruct implementation of an applicable air quality plan

MM AQ-1a **Improve Air Quality Planning Inventories and Local Control Measures.** In approving a well stimulation treatment permit, DOGGR shall assess the total well counts and anticipated oil and gas production for the local air district and determine whether trends in well counts and production would exceed the levels assumed for the air quality planning inventories.

Depending on the well counts and production levels, DOGGR may need to recommend to local air districts that they update their planning inventories and, if necessary, establish in future air quality plans additional control strategies for sources related to petroleum production to ensure that emissions with potential growth are not in excess of those anticipated within the planning inventories for the oil and gas production subcategory.

MM AQ-1b **Improve the Methodologies and Emission Factors Used in Inventory Development.** In approving a well stimulation treatment permit, DOGGR shall provide ARB with locally specific forecasts of growth assumptions for oil and gas activities in terms of well counts and production. This information would allow ARB to revisit criteria pollutant emission inventories, emission factors, and growth factors, as needed.

Impact AQ-2: Increase criteria pollutants or precursor pollutants to levels that violate an air quality standard or contribute substantially to an existing or projected air quality violation

MM AQ-2a **Reduce Hydrocarbon Emissions from Well Stimulation Treatments.** After consultation with the local or regional air pollution control district or air quality management district, DOGGR, in approving a well stimulation treatment permit, shall impose a condition requiring that the applicant use reduced emission completions ("green" completions) or completion combustion devices during oil and gas well completions that use a well stimulation treatment. The consultation shall determine the best feasible strategy to reduce hydrocarbon emissions. Products of combustion would include NOx and other pollutants that may require a permit through the local air district. Potential hydrocarbon emission control strategies for completions are named in the EPA April 15, 2014 White Paper: "*Oil and Natural Gas Sector Hydraulically Fractured Oil Well Completions and Associated Gas during Ongoing Production*" (EPA, 2014b), and defined as follows:

- Reduced emission completions are a well completion following fracturing or refracturing where gas flowback that is otherwise vented is captured, cleaned, and routed to the flow line or collection system, re-injected into the well or another well, used as an on-site fuel source, or used for other useful purpose that a purchased fuel or raw material would serve, with no direct release to the atmosphere. Site-specific feasibility of implementing a reduced emission completion depends on: proximity of nearby sales line; sufficient pressure in produced gas; and inert gas makeup of the flowback being suitable to meet specifications of line. The recovered liquids should be routed into one or more storage vessels or re-injected the recovered liquids into the well or another well.
- Completion combustion is a high-temperature oxidation process to burn combustible components, mostly hydrocarbons, found in gas streams. Completion combustion devices are can be as simple as a pipe with a basic ignition mechanism and discharge over a pit near the wellhead. However, the flow directed to a completion combustion device may or may not be combustible depending on the inert gas composition of flowback gas, which would require a continuous ignition source. Completion combustion devices provide a means of minimizing vented gas during a well completion and are generally preferable to venting, due to reduced air emissions.

This mitigation measure and its requirements shall cease to have effect as soon as requirements established by the Air Resources Board (ARB) or the local air district to address the same impacts from well stimulation activities (Impact AQ-2: Increase criteria pollutants or precursor pollutants to levels that violate an air quality standard or contribute substantially to an existing or projected air quality violation) become effective. If the new requirements only address one or some of the pollutants then this measure will continue to apply to those pollutants not covered by the ARB or local air district requirements.

MM AQ-2b **Reduce Emissions from Portable Equipment and Mobile Sources.** For activities located in ozone nonattainment areas or projects that emit toxics [e.g., diesel particulate matter (DPM)], DOGGR, after consultation with the local or regional air pollution control district or air quality management district, shall require as a condition of approval for a well stimulation permit that the applicant and its contractors operating mobile sources or other air pollution sources to comply with a program for using equipment with low-emission engines during all stages of construction and well stimulation treatment. Potential strategies include relying on electricity from the distribution grid for power and requiring all off-road diesel engines to meet at a minimum the Tier 3 (with proper diesel particulate controls), or better (Tier 4) California Emission Standards for Off-Road Compression-Ignition Engines as specified in California Code of Regulations (CCR) Title 13, Division 3, Chapter 9, Article 4, Sec. 2423(b)(1). In addition, if not already supplied with a

factory-equipped diesel particulate filter, all construction equipment shall be outfitted with Verified Diesel Emissions Control Strategies (VDECS) devices certified by ARB. Any emissions control device used by the contractor shall achieve emissions reductions that are no less than what could be achieved by a Level 3 VDECS diesel emissions control strategy for a similarly sized engine as defined by ARB regulations.

Offsets or emission reduction credits may be used to further reduce the residual impact from stationary sources, portable equipment and mobile sources related to a well stimulation treatment permit. Where, prior to approving a well stimulation treatment permit, DOGGR determines that issuance of the permit, without additional mitigation, would result in the emission of cumulatively considerable levels of criteria air pollutants from stationary sources, portable equipment and mobile sources, DOGGR shall not approve the permit without considering additional potentially feasible mitigation measures, with the objective of reducing emissions to less than significant levels if feasible. Such measures may include mandatory participation in a proposed or established program for offsetting criteria air pollutants operated by an air pollution control district or air quality management district.

MM AQ-2c **Reduce Emissions from Dust-Causing Activities.** For activities located in particulate matter nonattainment areas, DOGGR, after consultation with the local or regional air pollution control district or air quality management district, shall require as a condition of approval for a well stimulation permit that the applicant and its contractors operating mobile sources or other air pollution sources to comply with a dust abatement plan that addresses emissions of fugitive dust during all stages of construction and well stimulation treatment. The dust abatement plan shall require implementation of the standard and enhanced dust control strategies identified by the local air district. Examples of such measures include:

- limiting the speeds of construction vehicles on unpaved surfaces to 15 miles per hour,
- suspending excavation and grading activities when winds exceed 20 miles per hour,
- limiting the size of area subject to excavation, grading, or other construction disturbance at any one time to avoid excessive dust,
- applying non-toxic soil stabilizers according to manufacturers' specifications to all construction areas that have been previously graded and are inactive for ten days or more,
- covering all trucks hauling dirt, sand, soil, or other loose materials,

- using enclosures, covers, flexible intermediate bulk containers, or rigid intermediate bulk containers for the storage, handling, and transfer of bulk dry materials such as sand, gravel and other dry additives used in well stimulation treatments, and
- Expeditiously removing the accumulation of mud or dirt from adjacent public streets at least once every 24 hours when construction activities are occurring.

Impact AQ-3: Expose sensitive receptors to substantial pollutant concentrations

MM AQ-3a **Comply with Local Air District Protocols Relating to the Preparation of a Health Risk Assessment and Implement Emission Controls.** Prior to approval of a well stimulation treatment permit for well stimulation treatment activities within 1,500 feet of any existing residences, worksites, schools, daycare centers, playgrounds, or medical facilities, DOGGR shall consider whether air pollutant emissions under the proposed permit could result in an unacceptable health risk with respect to such potential sensitive receptors. In doing so, DOGGR shall consult with the relevant local or regional air district to ensure consideration of any applicable air district protocols relating to the conditions under which, and how a health risk assessment (HRA) should be prepared under the circumstances. Where any such applicable protocol demonstrates the need for such a document, DOGGR shall require the applicant to fund the preparation of an HRA by a qualified consultant acceptable to DOGGR.

If an HRA finds that the proposed well stimulation treatment or associated new well drilling activity shall cause an unacceptable health risk, DOGGR shall require the applicant to commit to implementing an emission control strategy sufficient to achieve an acceptable health risk or shall deny the proposed permit if such a result is infeasible. The HRA shall address at a minimum diesel particulate matter (DPM) and other quantifiable toxic air contaminants (TACs), and criteria air pollutants when recommended by the local air district. The inventory of DPM and other TACs shall be field-wide and shall include construction activities, stationary sources, including those with vented and fugitive emissions, portable equipment, and mobile sources. The assessment must include emission control strategies as necessary to ensure that estimated health risks for the field do not exceed the following levels: a maximum individual lifetime cancer risk of greater than 10 in one million (1.0×10^{-5}) at any off-site receptor location, or a total chronic or acute hazard index greater than 1.0 at any off-site receptor location, or more stringent limits established by the air district.

To achieve the specified levels, examples of the specific steps that DOGGR may require the operator to undertake to reduce and avoid exposure of receptors to substantial concentrations of pollutants include: moving sources within the field to provide an effective buffer zone; reducing the drilling activities, equipment

counts, throughput, or production rates for oil and gas extraction; installing Toxic Best Available Control Technology (TBACT) including ROG controls to reduce emissions; and redesigning operations to avoid emissions of DPM and other TACs, for example by centralizing oil and gas processing or electrification of equipment that would otherwise be diesel-powered.

MM AQ-3b **Avoid Unnecessary Exposure to Air Pollutants by Improving Local Land Use Compatibility.** In approving a well stimulation treatment permit, DOGGR shall confirm that well stimulation treatment activities shall be limited to geographic areas in which such activities shall not create unacceptable health risk to sensitive receptors. Where applicable, DOGGR may need to recommend to counties and cities that they address the compatibility of well stimulation treatment activities and other land uses with sensitive receptors by using their police power and statutory authority under the Planning and Zoning Law to limit well stimulation treatment activities to geographic areas in which such activities should not create unacceptable health risks to sensitive receptors. Such outcomes could be accomplished through amendments to General Plans or Zoning Ordinances and/or by subjecting well stimulation treatment activities to local conditional use permit requirements.

Impact AQ-4: Create objectionable odors affecting a substantial number of people

MM AQ-4a **Prepare and Implement an Odor Minimization Plan.** In approving a well stimulation treatment permit for well stimulation treatment activities within one mile of any land use where human exposure is continuous, such as residential areas, worksites, schools, or hospitals, DOGGR, after consultation with the local or regional air district, shall require as a condition of approval for a well stimulation permit that an independent third party prepare, and that the applicant comply with, an odor minimization plan that controls odors from all oil field equipment, including wells and drilling operations. Potential odor management strategies include establishing buffer zones, ensuring all produced water and crude oil storage occurs within closed systems, installing vapor recovery systems for organic liquid storage tanks, and making portable flares available for immediate use to combust gas encountered during well completions, reworks, and drilling. Ambient air monitoring for total hydrocarbon compounds and H_2S concentrations can be used to verify the goals of the odor minimization plan. The plan shall also establish a procedure for receiving and responding to citizen complaints in a timely manner. DOGGR, in consultation with the local or regional air quality district, shall review the plan for effectiveness and may impose additional requirements. The odor minimization plan must include sufficient controls as necessary to ensure that no new nuisance occurs.

MM AQ-4b **Avoid Unnecessary Exposure to Odors by Improving Local Land Use Compatibility.** In approving a well stimulation treatment permit, DOGGR shall require the applicant to submit documentation demonstrating to DOGGR's satisfaction that well stimulation treatment activities are limited to geographic areas in which such activities shall not create unacceptable odor conditions for sensitive receptors. Where applicable, DOGGR may need to recommend to counties and cities that they address the compatibility of well stimulation treatment activities and other land uses with sensitive receptors by using their police power and statutory authority under the Planning and Zoning Law to limit well stimulation treatment activities to geographic areas in which such activities should not create unacceptable odor conditions for sensitive receptors. Such outcomes could be accomplished through amendments to General Plans or Zoning Ordinances and/or by subjecting well stimulation treatment activities to local conditional use permit requirements.

Biological Resources: Terrestrial Environment

Impact BIOT-1: Substantially reduce the habitat of a fish or wildlife species

MM BIOT-1a **Evaluate Impacts to Native Vegetation and Fish and Wildlife Habitat.** As part of the application for a well stimulation treatment permit, DOGGR shall require that the applicant submit information regarding whether the proposed well stimulation treatment activities, including, but not limited to, worksites, parking and staging areas, access roads, and any other project-related infrastructure, would occur in or within 300 feet of areas that support native vegetation, special status species habitat, or agricultural lands that could support special-status species. Where proposed permit activities would occur within such, the following information shall also be included as part of the application materials:

- **Grading, Fencing, and Site Preparation Plan.** The applicant shall prepare a proposed Grading, Fencing, and Site Preparation Plan, indicating the limits of all project-related disturbance to soils or vegetation, including work areas, support and staging areas, water source sites, and any other direct or indirect project-related disturbance areas. Site preparation includes any ground or vegetation disturbance, including "drive and crush." Alternatively, the applicant may affirm that no grading, fencing, or other site preparation will be included in the work and no native vegetation, special status species habitat, or agricultural lands that support special-status species are within 300 feet of project disturbance areas. In this case, the remainder of Mitigation Measure BIOT-1a shall not be applicable.
- **Vegetation and Habitat Map.** The applicant shall contract with a qualified biologist acceptable to DOGGR to map vegetation and habitat within the

proposed limits of grading or site preparation, and within a 300-foot buffer of the grading and site preparation area. For each native vegetation or habitat type to be affected, the biologist shall determine whether it is a sensitive vegetation or habitat type (including but not limited to wetlands, riparian, or aquatic habitat, or "communities with highest inventory priority"; CDFW, 2010) or may support special-status plants or animals. The potential for subterranean biological resources (e.g., burrow networks, cave ecosystems, bat roosts) that could be affected by the project shall also be considered and mapped, as appropriate. The vegetation and habitat map shall be developed from on-site field work, in combination with a review of any digital vegetation mapping data that may be available, including but not limited to background information and mapping data available from the CDFW Vegetation Classification and Mapping Program (http://www.dfg.ca.gov/biogeodata/vegcamp/). The vegetation and habitat map shall specify whether any proposed activities would affect habitat meeting any of these criteria:

- Habitat or vegetation that may support special-status plants, fish or wildlife;
- Habitat or vegetation meeting criteria as wetlands according to state or federal delineation criteria;
- Riparian habitat, including any vegetation or habitat that is distinct from surrounding upland habitat, and is dependent upon intermittent, seasonal, or perennial soil moisture from a nearby source;
- Communities recognized by CDFW as sensitive (i.e., marked with an asterisk in the Department's Natural Communities List (CDFG, 2010);
- Habitat designated by USFWS as "critical habitat" for a federally listed threatened or endangered species; or
- Habitat recognized as "essential habitat" for a federally listed species, even if the habitat is excluded from the final critical habitat designation.

MM BIOT-1b **Minimize Impacts to Native Vegetation and Habitat.** In approving a well stimulation treatment permit for activities that would in or within 300 feet of areas that support native vegetation, special-status species habitat, or agricultural lands that support special-status species, DOGGR shall impose conditions requiring the applicant to implement the following measures to minimize those impacts.

- **Impact Minimization.** For well stimulation treatment activities that may directly or indirectly affect native vegetation, special-status species habitat, or agricultural lands that support special-status species, DOGGR shall review the project footprint design to ensure that it minimizes these effects (e.g., by consolidating well pads, or revising the site plan to relocate disturbance areas,

if such revisions would allow for safe project implementation and would not cause new adverse effects to other resources).

- **Biological Monitor.** For well stimulation treatment activities that may directly or indirectly affect native vegetation or fish and wildlife habitat (including non-sensitive natural communities, agricultural lands, or other areas that could support special-status species), the applicant shall assign a biological monitor (approved by DOGGR after consultation with CDFW) to evaluate compliance with biological resources mitigation measures and any related conditions of approval, including determining whether project activities are kept within the designated limits of disturbance. The applicant-designated biological monitor shall be responsible for monitoring compliance with each requirement, and reporting to the Lead Agency. The biological monitor shall provide a written report to DOGGR upon completion of a well stimulation treatment, describing observations of any impacts to biological resources.
- **Worker Training.** For well stimulation treatment activities that may directly or indirectly affect native vegetation or fish and wildlife habitat (including non-sensitive natural communities, agricultural lands, or other areas that could support special-status species), the applicant shall prepare and implement a worker training program acceptable to DOGGR, after consultation with CDFW and/or USFWS, to instruct all on-site workers (excluding materials and equipment delivery drivers) of all project requirements related to biological resources. An abbreviated training program, limited to vehicle-related requirements and practices, may be adopted for materials and equipment delivery drivers, where appropriate. Permittee shall provide interpretation for non-English speaking workers. The program shall be repeated annually for authorizations extending more than one year. Copies of program materials shall be maintained at the site for reference as needed. The program shall consist of a presentation by a biologist acceptable to DOGGR. In addition, the program may include information signs posted in break rooms or selected sites in work areas to help minimize accidental non-compliance with the training program. Details of the worker training program shall be dependent on the location and nature of proposed activities. Worker training will be required for all well stimulation activities.
- **Invasive Species Management.** The applicant shall prepare and implement an Invasive Species Management Plan acceptable to DOGGR to prevent the introduction or spread of invasive non-native plants into the project area and surrounding habitat. For purposes of this measure, “weeds” shall include designated noxious weeds, as well as any other weeds or pest plants identified on weed lists of the California Department of Food and Agriculture or the California Invasive Plant Council. No special management or control shall be required for non-native plants already widespread within and around the project site. The Invasive Species Management Plan shall describe measures for (1) preventing or minimizing introduction of weeds; (2) monitoring the project

site and surrounding area for weed infestations; and (3) controlling weed infestations that may be discovered. Weed infestations shall be controlled early in the growing season, before they set seed. Where control measures may include herbicides, the plan shall specify that all herbicide use shall comply with applicable local, state, and federal requirements and conform to Environmental Protection Agency label instructions. For well stimulation treatment activities affecting wetlands, aquatic, or riparian habitats where invasive animal species (i.e., invasive fish or invertebrates) may be of concern, the Invasive Species Management Plan shall also address these species. The Plan must be acceptable to DOGGR after consultation with CDFW. No special management or control shall be required for invasive animals already widespread within and around the site. The Plan shall describe measures for (1) preventing introduction of non-native animals; (2) monitoring the site and surrounding area for invasive animal infestations; and (3) controlling infestations that may be discovered. Invasive animals shall be controlled according to species-specific life history patterns to minimize or prevent reproduction and spread. Where control measures may include toxic materials, the plan shall specify that all use shall comply with applicable local, state, and federal requirements and conform to Environmental Protection Agency label instructions.

- **Worker Training.** The worker training program described above shall include instruction on invasive species management, as follows. The program shall include a discussion of any invasive species present within the work site(s) or that may pose a threat to or have the potential to invade the site(s). The discussion shall include a description of each species and information regarding its habitat, local and statewide distribution, modes of dispersal, and impacts. The program shall also include a discussion of Best Management Practices (BMPs) to avoid the introduction and spread of invasive species into and out of each work area.
- **Prevention.** Each applicant or permittee shall prevent the introduction, transfer, and spread of invasive species, including plants, animals, and microbes (e.g., algae, fungi, parasites, bacteria, etc.), from one work site or waterbody to another. Site-specific guidelines BMPs may be adopted as applicable from the BMPs and guidelines for invasive plants found on the California Invasive Plant Council's website at: http://www.cal-ipc.org/ip/prevention/index.php and for invasive mussels and aquatic species can be found at the Stop Aquatic Hitchhikers website: http://www.protectyourwaters.net/.
- **Equipment Inspection and Decontamination.** Each applicant or permittee shall inspect all vehicles, watercraft, tools, waders and boots, and other project-related equipment and remove all visible soil, mud, plant materials, and animal remnants prior to entering and exiting each work site and between each use in different waterbodies.

Decontamination Site. Decontamination of vehicles, watercraft, and other project gear and equipment shall be performed in a designated location where runoff shall be contained and not allowed to pass into drainageways, including waters of the State and waters of the U.S., or other sensitive habitat areas.

Equipment Used in Water. Each applicant or permittee shall decontaminate all tools, waders and boots, and other equipment that shall enter the water prior to entering and exiting the project site or between each use in different waterbodies. Equipment shall be thoroughly scrubbed, paying close attention to small crevices such as boot laces, seams, net corners, etc., with a stiff-bristled brush to remove all organisms. In addition, decontamination shall utilize one of three methods: (1) drying, (2) hot water soaking, or (3) freezing, as appropriate to the type of gear or equipment. To decontaminate by drying, equipment shall be allowed to dry thoroughly (i.e., until there is a complete absence of water), preferably in the sun, for a minimum of 48 hours. To decontaminate using a hot water soak, equipment shall be immersed in 140°F or hotter water to soak for a minimum of 5 minutes. To decontaminate by freezing, equipment shall be placed in a freezer 32°F or colder for a minimum of 8 hours. Repeat decontamination is required only if the equipment/clothing is removed from the site, used within a different waterbody, and returned to the project site.

Vehicles and Watercraft. Each applicant or permittee shall decontaminate vehicles, watercraft, and other project-related equipment too large to immerse in a hot water bath by pressure washing with hot water a minimum of 140°F at the point of contact or 155°F at the nozzle. Additionally, Permittee shall flush watercraft engines and all areas that could contain standing water (e.g., live wells, bilges, etc.) for a minimum of 10 minutes. Following the hot water wash, vehicles, watercraft, and other large equipment shall be dried as thoroughly as possible.

– **Notification of Invasive Species.** Each applicant or permittee shall notify CDFW immediately if an invasive species not previously documented within the vicinity (i.e., the oil and gas field where the activity is located, or within a 3-mile radius if the activity is outside any oil and gas field) is discovered by submitting a completed Suspect Invasive Species Report (available online at: http://www.dfg.ca.gov/invasives/inv_reporting/sightingReport.html) and photos to the Invasive Species Program by email at: invasives@wildlife.ca.gov. Notification may also be provided by calling (866) 440 9530. Upon receiving notification, CDFW shall provide guidance for further action as appropriate to the species.

Invasive Aquatic Species. Additional information regarding aquatic invasive species and how to prevent their spread in California water bodies can be

found on the CDFW Invasive Species Program website: http://www.dfg.ca.gov/Invasives/.

Dreissenid Mussels. Each applicant or permittee operating within a pond, lake or reservoir shall implement Fish and Game Code Section 2302 by: (1) assessing the vulnerability of the reservoir for the introduction of nonnative dreissenid mussels (Dreissenid spp.) and (2) developing and implementing a program designed to prevent the introduction of nonnative dreissenid mussel species into the pond, lake or reservoir.

Invasive Plants. Each applicant or permittee shall prepare and implement an Invasive Species Management Plan focused on controlling or eradicating invasive plants and preventing the introduction of new nonnative and invasive plants into within the work areas. The Plan shall include a list of plant species targeted for control or eradication, a description of the methods that shall be used for control or eradication, a list of BMPs to prevent the introduction and spread of invasive plant species into and out of the project site, and a rapid response plan in the event that a new plant species invades the project site. The Plan shall be implemented for the duration of the authorized activities. The Plan shall be submitted no later than 60 days prior to the commencement of well stimulation activities to DOGGR for review approval in consultation with CDFW.

Invasive Plant Control and Eradication. Each applicant or permittee shall implement control and eradication activities prior to the initiation of ground-disturbing activities. Specific control and eradication methods shall be selected for the target species, avoid the spread and proliferation of other invasive plant species, and minimize damage or removal of native plant species. All nonnative and invasive plants controlled or eradicated shall be removed and disposed of in a manner that prevents the introduction and establishment of those species to new areas.

Protection of Native Plants. Native plants within the vicinity of invasive plants scheduled for control or eradication shall be flagged or otherwise marked for avoidance.

Hand Tools. Hand tools shall be used to the greatest extent possible when removing invasive plants to avoid damage to native plant species.

No Introduction of Invasive Plants. Applicants and permittees shall not knowingly plant, seed, or otherwise introduce any plants listed in the California Invasive Plant Council's Invasive Plant Inventory: http://www.cal-ipc.org/ip/inventory/index.php.

– **Fuel Modification Zones.** Each applicant or permittee shall utilize only local, native plant materials with low flammability in any fuel modification zones.

MM BIOT-1c **Replace or Offset Loss of Sensitive Habitat.** In unusual circumstances, the effects of well stimulation treatment activities on native vegetation, special-status species habitat, or agricultural lands that support special-status species may be so severe as to amount to the equivalent of a permanent loss of such resources. In such unusual circumstances, where the account of land involved is substantial, DOGGR shall require the applicant to implement the following measures to offset or compensate for those impacts. In some cases, participation in an existing NCCP or HCP may serve to replace or offset sensitive habitat. For well stimulation activities that may be covered by an NCCP or HCP, the applicant may coordinate with DOGGR or another CEQA lead agency, and the NCCP or HCP administrator, to identify project-specific impacts covered by the NCCP or HCP and supporting CDFW and USFWS authorizations. DOGGR or another CEQA lead agency may determine that NCCP/HCP participation would substantially replace or offset habitat loss in conformance with this mitigation measure.

- **On-site Restoration.** If sensitive vegetation or habitat that may support special-status plants or animals would be removed or degraded for temporary project impacts, the applicant shall prepare and implement an Ecological Restoration Plan. The Ecological Restoration Plan shall have a goal of achieving restoration of any temporary habitat loss within five (5) years of initial disturbance. The Plan shall be subject to review and approval by DOGGR after consultation with CDFW. The Ecological Restoration Plan's goal shall be to replace habitat values that are damaged or degraded by the project. The plan shall include: (a) soil or substrate preparation measures, such as recontouring, decompacting, or imprinting; (b) provisions for soil or substrate salvage and storage; (c) plant material collection and acquisition guidelines, including guidelines for salvaging, storing, and handling seed, cuttings, or rooted plants from the project site, as well as obtaining materials from commercial nurseries or collecting from outside the project area; (d) time of year that the planting or seeding shall occur and the methodology of the planting; (e) an irrigation plan or alternate measures to ensure adequate water; (f) quantitative success criteria, to reflect yearly progress and final completion; (g) a detailed monitoring program to evaluate conformance with the success criteria; and (h) contingency measures to remediate the restoration site if success criteria are not met. The success criteria shall be based on existing (pre-disturbance) habitat conditions such as native vegetation cover, vertical habitat structure, and species diversity, with the intent of replacing long-term fish or wildlife habitat values to the greatest extent feasible using available restoration techniques. Success criteria shall specify that restored habitat must not be dependent on active management (e.g., irrigation or weed control) upon final completion. If the restoration does not achieve success criteria after five years and contingency measures are unsuccessful, the impact shall be deemed permanent and compensation shall be required, as detailed below.

- **Compensation.** If sensitive vegetation or habitat that may support special-status species would be removed or degraded for long-term or permanent project impacts (i.e., impacts lasting more than five [5] years), the applicant shall provide for long-term habitat replacement by acquiring and protecting compensation land that shall provide habitat value for those species that is equivalent or greater than habitat removed or degraded for the project. Compensation may include off-site habitat restoration or other habitat improvements as needed, to replace habitat components affected by the project. In addition, the applicant shall provide funding for long-term conservation management of the compensation land. The applicant shall prepare a Compensation Plan, identifying the proposed compensation lands, proposed habitat improvements and long-term management, and specific legal mechanism for long-term preservation (e.g., holder of conservation easement or fee title). The Compensation Plan shall include a proposed timeline for completion of implementation. The Compensation Plan shall be subject to review and approval by DOGGR after consultation with CDFW. The Compensation Plan and funding mechanism for its implementation must be approved before well stimulation treatment or associated work begins. After approval, the Compensation Plan must be implemented in full. In cases where a federally or state-listed threatened or endangered species may be affected, the Compensation Plan shall conform to applicable conditions under any CESA or federal ESA Incidental Take Permit, Biological Opinion, or other consultation documents. Where a mitigation bank, habitat conservation plan or similar conservation instrument is applicable, then participation in that plan may constitute compliance with this habitat compensation requirement, on approval by DOGGR after consultation with CDFW. In cases where compensation lands have the necessary characteristics (e.g., species occupancy, wetlands, or other criteria) to mitigate project impacts to two or more species or resources, application of off-site compensation may be "layered" or "nested" to mitigate multiple resource impacts.

MM GW-1a Use Alternative Water Sources to the Extent Feasible.

MM GW-1b Minimize Groundwater Impacts.

MM HAZ-1a Ensure that Spill Contingency Plan Provides Adequate Protection Against Leaks or Discharges of Dangerous Fluids and Other Potentially Dangerous Materials.

MM AQ-2c Reduce Emissions from Dust-Causing Activities.

MM SWR-1a Require Stormwater Pollution Prevention Plan.

MM SWR-2a Implement Erosion Control Plan.

MM SWR-3a Ensure Adequate Water Availability.

Impact BIOT-2: Cause a fish or wildlife population to drop below self-sustaining levels

MM BIOT-2a **Prevent Hazards to Fish and Wildlife.** As part of the application for a well stimulation treatment permit for activities that would occur in or within 300 feet of areas that support native vegetation, special-status species habitat, or agricultural lands that support special-status species, DOGGR shall require that the applicant submit information prepared by a qualified biologist acceptable to DOGGR regarding whether the proposed well stimulation treatment activities could cause adverse effects to fish or wildlife. The applicant shall also submit a proposed Spill Contingency Plan that identifies and evaluates best available technologies to respond to spills of hydraulic fracturing fluids and potential spills of these fluids mixed with crude oil on land, surface water, and groundwater. The Spill Contingency Plan shall be written in part with the goal of reducing potential impacts to wildlife, including wildlife that might gain access to the site of the proposed well stimulation treatment. The proposed Spill Contingency Plan shall include current contact information for CDFW, and shall require that the applicant or operator immediately notify both DOGGR and CDFW of any unauthorized release of potentially hazardous materials exceeding the thresholds specified in the plan or as required by law. Prior to approving the proposed Spill Contingency Plan, DOGGR shall consult with CDFW to gain the latter agency's input regarding whether the document is sufficiently protective of wildlife.

In approving a well stimulation treatment permit for activities that would occur in or within 300 feet of areas that support native vegetation, special status species habitat, or agricultural lands that support special-status species, DOGGR shall impose conditions requiring the applicant to mitigate potential fish or wildlife disturbance or hazards as follows:

Fish and Wildlife Disturbance. Noise disturbance shall be minimized or mitigated in areas within 300 feet of native vegetation, special-status species and habitat, or agricultural lands that support protected birds or special-status wildlife (based on field survey results). For project activities (e.g., high-pressure pumping of hydraulic fracturing fluids) causing sound levels at the project site boundary to exceed the greater of either (1) 70 decibels Leq, or (2) eight (8) decibels Leq above existing ambient sound and where a qualified biologist acceptable to DOGGR has identified a potential for noise impacts to sensitive wildlife or habitat, noise control measures will be employed to mitigate noise levels to the extent feasible. These measure may include, but would not be limited to:

- Temporary noise barriers or sound walls;
- Noise pads or dampers, or moveable task noise barriers;
- Replace or update noisy equipment, enhanced engine mufflers;
- Queue trucks to distribute idling noise;
- Locate vehicle access points away from the affected habitat area;

- Reduce the number of loud activities that occur simultaneously; and
- Place loud stationary equipment in acoustically engineered enclosures or relocate them away from the affected habitat area.

The well stimulation treatment permit conditions shall also require the following:

- The applicant shall specify and enforce vehicle speed limits on access roads within the project vicinity (not applicable to public roads).
- The applicant shall prohibit all project personnel from bringing pets or other domestic animals onto the project site.
- The applicant shall mark the project site boundaries as approved by the Lead Agency with clearly visible flagging or other materials. No project-related pedestrian or vehicle traffic shall be permitted outside the marked site boundaries.
- Night lighting, when in use, shall be designed, installed, and maintained to prevent side casting of light towards surrounding fish or wildlife habitat. Night lighting shall be directed downward, as feasible.
- The applicant shall prevent wildlife subsidies or attractants (mainly food and water) by minimizing watering for dust control, maintaining all tanks and pipes to prevent leaks, prohibiting littering by personnel, performing daily site clean-up, and providing self-closing waste containers and removing trash contents regularly to prevent overflow.

Wildlife Exclusion Fencing. Where a qualified terrestrial biologist acceptable to DOGGR has identified a potential for terrestrial wildlife to access the project site, and potential resulting undue hazard to wildlife, the applicant shall consult with CDFW minimize wildlife access as appropriate to the specific site. It may be necessary to install temporary or permanent fencing around the project site to prevent fish or wildlife exposure to hazards such as toxic materials or vehicle strikes. Specific fence design shall be dependent on the site location and wildlife species to be excluded. Chain link fencing installed flush to the ground may be suitable for many species; finer mesh in the lower portions of the fence may be necessary to exclude small mammals and reptiles (including hatchling desert tortoises). Temporary plastic sheet or mesh fencing may also be suitable in some situations. The biological monitor shall inspect the fence (if installed) weekly and shall inform the applicant and Lead Agency of any needed repairs.

Water. The applicant shall prevent wildlife (including birds) from accessing project-related potable and non-potable water sources, including, but not limited to, hydraulic fracturing fluids (before and after mixing), wastewater, and produced water. Prevention methods may include storing all water within closed tanks, covering open storage tanks with 2 centimeter netting, or other means as applicable. The biological monitor or a project site worker trained by the biological monitor shall check water sources on the site daily, and report to the Lead Agency

on applicant compliance and any wildlife observations, including mortality or injury.

Wildlife Entrapment. The applicant shall ensure that all potential wildlife pitfalls (trenches, bores, temporary detention basins, and other excavations) have been backfilled or covered at the end of each workday. If backfilling or covering is not feasible, these potential pitfalls shall be sloped at a 3:1 ratio at the ends as wildlife escape ramps. The biological monitor shall inspect all potential pitfalls no fewer than three times daily throughout and at the end of each workday. Should wildlife become trapped, the biological monitor shall remove it (if feasible and safe to do so) or immediately contact CDFW. Any wildlife encountered shall be allowed to leave the area unharmed.

All pipes or other construction materials or supplies shall be covered or capped in storage or laydown areas. No pipes or tubing shall be left open temporarily or permanently, except during use or installation. Any construction pipe, culvert, or other hollow materials shall be inspected for wildlife before it is moved, buried, or capped.

Bird Collisions and Electrocutions. Project facilities and infrastructure, such as overhead electrical distribution lines, could cause collision or electrocution hazards to birds or bats. This potential impact shall be mitigated by designing and constructing all project-related electrical infrastructure according to APLIC guidelines (APLIC, 2006).

Wildlife Injury or Mortality. The applicant shall ensure that any injured or dead wildlife located along access roads that are (1) used for the well stimulation treatment and related activities and (2) located within well fields where they are not accessible to the general public, shall be reported to the biological monitor, and in turn, reported to CDFW as soon as possible. The biological monitor shall implement CDFW guidance on disposal, storage, or curation.

Toxic Materials. The applicant and operator shall comply with all applicable well stimulation treatment regulations regarding storage and handling of well stimulation treatment fluid, additives, and produced water. Under SB 4, California Code of Regulations Section 1786 (DOGGR's final regulations for well stimulation treatments as of December 30, 2014) would require the owner/operator's Spill Contingency Plan account for well stimulation fluids. In the event of a spill, the owner/operator would implement the Spill Contingency Plan and notify appropriate response entities for the location and the type of fluids involved. The applicant shall implement the final Spill Contingency Plan as approved by DOGGR after consultation with CDFW.

The Spill Contingency Plan will identify reportable quantities of each material covered in the Plan. In the event of any unauthorized release of potentially hazardous materials exceeding the thresholds specified in the plan or as required by law, the applicant and operator shall notify the CDFW Office of Spill Prevention

and Response (OSPR) and notify California Office of Emergency Services State Warning Center at (800) 852-7550. The Spill Contingency Plan shall also identify approved local wildlife rehabilitators that may need to be contracted with and activated in the event wildlife become oiled and need to be collected and rehabilitated. Any project-related toxic materials shall be stored in closed containers. Soil bonding and weighting agents used on unpaved surfaces shall be nontoxic to fish, wildlife, and plants. All vehicles and equipment shall be maintained in proper working condition to minimize the potential for leaks. Fueling and servicing of vehicles and equipment shall take place only at a designated area approved in writing by the Lead Agency.

Species-specific Protection Measures. If special-status fish or wildlife are located during the field surveys, or if well stimulation activities are proposed within the habitat and geographic range of special-status species, DOGGR shall determine whether the proposed activities may cause a hazard to that species and shall design and implement appropriate mitigation measures after consultation with the appropriate resource agencies to avoid or mitigate the hazard. DOGGR shall not approve a well stimulation treatment permit authorizing well stimulation treatment activities in an area where special status fish or wildlife are located without including permit conditions requiring such measures, which may include, but would not be limited to, the following: Species-specific worker training requirements; work activity or biological monitoring; seasonal or daily limitations on activities (e.g., specific requirements for breeding seasons or for nocturnal species); noise, lighting, or other limitations; habitat avoidance measures (e.g., avoidance of traffic in stream crossings); and reporting.

MM BIOT-2b **California Condor Protection Measures.** For each well stimulation treatment project in the geographic range of the California condor, where California condors may be present or may be affected by project work, DOGGR shall require as a condition of approval for well stimulation permits the following mitigation for potential impacts to California condor.

- **Worker Training.** The worker training program (see Mitigation Measure BIOT-1b) for any well stimulation activity in areas where California condor may be present or may be affected project work, shall include instruction on the following conditions applicable to California condor protection. Informational signs regarding compliance with condor protection measures will be posted in break areas in conspicuous locations in the work areas.
- **Avoidance of California Condors.** A designated biological monitor (see Mitigation Measure BIOT-1b) shall be responsible for monitoring work activities and condor activity in and around each work site, throughout the period of work activities. The monitor's qualifications shall be subject to DOGGR review to ensure qualification to detect and monitor California condors. Should a condor approach or land within or near an active work site, all activities within 500 feet

of the condor shall be halted and all workers shall either leave the area or go inside vehicles or structures. Work and other activities shall not proceed within 500 feet until the bird has left the area on its own. If the bird fails to leave the site, the biological monitor shall contact the USFWS and CDFW for direction. The biological monitor may attempt to haze the condor only if specifically authorized in advance by USFWS and CDFW. Exceptions for work activities that cannot be halted (e.g., concrete pours) may be authorized by the biological monitor and reported to the CDFW and USFWS in periodic monitoring reports (below).

- **Microtrash.** All trash and microtrash including food-related items (such as wrappers, cans, bottle caps, food scraps) and other project related trash or debris, including scrap hardware, supply packages, wire, nuts, bolts, and any other small objects which could be ingested by condors, shall be picked up daily and removed from the work site or stored on the site in closed animal-proof containers. No littering or deliberate feeding of wildlife is authorized. Worker training (see Mitigation Measure BIOT-1b) shall include training on microtrash prevention and clean-up and the designated biological monitor shall be responsible for daily inspections at active work sites to ensure no microtrash is left where it may be available to condors or other wildlife.
- **Supplies and Equipment.** All tools, wires, hoses, cords, hardware, fasteners, rags, and other supplies or equipment shall be kept within closed containers or within vehicles except when in immediate use. If a condor approaches a work site, all such materials shall be covered or stored out of access to the bird. Hoses and cords in use shall be covered within trenches, or covered by heavy mats or other coverings to prevent accessibility to California condors. All liquids including but not limited to drilling mud, hydraulic fracturing fluid, fuels, lubricants, and coolants, shall be kept within covered containers. No open tanks or other open storage shall be permitted. Any spilled liquids shall be cleaned up immediately and attended by on-site staff to prevent wildlife access until clean-up is complete. The operator shall inspect all vehicles and equipment using ethylene glycol coolant daily, log any leaks or overflow for each vehicle, and document resolution to the problem. To the extent feasible, ethylene glycol shall not be used as a coolant, and any equipment leaking coolant or other fluid shall be removed immediately from the work area and fully repaired before returning to the site.
- **Facility Design.** All pumping and related equipment to be left in operation long-term shall be designed to prevent or minimize condor access to moving parts or to any parts or materials (e.g., hoses, plastic lines) that may be susceptible to damage by condors. All electrical service lines shall be designed and maintained to prevent condor electrocution (i.e., energized and grounded conductors and hardware shall be located far enough apart from one another to prevent contact by a condor, or insulated with materials that cannot be removed by a condor).

- **Reporting.** All California condor sightings in the project area shall be logged in field notes and compiled into quarterly reports to the USFWS and CDFW. These regular report compilations will support to wildlife agencies in the ongoing management and recovery of the California condor, and support the project operator in planning and managing site activities to avoid or minimize condor interactions. Each sighting record shall indicate the date, time, and location of the observation (from sighting until the bird leaves the area); the bird's activity; any approach or landing at oil and gas work areas (including drill sites, operating or abandoned well sites, roads, administrative facilities, or any other project-related site or facility); any interference with work activities; any effort to haze the bird; and any additional pertinent information.
- **ESA and CESA Consultation and Permitting.** Where the biological information developed in connection with the application for a well stimulation treatment permit has convinced DOGGR, after consultation with CDFW, that, despite compliance with all of the elements of Mitigation Measure BIO-2b, a proposed well stimulation treatment activity would probably result in the "take" of a California Condor in violation of the Endangered Species Act, the California Endangered Species Act, or California Fish and Game Code section 3511, DOGGR shall deny the proposed permit until such time, if ever, as the applicant can demonstrate the ability to commit an incidental take of a California Condor under applicable provisions of federal and/or State law.

MM BIOT-2c **Nelson's Bighorn Sheep Protection Measures.** For each well stimulation treatment project in the geographic range of Nelson's bighorn sheep, where Nelson's bighorn sheep may be present or may be affected by project work, DOGGR shall require as a condition of approval for well stimulation permits the following mitigation for potential impacts to Nelson's bighorn sheep.

- **Worker Training.** The worker training program for any well stimulation activity in the geographic range of Nelson's bighorn sheep (see Mitigation Measure BIOT-1b) shall include instruction on the following conditions applicable to Nelson's bighorn sheep protection.
- **Avoidance of Nelson's Bighorn Sheep.** A designated biological monitor (see Mitigation Measure BIOT-1b) shall be responsible for monitoring work activities and bighorn sheep activity in and around each work site, throughout the period of work activities. The monitor's qualifications shall be subject to DOGGR review to ensure qualification to detect and monitor bighorn sheep and other large mammals. Daily work activities shall not begin if bighorn sheep are present on the site until bighorn sheep move from the area. Should a bighorn sheep approach or enter an active work site, all activities within 500 feet of the animal shall be halted and all workers shall either leave the area or go inside vehicles or structures. Project personnel shall not harass, handle or remove wildlife. Work and other activities shall not proceed within 500 feet until the animal has

left the area on its own. If it fails to leave the site, the biological monitor shall contact the CDFW for direction. Exceptions for work activities that cannot be halted (e.g., concrete pours) may be authorized by the biological monitor and reported to the CDFW in periodic monitoring reports (below).

- **Disease Prevention.** To prevent transmission of domestic livestock diseases to wild Nelson's bighorn sheep, all workers who may have contact with domesticated sheep and goats (e.g., domestic animals encountered occasionally or routinely at home, farms, fairs, barnyards, or elsewhere) must decontaminate work boots prior to entering work areas by scrubbing the soles with a 10 percent bleach solution to remove all soil and kill pathogens. Alternately, footwear may be changed so that potentially contaminated footwear does not enter the construction area.
- **Reporting.** All Nelson's bighorn sheep sightings in the project area shall be logged in field notes and compiled into quarterly reports to the USFWS and CDFW. Each sighting record shall indicate the date, time, and location of the observation (from sighting until the animal leaves the area); the animal's activity; any approach entry into oil and gas work areas (including drill sites, operating or abandoned well sites, roads, administrative facilities, or any other project-related site or facility); any interference with work activities; and any additional pertinent information. If a Nelson's bighorn sheep is observed injured, or if a lamb is been observed separated from a ewe, at any time CDFW's South Coast Region office must be contacted immediately, and any guidance offered shall be followed.

MM BIOT-1b Minimize Impacts to Native Vegetation and Habitat.

MM BIOT-1c Replace or Offset Loss of Sensitive Habitat.

MM BIOT-4b Minimize Impacts to Protected Birds.

MM BIOT-3a Minimize and Mitigate Impacts to Special-status Fish and Wildlife.

MM BIOT-7a Prevent or Mitigate Habitat Fragmentation and Impacts to Fish and Wildlife Movement.

MM GW-4a Demonstrate that Wells within the ADSA Have Effective Cement Well Seals and Monitor Wells during Well Stimulation.

MM GW-4b Install a Well Seal Across Protected Groundwater for New Wells Subject to Well Stimulation Treatments.

MM HAZ-1a Ensure that Spill Contingency Plan Provides Adequate Protection Against Leaks or Discharges of Dangerous Fluids and Other Potentially Dangerous Materials.

MM SWR-1a Require Stormwater Pollution Prevention Plan.

MM SWR-2a Implement Erosion Control Plan.

Impact BIOT-3: Substantially reduce the number or restrict the range of an endangered, rare, or threatened species

MM BIOT-3a Minimize and Mitigate Impacts to Special-status Fish and Wildlife. As part of the application for a well stimulation treatment permit, DOGGR shall require that the applicant submit information regarding whether the proposed well stimulation treatment activities would be located within the range and habitat of one or more special-status fish or wildlife species; evaluations of occurrence likelihood for these species; and specific plans to avoid or mitigate impacts of the well stimulation activities. Such information shall include the following:

General Fish and Wildlife Survey. A qualified biologist acceptable to DOGGR shall review available literature and survey the site to evaluate habitat suitability and occurrence likelihood for local and regional special-status fish and wildlife, including listed threatened or endangered species. The literature review shall summarize data from the California Natural Diversity Database (CNDDB) and the USFWS quadrangle species lists. The field methods and survey report shall reflect best professional practices according to industry standards. In reviewing this information in draft form, DOGGR shall consult with CDFW and the city, county, or other agency with land use authority over the affected site.

Burrowing Owl. On any proposed well stimulation site where burrowing owl may occur, the applicant shall contract with a qualified biologist acceptable to DOGGR to evaluate occupancy and habitat suitability for burrowing owls, regardless of the season, according to survey guidelines recommended by CDFW (CDFG, 2012b). If burrowing owls are present on or near the site, DOGGR shall require the applicant to implement measures to exclude burrowing owls from the project area, or protect them in place throughout project implementation by designating a buffer area where project activities shall be avoided, following CDFW (2012b) guidelines, methods, and standards or a more current revision, if available.

Protocol Survey. Field surveys are only necessary where DOGGR determines, after considering the information submitted by the applicant and consulting with CDFW, that there is a substantial likelihood that listed threatened or endangered, or State candidate fish or wildlife could be present at, or in areas close to, the location of the proposed well stimulation treatment, and could be adversely affected by well stimulation treatment activities. Alternatively, in order to save the time and costs associated with surveys, the applicant may stipulate to allow DOGGR or the other lead agency to assume the presence of the listed species in question, and to require the applicant to mitigate accordingly.

For any required field survey, the qualified biologist shall use established resource agency-accepted protocols for each listed species that may be affected. If resource

agencies (e.g., CDFW, USFWS, or NMFS) have not adopted protocol survey guidelines for a given species, then DOGGR or another agency acting as the CEQA lead agency shall develop site-specific or project-specific field survey protocols (or field survey methodologies) in consultation with resources agencies and consulting biologists. The qualified biologist shall provide DOGGR and any other agency acting as CEQA lead agency with all survey results, along with a list of all wildlife species observed during fieldwork and an evaluation of occurrence likelihood for any special-status fish or wildlife species (not limited to the listed species).

Project-specific Mitigation. If special-status fish or wildlife are determined to be present based on literature surveys, located during the field surveys, otherwise determined to have a moderate to high probability of occurrence, or assumed to be present in order to save the applicant the time and costs of conducting surveys, DOGGR shall determine whether anticipated project impacts may reach a level of significance (see criteria outlined in Impact BIOT-3) and shall design and implement appropriate mitigation measures after consultation with the appropriate resource agencies. DOGGR shall not approve a well stimulation treatment permit authorizing well stimulation treatment activities in an area where special status fish or wildlife are located without including permit conditions requiring mitigation measures, which may include, but would not be limited to, the following:

- **Avoidance.** The applicant's proposed design shall be altered to avoid or minimize impacts to special-status fish and wildlife and their habitat, and provide a minimum 100-foot buffer area surrounding the habitat, where no well stimulation or related activities shall take place.

Off-site Compensation. In unusual circumstances, the effects of well stimulation treatment activities on the habitat of special-status fish and wildlife species may be so severe as to amount to the equivalent of a permanent loss of habitat. In such unusual circumstances, where the amount of land involved is substantial, the applicant shall provide compensation lands to protect off-site special-status fish and wildlife occurrence(s). Compensation lands would protect acreage, habitat suitability, and overall numbers of each special-status animal at no less than a 1:1 ratio or levels comparable to the activity's impacts. Compensation lands would be funded, protected, and managed as described in Mitigation Measure BIOT-1c. In cases where compensation lands have the necessary characteristics (e.g., species occupancy, wetlands, or other criteria) to mitigate project impacts to two or more species or resources, application of off-site compensation may be "layered" or "nested" to mitigate multiple resource impacts.

In some cases, participation in an existing NCCP or HCP may serve as suitable project-specific mitigation. For well stimulation treatment activities that may be covered by an NCCP or HCP, the applicant may coordinate with DOGGR or another CEQA lead agency, and the NCCP or HCP administrator, to identify project-specific

impacts covered by the NCCP or HCP and supporting CDFW and USFWS authorizations. DOGGR or another CEQA lead agency may determine that NCCP/HCP participation would substantially mitigate the impact in conformance with this mitigation measure.

ESA and CESA Compliance. Where the biological information developed in connection with the application for a well stimulation treatment permit has convinced DOGGR, after consultation with CDFW, that, despite compliance with all of the elements of all applicable mitigation measures, a proposed well stimulation treatment activity would probably result in the "take" of an individual member of a species listed as endangered or threatened in violation of the Endangered Species Act, the California Endangered Species Act, or California Fish and Game Code Sections 3511, 4700, 5050, or 5515, DOGGR shall deny the proposed permit until such time, if ever, as the applicant can demonstrate the ability to commit an incidental take of such a species under applicable provisions of federal and/or State law. The applicant shall implement all terms or conditions of any required permit or authorization.

MM BIOT-3b **Minimize and Mitigate Impacts to Special-status Plants.** As part of the application for a well stimulation treatment permit, DOGGR shall require that the applicant submit information regarding whether the proposed well stimulation treatment activities would be located within the range and habitat of one or more special-status plant species, evaluations of occurrence likelihood for these species, and specific plans to avoid or mitigate impacts of the well stimulation activities. Such information shall include the following:

Conduct Special-status Plant Survey. DOGGR shall require, as part of the application for a well stimulation treatment permit, that the applicant submit information regarding whether the proposed well stimulation treatment activities (1) could affect native vegetation and habitat (based on the vegetation map described in Mitigation Measure BIOT-1a), or (2) be located within the geographic range of one or more special-status plant species ("target species"). Such information shall be prepared by a qualified biologist acceptable to DOGGR, and shall include literature review and, in some circumstances, field surveys. The literature review shall summarize data from the California Natural Diversity Database (CNDDB) and the USFWS quadrangle species lists. Field surveys are only necessary where DOGGR determines, after considering the information submitted by the applicant and consulting with CDFW, that there is a substantial likelihood that special status plants could be present at the location of the proposed well stimulation treatment, and could be adversely affected by well stimulation treatment activities. Alternatively, in order to save the time and costs associated with field surveys, the applicant may stipulate to allow DOGGR and any other agency acting as CEQA lead agency to assume the presence of the special status plant species in question, and to require the applicant to mitigate accordingly.

Any required field survey shall cover all areas to be affected by the proposed well stimulation treatment area and surrounding 300-foot buffer area to determine presence or absence of special-status plants, and to identify any additional area where direct or indirect effects to soils or vegetation could affect special-status plants (if present).

The field surveys and reporting shall conform to current CDFW botanical field survey protocol (CDFG, 2009b), or more recent updates if available. Field surveys shall be con-ducted at the appropriate time of year to locate target species and the reports shall describe any conditions that may have prevented target species from being located or identified, even if they are present as dormant seed or below-ground rootstock (e.g., poor rainfall, recent grazing, or wildfire). When conducting field surveys at the appropriate time of year could lead to undue delays in the issuance of the well stimulation treatment permit, DOGGR may assume the presence of the target species. In determining whether to accept the submitted information, including the field surveys, as adequate, DOGGR shall consult with CDFW and USFWS. In some cases, follow-up surveys may be necessary to adequately evaluate impacts.

Implement Project-Specific Mitigation for Special-status Plants. If special-status plants are determined to be present based on literature surveys, located during any field surveys required as part of a complete application for a well stimulation treatment permit, otherwise determined to have a moderate to high probability of occurrence, or assumed to be present in order to save the applicant the time and costs of conducting surveys, DOGGR shall, in consultation with CDFW, the USFWS, or both, determine whether the impacts would be significant (see criteria outlined in Impact BIOT-3), and design and implement appropriate mitigation measures. DOGGR shall not approve a well stimulation treatment permit authorizing well stimulation treatment activities in an area where special status plants are located without including permit conditions requiring such measures, which may include, but would not be limited to, the following:

- **Avoidance.** Well stimulation treatment activities shall avoid or minimize impacts to special-status plants and provide a minimum 100-foot buffer area surrounding each avoided occurrence, where no such activities shall take place.
- **Off-site Compensation.** In unusual circumstances, the effects of well stimulation treatment activities on the habitat of special-status plant may be so severe as to amount to the equivalent of a permanent loss of habitat. In such unusual circumstances, where the amount of land involved is substantial, the applicant shall provide compensation lands to protect off-site special-status plant occurrence(s). Compensation lands would protect acreage, habitat suitability, and overall numbers of each special-status plant at no less than a 1:1 ratio or levels comparable to the project's impacts. Compensation lands would be funded, protected, and managed as described in Mitigation Measure BIOT-1c. In cases where compensation lands have the necessary characteristics (e.g.,

species occupancy, wetlands, or other criteria) to mitigate project impacts to two or more species or resources, application of off-site compensation may be "layered" or "nested" to mitigate multiple resource impacts.

- **Salvage.** For most special-status species, it is not known whether salvage is a feasible mitigation strategy. DOGGR shall therefore consult with both CDFW and a qualified conservation and horticulture institute (such as Rancho Santa Ana Botanic Garden in Claremont, California) to design a Salvage and Relocation Plan, the implementation of which must be required by a condition of the well stimulation treatment permit. The Plan shall include, at minimum: (a) collection/salvage measures for plants or seed banks, to retain intact soil conditions and maximize success likelihood; (b) details regarding storage of plants or seed banks; (c) location of the proposed recipient site, and detailed site preparation and plant introduction technique; (d) details for topsoil storage, as applicable; (e) time of year that the salvage and replanting or seeding shall occur and the methodology for replanting; (f) a description of the irrigation method(s), if used; (g) success criteria; and (h) a detailed monitoring program, commensurate with the Plan's goals.
- **Horticultural propagation and off-site introduction.** If DOGGR determines that salvage and relocation are not feasible for special-status plants, then the applicant shall develop and implement an appropriate experimental propagation and relocation strategy acceptable to DOGGR, based on the life history of the species affected. The Plan shall include, at minimum: (a) collection/salvage measures for plant materials or seed banks, to retain intact soil conditions and maximize success likelihood; (b) details regarding storage of plant, plant materials, or seed banks; (c) location of the proposed propagation facility, and proposed methods; (d); time of year that the salvage and other practices shall occur; (e) success criteria; and (f) a detailed monitoring program, commensurate with the Plan's goals.

In some cases, participation in an existing NCCP or HCP may serve mitigate this impact. For well stimulation treatment activities that may be covered by an NCCP or HCP, the applicant may coordinate with DOGGR or another CEQA lead agency, and the NCCP or HCP administrator, to identify project-specific impacts covered by the NCCP or HCP and supporting CDFW and USFWS authorizations. DOGGR or another CEQA lead agency may determine that NCCP/HCP participation would substantially conform to this mitigation measure.

ESA and CESA Compliance. Where proposed well stimulation treatment activities would cause a "take" of threatened, endangered, or rare plant species under the Endangered Species Act, the California Endangered Species Act, or the California Native Plant Protection Act, the applicant may proceed with ground-disturbing well stimulation treatment activities only after obtaining applicable take authorization, or written agency confirmation that no authorization is required.

The applicant shall implement all terms or conditions of each permit or authorization.

MM BIOT-1b Minimize Impacts to Native Vegetation and Habitat.

MM BIOT-1c Replace or Offset Loss of Sensitive Habitat.

MM BIOT-2a Prevent Hazards to Fish and Wildlife.

MM BIOT-4b Minimize Impacts to Protected Birds.

MM BIOT-7a Prevent or Mitigate Habitat Fragmentation and Impacts to Fish and Wildlife Movement.

MM AQ-2c Reduce Emissions from Dust-Causing Activities.

MM SWR-1a Require Stormwater Pollution Prevention Plan.

Impact BIOT-4: Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS

MM BIOT-4a Minimize and Mitigate Impacts to All Species Identified as a Candidate, Sensitive, or Special-status Species in Local or Regional Plans, Policies, or Regulations, or by CDFW or USFWS. In approving a well stimulation permit, DOGGR shall require the applicant to extend the literature reviews, field surveys, evaluation of impacts, and imposition of mitigation requirements for endangered, rare, or threatened fish, wildlife, and plants required under Mitigation Measures BIOT-3a and BIOT-3b to include all species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS.

In some cases, participation in an existing NCCP or HCP may serve to minimize and mitigate impacts to special-status species. For well stimulation treatment activities that may be covered by an NCCP or HCP, the applicant may coordinate with DOGGR or another CEQA lead agency, and the NCCP or HCP administrator, to identify project-specific impacts covered by the NCCP or HCP and supporting CDFW and USFWS authorizations. DOGGR or another CEQA lead agency may determine that NCCP/HCP participation would substantially conform with this mitigation measure.

MM BIOT-4b Minimize Impacts to Protected Birds. This measure applies to all birds protected under the Migratory Bird Treaty Act and California Fish and Game Code. In approving a well stimulation treatment permit, DOGGR shall impose conditions of approval requiring the following:

Nesting Birds. Clearing of vegetation, site preparation in open areas, or other future well stimulation treatment activities that may adversely affect breeding birds shall be scheduled outside the peak nesting season (generally February 1 through August 31, but variable according to region) wherever feasible. The applicant, DOGGR, or other agency acting as CEQA lead agency shall contact local CDFW staff to determine applicable peak avian breeding season within the project vicinity. In addition, the applicant, DOGGR, or other agency acting as lead agency shall identify any existing local regulations or standards that may suitably minimize impacts to protected birds (including nests). Note that many bird species nest in low grasslands or on open ground; thus, the absence of native forests, woodlands, or shrublands does not indicate an absence of nesting birds. Where DOGGR after consultation with CDFW determines that project scheduling cannot feasibly accommodate avoidance of vegetation clearing, site preparation, disturbance, noise, lighting, or other project-related effects during the peak breeding season, and that existing regulations or standards provide insufficient protection, then the applicant shall prepare and implement a Nesting Bird Management Plan (NBMP) acceptable to DOGGR. The plan shall specify that a qualified biologist, experienced with conducting breeding bird surveys and acceptable to DOGGR, shall survey for active bird nests at work sites and surrounding 300-foot buffer area prior to work in the area. If an active nest is identified, the qualified biologist shall recommend the establishment and demarcation of a buffer zone, which may be several hundred feet wide, often 300 to 500 feet, depending on the species and local conditions (e.g., ambient levels of human activity, screening vegetation between the work site and the nest, or other factors) so that breeding activities are not interrupted. The buffer zone must be acceptable to DOGGR, and shall remain in place until the young have fledged or the nest is no longer active, as determined by DOGGR after consultation with the qualified biologist.

A qualified biological monitor acceptable to DOGGR shall monitor bird activities at each nest during the time period in which well stimulation treatment activities are occurring, and shall report to DOGGR on the fate of each nest throughout these activities. In addition, in the event that the nests of any special-status bird species (including CDFW-designated Species of Special Concern, fully protected species, or listed threatened or endangered species) could be adversely affected, DOGGR shall consult with a qualified avian biologist or CDFW to develop any additional recommended measures as needed to prevent take. DOGGR shall consider such proposed measures and shall approve them with or without modifications, based on DOGGR's informed discretion.

MM BIOT-1b Minimize Impacts to Native Vegetation and Habitat.

MM BIOT-1c Replace or Offset Loss of Sensitive Habitat.

MM BIOT-2a Prevent Hazards to Fish and Wildlife.

MM BIOT-3a Minimize and Mitigate Impacts to Special-status Fish and Wildlife.

MM BIOT-3b Minimize and Mitigate Impacts to Special-status Plants.

MM BIOT-7a Prevent or Mitigate Habitat Fragmentation and Impacts to Fish and Wildlife Movement.

Impact BIOT-5: Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFW or USFWS

MM BIOT-1a Evaluate Impacts to Native Vegetation and Fish and Wildlife Habitat.

MM BIOT-1b Minimize Impacts to Native Vegetation and Habitat.

MM BIOT-1c Replace or Offset Loss of Sensitive Habitat.

MM AQ-2c Reduce Emissions from Dust-Causing Activities.

MM GW-4a Demonstrate that Wells within the ADSA Have Effective Cement Well Seals and Monitor Wells during Well Stimulation.

MM GW-4b Install a Well Seal Across Protected Groundwater for New Wells Subject to Well Stimulation Treatments.

MM SWR-1a Require Stormwater Pollution Prevention Plan.

MM SWR-1b Surface Water Protection.

MM SWR-2a Implement Erosion Control Plan.

MM SWR-3a Ensure Adequate Water Availability.

Impact BIOT-6: Have a substantial adverse effect on federally protected wetlands as defined by Section 404, of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means

MM BIOT-6a Protect Jurisdictional Waters. As part of the application for a well stimulation treatment permit, DOGGR shall require that the applicant submit information regarding whether the proposed well stimulation treatment activities would occur where jurisdictional waters may be present. DOGGR shall not approve a well stimulation treatment permit for activities that could adversely affect jurisdictional waters absent permit conditions imposing the following requirements. This mitigation measure is not limited to wetlands or mapped "blueline" streams, but encompasses all State or federal jurisdictional waters, generally including intermittent channels or washes.

To protect aquatic species (e.g., southern California steelhead, arroyo chub, and California red-legged frog) measures shall be incorporated into each single-project authorization to avoid impacts to streams, ponds, seeps, and seasonally or perennially_wetted areas. A minimum 150-foot buffer shall be established surrounding these areas. Drill pads shall include secondary containment areas for any potential spills. In downslope areas that flow towards a stream, pond, seep, or wetted area, there shall be a containment system to capture spills prior to entering the stream, pond, seep, or wetted area. An emergency action plan and protocol shall be developed, equipment shall be maintained on site and in good condition, and on site personnel shall be trained to prevent and contain spills or runoff materials.

Jurisdictional Delineation. For each well stimulation treatment project where grading or site preparation could alter or fill channels, based on the project-specific limits of all project-related disturbance to soils or vegetation as shown on the Grading And Site Preparation Plan (see Mitigation Measure BIOT-1a), the applicant shall prepare a Jurisdictional Delineation Report, documenting the methods and results of a site-specific delineation of State or federally jurisdictional waters. The Jurisdictional Delineation Report must be acceptable to DOGGR and must include maps and acreages of all jurisdictional areas that would be directly or indirectly affected by the proposed well stimulation treatment activities, including downstream areas where surface hydrology or sediment transport may be altered. Alternatively, the applicant shall affirm that no potentially jurisdictional waters shall be altered or filled.

No Net Wetlands Loss and Water Course Impacts Minimization. For any well stimulation treatment project that would result in a direct or indirect reduction of wetland acreage or wetland habitat values, DOGGR shall require the applicant to develop and implement mitigation that assures no net loss of wetland acreage or habitat value. Mitigation shall be designed on a case-by-case basis, and may include re-siting of proposed well stimulation activity areas, on-site measures to prevent adverse impacts to jurisdictional waters or wetlands, and off-site restoration or compensation, to offset impacts of the proposed activities. If restoration or compensation are implemented as a part of this mitigation measure, the requirements of such restoration or compensation shall be as described in Mitigation Measure BIOT-1c. All wetlands and watercourses, whether intermittent or perennial, shall be retained to the extent feasible, and appropriate site-specific setbacks or other means shall be proposed by the applicant for review and approval by DOGGR after consulting with CDFW, and employed to prevent adverse impacts to surface waters or associated habitat values.

Clean Water Act and California Fish and Game Code Permit Compliance. The applicant shall proceed with any alteration or fill activities in potentially jurisdictional waters only after obtaining all applicable permits or authorizations from agencies other than DOGGR, or written agency confirmation that no permit or authorization is required. The applicant shall implement all terms or conditions of

each permit or authorization. Regardless of any conditions specified in permits or authorizations, the applicant shall prevent contaminants or pollutants from entering any State or federally jurisdictional waters, in accordance with Mitigation Measures SWR-1a and SWR-1c (surface water quality).

MM BIOT-1a Evaluate Impacts to Native Vegetation and Fish and Wildlife Habitat.

MM BIOT-1b Minimize Impacts to Native Vegetation and Habitat.

MM BIOT-1c Replace or Offset Loss of Sensitive Habitat.

MM BIOT-2a Prevent Hazards to Fish and Wildlife.

MM BIOT-3a Minimize and Mitigate Impacts to Special-status Fish and Wildlife.

MM BIOT-6a Protect Jurisdictional Waters.

MM GW-1a Use Alternative Water Sources to the Extent Feasible.

MM GW-1b Minimize Groundwater Impacts.

MM GW-4a Demonstrate that Wells within the ADSA Have Effective Cement Well Seals and Monitor Wells during Well Stimulation.

MM GW-4b Install a Well Seal Across Protected Groundwater for New Wells Subject to Well Stimulation Treatments.

MM SWR-1a Require Stormwater Pollution Prevention Plan.

MM SWR-1b Surface Water Protection.

MM SWR-2a Implement Erosion Control Plan.

MM SWR-3a Ensure Adequate Water Availability.

Impact BIOT-7: Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites

MM BIOT-7a Prevent or Mitigate Habitat Fragmentation and Impacts to Fish and Wildlife Movement. For each well stimulation application that would require grading, fencing, or site preparation work or would occur in or within 300 feet of areas that support native vegetation, special-status species habitat, or agricultural lands that support special-status wildlife (see Mitigation Measure BIOT-1a), the following site-specific evaluation and mitigation strategy shall apply:

Fish and Wildlife Movement and Biological Connectivity Evaluation. As part of the application for a well stimulation treatment permit, DOGGR shall require that the applicant submit information from a qualified biologist acceptable to DOGGR

that evaluates local and regional fish and wildlife movement and biological connectivity. The evaluation shall include the following components:

- A review of all applicable local and regional conservation plans to identify designated wildlife movement or habitat linkage areas, and a determination whether the project site is within any such designated area;
- A description of vegetation and habitat within and surrounding the proposed limits of grading, fencing, or site preparation, in terms of accessibility to terrestrial wildlife, including large mammals, small mammals, reptiles, and amphibians;
- A description of expected project-related habitat effects and potential fish or wildlife movement barriers (e.g., permanent fencing, culverts, or other stream crossings); and
- A project-specific conclusion whether the project would interfere substantially with the movement of any native resident or migratory fish or wildlife species or with any established native resident or migratory wildlife corridors.
- Before accepting the evaluation, DOGGR shall consult with CDFW.

Impact Minimization. In approving a well stimulation treatment permit for proposed well stimulation treatment activities that may substantially interfere with fish or wildlife movement or cause habitat fragmentation, DOGGR shall impose a condition requiring the applicant to modify the project footprint design to minimize these effects (e.g., by revising the site plan to relocate disturbance areas, siting project facilities outside of habitat linkages or movement corridors, redesigning stream crossings, implementing seasonal road closures, or creating wildlife crossings). Specific minimization measures shall be developed by DOGGR after consultation with CDFW.

Barrier Removal. In approving a well stimulation treatment permit for proposed well stimulation treatment activities that may substantially interfere with fish or wildlife movement or cause habitat fragmentation, even with minimization measures (above), DOGGR shall impose a condition requiring the applicant to further mitigate this impact by removing or modifying an existing barrier to fish or wildlife movement. Examples of potential barrier removal projects include (1) reconstruction or removal of culverts or dams that may interfere with fish movement, or (2) construction or enhancement of crossing sites at linear barriers (e.g., roadways, rail lines, or aqueducts) to improve bio-logical connectivity. Specific barrier removal measures shall be developed by DOGGR after consultation with CDFW.

Restoration or Compensation. In approving a well stimulation treatment permit for proposed well stimulation treatment activities that may substantially interfere with fish or wildlife movement or cause habitat fragmentation even with minimization measures (above), DOGGR shall impose a condition requiring the applicant to implement either on-site restoration to mitigate temporary on-site impacts to movement habitat or to the offset the impact through off-site

movement habitat restoration or compensation. On-site restoration shall be favored where feasible and more biologically protective than off-site restoration or compensation. Restoration or compensation shall be implemented according to the requirements described in Mitigation Measure BIOT-1c. Restoration or compensation shall be specifically designed to mitigate fish or wildlife movement and habitat fragmentation impacts; these requirements may be in addition to other biological resource impacts requiring restoration or compensation. Restoration or compensation plans shall include wildlife movement among the overall goals, and shall include specific components and objectives for wildlife movement (among other applicable resource objectives). For example, a Compensation Plan would include specific location of compensation lands with an analysis of their contribution to regional or local wildlife movement. The Plan shall be subject to review and approval by the Lead Agency, in coordination with CDFW; see Mitigation Measure BIOT-1c.

In some cases, participation in an existing NCCP or HCP may serve to mitigate habitat fragmentation and wildlife movement impacts. For well stimulation treatment activities that may be covered by an NCCP or HCP, the applicant may coordinate with DOGGR or another agency acting as CEQA lead agency, and the NCCP or HCP administrator, to identify project-specific impacts covered by the NCCP or HCP and supporting CDFW and USFWS authorizations. DOGGR or another CEQA lead agency may determine that NCCP/HCP participation would substantially conform with this mitigation measure.

Impact BIOT-8: Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance

MM BIOT-8a **Coordinate with Local Agencies and Jurisdictions Regarding Local Policies and Conservation Plans.** As part of the application for a well stimulation treatment permit, DOGGR shall require that the applicant submit information prepared by a qualified biologist or planner, experienced in the local policies and ordinances and acceptable to DOGGR, regarding whether the project site is subject to local conservation policies or ordinances. If the project location, including any off-site project components and any off-site surface waters or groundwater discharges (springs, seeps, or wells), is subject to such local conservation policies or ordinances, DOGGR shall consult with the local agencies to identify any potential conflict with local policies or ordinances. As part of this consultation, DOGGR shall seek input with respect to potential design features, conservation measures, or other mitigation strategies to avoid potential conflict and achieve substantial conformance with the local policies or ordinances. In approving a well stimulation treatment permit for well stimulation treatment activities on a site that is subject to local conservation policies or ordinances, DOGGR shall impose conditions requiring the applicant to incorporate design features, conservation measures, or

mitigation into the project proposal or authorization to conform to applicable policies or ordinances.

In some cases, the applicant or Lead Agency may obtain status as a "participating special entity" contributing to plan implementation, under which subsequent project activities could be approved as "covered activities." In some cases, the applicant or Lead Agency may obtain status as a "participating special entity" contributing to plan implementation, under which subsequent project activities could be approved as "covered activities" once an NCCP or HCP is approved.

Impact BIOT-9: Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan

MM BIOT-9a **Coordinate with CDFW, USFWS, and Permittees Regarding NCCPs, HCPs, and Other Conservation Plans.** As part of the application for a well stimulation treatment permit, DOGGR shall require that the applicant contact CDFW or USFWS to determine whether the project site is within planning areas for any NCCPs, HCPs, or similar conservation plans that have been adopted or are in preparation and submit that information to the lead agency. If the project location, including any off-site project components and any off-site surface waters or groundwater discharges (springs, seeps, or wells), is within the planning area for any adopted NCCP, HCP, or similar conservation plan, DOGGR shall consult with the plan permittee(s), CDFW, and USFWS to identify any potential conflict with the plan's goals, objectives, or conservation measures. As part of this consultation, DOGGR shall seek input with respect to potential design features, conservation measures, or other mitigation strategies to avoid potential conflict and achieve substantial conformance with the objectives of the NCCP, HCP, or similar conservation plan. DOGGR shall also inquire whether the applicant for the well stimulation treatment permit could obtain status as a permittee (e.g., a "participating special entity" or similar designation).

If the proposed well stimulation activity, including any off-site components and any off-site surface waters or groundwater discharges (springs, seeps, or wells), is within the planning area for any NCCP, HCP, or similar conservation plan still in preparation, the project applicant and DOGGR shall confer with the plan applicant(s), CDFW, and USFWS to identify any potential conflict with the plan's goals, objectives, or conservation measures. DOGGR's environmental review of the application shall specify any such plans that are in preparation. The Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report for the proposed activities shall describe and analyze any potential conflicts with the conservation plan.

Impact BIOT-10: Contribute to global climate change and consequent impacts to biodiversity

MM AQ-2a Reduce Hydrocarbon Emissions from Well Stimulation Treatments.

MM AQ-2b Reduce Emissions from Portable Equipment and Mobile Sources.

MM GHG-1a Prevent Methane Emissions from Associated Gas and Casinghead Gas.

MM GHG-1b Reduce Emissions by Implementing Clean Development Mechanism (CDM) Strategies

MM GHG-2a Require Applicant to Enter into Mitigation Programs or Agreements for GHG Emissions not Covered by or Exempt from ARB's Cap and Trade Program.

Coastal Processes and Marine Water Quality

Impact CPMWQ-1: Change marine water chemical composition with respect to known hazardous substances; or the measured water temperature, salinity, conductivity, or turbidity

MM CPMWQ-1a **Protect Marine Water Quality.** Prior to approving a well stimulation treatment permit that would involve activities in ocean waters, DOGGR shall consult with staff of the California Coastal Commission or its locally designated permitting agency and staff of the State Lands Commission, as applicable, in order to establish a strategy for the protection of marine water quality that may be warranted in addition to implementation of the permanent regulations for well stimulation that are adopted by DOGGR. If a need is identified, DOGGR shall require the applicant to mitigate impacts to ensure that there is no significant alteration of marine water quality. DOGGR shall not approve the well stimulation treatment permit if it has determined, based on substantial evidence, that the proposed well stimulation will have significant adverse effects on marine water quality, and the applicant declines to implement feasible mitigation for such significant adverse effects.

As part of the above-described consultation and review, DOGGR shall require the applicant to prepare a proposed Discharge Prevention plan and a Spill Contingency plan that offers more than one alternative for cleanup and mitigation of discharges, depending on their location (onshore and offshore) and specific chemicals used at the project. DOGGR shall review the draft plan and direct the applicant to make any changes needed to make the final plan satisfactory to DOGGR. The Discharge Prevention Plan and a Spill Contingency Plan required by this measure shall be included within the Spill Contingency Plan for the affected well required by Section 1722.9 of Title 14 of the California Code of Regulations.

As a condition of permit approval, DOGGR shall require the project operator to implement the recommended cleanup in the case of a discharge noncompliant with Section 404.

Where an agency other than DOGGR (e.g., a local government or another State agency) is the CEQA Lead Agency for a proposed project including well stimulation treatment while DOGGR is acting as a Responsible Agency, DOGGR shall encourage the Lead Agency to include in the draft environmental document circulated for public review the final version, satisfactory to the Lead Agency, of the Discharge Prevention and the Spill Contingency Plans, in consultation with the California Coastal Commission or its locally designated permitting agency and staff. The agencies and drilling operators pursuing the permit should also consult with the State and local Water Quality Boards (SWRCB and RWQCB appropriate to the location). However, as the primary enforcement agencies for water quality issues, the role of the Water Quality Boards in composing the Strategy should be in an advisory and voluntary capacity rather than having the Water Quality Boards originate the Strategy and then enforce compliance. The purpose of the Plans shall be to mitigate impacts to a less than significant level upon complete implementation of the plan. DOGGR may impose conditions upon permit approval that require alteration of the project in order to achieve this mitigation.

Impact CPMWQ-2: Change the velocity or direction of ocean currents

MM CPMWQ-2a **Prepare and Implement Marine Current Plan.** DOGGR shall require a proposed Marine Current Plan as part of the application for any well stimulation treatment permit that would involve activities in ocean waters.

After receiving the proposed Marine Current Plan, DOGGR shall consult with any local agency with permit authority over the larger oil or gas project for which well stimulation is proposed, as well as with the California Coastal Commission or its locally designated permitting agency and staff of the State Lands Commission. The purpose of the consultation shall be to identify important coastal resources that depend on the existing marine current regime including, but not limited to: marine fauna migration routes; tidal circulation critical to water quality; or erosion patterns. If a need is identified, DOGGR shall require the applicant to mitigate potentially significant impacts to these resources, for example, by ensuring that there is no material alter~~n~~ation to marine currents, subject to the approval of the Coastal Commission.

Where an agency other than DOGGR (e.g., a local government or another State agency) is the CEQA Lead Agency for a proposed project including well stimulation treatment while DOGGR is acting as a Responsible Agency, DOGGR shall encourage the Lead Agency to include in the draft environmental document circulated for public review the final version, satisfactory to the Lead Agency, of a Marine Current Plan, in consultation with the California Coastal Commission or its locally designated permitting agency and staff. The agencies and drilling operators pursuing the permit should also consult with the State and local Water Quality Boards (SWRCB and RWQCB appropriate to the location). However, as the primary enforcement agencies for water quality issues, the role of the Water Quality Boards in composing the Strategy should be in an advisory and voluntary capacity rather than having the Water Quality Boards originate the Strategy and then enforce compliance. The purpose of the Plan shall be to identify important coastal resources that depend on the existing marine current regime including, but not limited to: marine fauna migration routes; recreational uses; tidal circulation critical to water quality; or erosion patterns. Impacts to these resources and other project-specific conditions of approval by DOGGR shall be addressed by design changes in the project or by mitigation projects, subject to the approval of the Coastal Commission.

Cultural Resources: All Impacts

Impact CUL 1: Affect historic-era archaeological and built-environment resources

Impact CUL-2: Affect prehistoric resources

Impact CUL-3: Disturb human remains or cultural items, including funerary objects, sacred objects, and objects of cultural patrimony

Impact CUL-4: Affect cultural landscapes

MM CUL-1a **Require Information and Evaluate Cultural Resources.** As part of the application for a well stimulation treatment permit, DOGGR shall require that the applicant submit the following historical research and historical context information prepared by qualified a cultural resources specialist, acceptable to DOGGR, whose training and background conforms to the U.S. Secretary of Interior's Professional Qualifications Standards, as published in 36 CFR, part 61: a cultural resources inventory and an evaluation of identified cultural resources. Inventory and evaluation methods shall vary according to resource type, but include:

Historical research:

- Contact California Historic Resource Information System (CHRIS) for information on previously recorded sites and surveys conducted in or near the project area. Federal land managing agencies also have similar repositories, which should also be checked.
- Conduct research at local historical societies and museums or other repositories of historical information.
- Conduct oral histories and interviews with individuals with knowledge of the resources potentially impacted by the project.
- Contact the Native American Heritage Commission (NAHC) to identify properties in the NAHC Sacred Lands File and the Native American groups requiring consultation.
- Consult, interview, and conduct ethnography and oral histories with the appropriate Native American groups to identify important cultural resources, landscapes, and traditional places.
- Identify geological and geomorphological characterizations of the project area, which can include backhoe trenching.

Historic Context: The results of the historic research shall be used to develop an appropriate historic context for the resources present in the project area. The format and content of the context shall follow the guidelines provided in *National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation (NPS, 2002)* and *The Components of a Historic Context: A National Register White Paper* (Wyatt, 2009).

Potential Additional Informational Requirements: In unusual circumstances, the effects of temporary, one-time well stimulation treatment activities on cultural resources may be so severe as to cause significant effects to such resources. Therefore, after considering the historical research and historical context information submitted by the applicant, DOGGR shall consider whether it is appropriate to require the applicant to provide, as part of a complete permit application, further, more detailed site-specific information on the subject of cultural resources. In determining whether to require the submission of such additional information, DOGGR shall also consider factors such as the level of existing disturbance at the proposed project site, the magnitude of the proposed well stimulation operation, and the intensity of related activities at the subject well site and in immediately surrounding areas, including the occurrence of multiple well stimulation treatment operations. Where DOGGR determines, after considering all such information and factors, that there is a substantial likelihood that the proposed well stimulation treatment activities could cause significant adverse effects on known or unknown unique archaeological resources, historical

resources, or human remains, DOGGR shall require additional baseline information from the applicant, as described below.

Sensitivity Model: Develop a sensitivity assessment for predicting where historical resources (CRHP-eligible cultural resources including unique archaeological resources and built environment historical resources) may be found within the project area based on information from the historical research including: known cultural resources; historical maps; geologic maps, soils maps, and hydrological information; basic patterns of prehistoric and historical settlement; and local historical information. Geological and topographic data are to be overlaid with known prehistoric archaeological sites in the project area. The historic period archaeological model is to be primarily based on historic maps and the extent of landform alterations depicted on geologic maps. Historical aerial photographs and quadrangles are to be used to assess cultural resources sensitivity for historical architectural resources.

Reconnaissance Survey: In order to identify and characterize large resources such as built environment historical resources and landscapes through a reconnaissance survey of the project area shall be conducted. For built environment resources a specialist shall notes the general distribution of buildings, structures, and neighborhoods representing different architectural styles, periods, and modes of construction. These surveys should at a minimum follow the standards outlined in *National Register Bulletin 24: Guidelines For Local Surveys – A Basis For Preservation Planning (Derry et al., 1985).*

Intensive Survey: In order to identify all of the cultural resources present, particularly archaeological resources, conduct an intensive cultural resources pedestrian survey of 100 percent of the project area. These surveys should at a minimum follow the standards outlined in *National Register Bulletin 24: Guidelines for Local Surveys – A Basis for Preservation Planning (Derry et al., 1985).* In addition, an intensive pedestrian survey shall entail a complete and intensive archaeological and built environment survey of the preliminary project area with transect spacing ranging from 10 to 15 meters (30 to 50 feet), unless the slope is greater than 30 percent in which case transects shall increase to 30 meters (98 feet). All landforms likely to contain or exhibit archaeologically or historically sensitive cultural resources shall be inspected carefully to ensure that visible, potentially important cultural resources are discovered and documented. Additionally, the surveyors shall investigate any unusual contours, soil changes, distinctive vegetation patterns, features (e.g., road cuts, ditches, and stream cuts), and other potential cultural site markers.

Underwater Survey: Inventories in underwater project areas should use a combination of the following techniques as appropriate: multibeam bathymetry and backscatter intensity data, side scan sonar, high resolution and deep penetration seismic reflection profiling, precision mapping, remote operated

vehicles, video surveys with towed cameras, and direct visualization by scuba divers.

Field Documentation: When encountered, all potentially significant cultural resources including previously recorded cultural resources, shall be documented on DPR 523 series forms; other forms shall also be prepared as appropriate (e.g., negative survey form or isolate report form). Resource recording shall at a minimum follow the California Office of Historic Preservation guidance *Instructions for Recording Historical Resource* (OHP, 1995). Systematic efforts shall be made to characterize and define the aerial extent of each cultural resource. Unless defined differently by a CEQA Lead Agency, at least two artifacts consisting of two different material types greater than 50 years of age within a 30 meters (98 feet) radius shall be deemed to constitute an archaeological site. A cultural feature unassociated with other features or artifacts within 30 meters (98 feet), or artifact scatters that are undateable, shall be considered isolated or unassociated features. Prehistoric or historical artifacts consisting of a single material type (regardless of quantity), and separated from any other artifact by 30 meters (98 feet), shall be considered to be an isolated find, and shall be recorded appropriately as such.

Previously recorded resources shall be updated on DPR 523 series forms if the site was recorded more than 10 years ago, and the character of the site has changed (e.g., ground disturbance, unrecorded artifacts or features, site boundary changes), or if the site does not have an DPR 523 series form. If a site is older than 10 years and the site recordation is considered adequate by a qualified cultural resources specialist (CRS), an DPR 523 series form shall not be updated. However, the resource shall still be reported in the cultural resources report resource summary descriptions, eligibility recommendations, and included on all maps.

Photographic Documentation: Digital photographs of each site, cultural feature, and diagnostic artifact shall be taken. Isolates shall also be photographed.

Mapping: Site locations shall be plotted on the appropriate 7.5’ USGS quadrangle using data collected with a Trimble GeoXT 2005 Series handheld Global Positioning System (GPS) unit with sub-meter accuracy. Detailed site maps shall also be prepared using this same GPS unit. When encountered, all features including isolates shall be documented with preliminary scale plan and elevation drawings.

Evaluation: For all identified resources, the cultural resources specialist shall evaluate the resources to determine if they qualify as any of the following:

- Historical resources (State CEQA Guidelines Section 15064.5[a])
- Significant historic resources under CEQA Section 21084.1
- Cultural resources eligible for local registers

MM CUL-1b **Complete Native American Coordination.** As part of the application for a well stimulation treatment permit, DOGGR shall require that the applicant submit information prepared by qualified cultural resource specialist acceptable to DOGGR demonstrating attempts, successful or otherwise, to contact both the Native American Heritage Commission (NAHC) to determine whether the affected site is among the properties in the NAHC Sacred Lands File, and any Native American groups with a demonstrated interest in potential impacts on cultural resources in the area in which the site is location. The specialist's submission shall demonstrate attempts, successful or otherwise, to consult, interview, and conduct ethnography and oral histories with the appropriate Native American groups to identify potentially important cultural resources, landscapes, and traditional places that may be impacted by the project. The results of these discussions shall be submitted for review and approval.

MM CUL-1c **Prepare and Implement Cultural Resources Management and Treatment Plan.** As part of the application for a well stimulation treatment permit, DOGGR shall require that the applicant submit a Cultural Resources Management and Treatment Plan prepared by a cultural resources specialist, acceptable to DOGGR, for the project to the relevant CEQA Lead Agency for review and approval. DOGGR shall then require that the Cultural Resources Management and Treatment Plan shall be prepared and implemented under the direction of the cultural resources specialist and to address and incorporate CUL-1a through CUL-1j. The Cultural Resources Management and Treatment Plan shall be prepared at the sole expense of the well owner/operator, and shall meet all CEQA Lead Agency regulatory requirements. The plan shall be tailored to the specific needs of the project area and the particular resources present there. Based on the needs of the well owner/operator the Cultural Resources Management and Treatment Plan can incorporate multiple related, more specific plans including but not limited to: an archaeological resources discovery plan, a human remains discovery plan, a monitoring plan, a built environment treatment plan, and an archaeological resource treatment plan.

The proposed Cultural Resources Management and Treatment Plan must minimally address the following:

- The duties of the cultural resources specialist shall be fully discussed, including oversight/management duties with respect to resource evaluation, data collection, monitoring, and reporting of all known CRHR-eligible cultural resources and any resources inadvertently discovered during project activities;
- A general research design shall be developed that:
  - Charts a timeline of all research activities.

  - Recapitulates any existing paleoenvironmental, prehistoric, ethnohistoric, ethnographic, and historic contexts to create a comprehensive historic context for the project vicinity.
  - Poses research questions and testable hypotheses specifically applicable to the resource types known for the project vicinity.
  - Clearly articulates why it is in the public interest to address the research questions that it poses.

- Artifact collection, retention/disposal, and curation policies shall be discussed, as related to the research questions formulated in the research design. These policies shall apply to cultural resources materials and documentation resulting from evaluation and data recovery of CRHR-eligible cultural resources and any resources inadvertently discovered during ground disturbing activities
- The implementation sequence and the estimated time frames needed to accomplish all project-related tasks during the ground-disturbance and post-ground–disturbance analysis phases of the project shall be specified.
- Person(s) expected to perform each of the tasks, their responsibilities, and the reporting relationships between project construction management and the mitigation and monitoring team shall be identified.
- The manner in which Native American observers or monitors shall be included, the procedures to be used to select them, and their roles and responsibilities shall be described.
- All impact-avoidance measures (such as flagging or fencing) to prohibit or otherwise restrict access to sensitive resource areas that are to be avoided during ground disturbance, construction, and/or operation shall be described. Any areas where these measures are to be implemented shall be identified. The description shall address how these measures would be implemented prior to the start of ground disturbance and how long they would be needed to protect the resources from project-related impacts.
- The commitment to record on Department of Parks and Recreation (DPR) 523 forms, to map, and to photograph all encountered cultural resources over 50 years of age shall be stated.
- The commitment to curate all archaeological materials retained as a result of the archaeological investigations (survey, testing, data recovery), in accordance with CEQA Lead Agency requirements and the California State Historical Resources Commission's *Guidelines for the Curation of Archaeological Collections (HRC, 1993)*, into a retrievable storage collection in a public repository or museum shall be stated.
- The commitment of the well owner/operator to pay all curation fees for artifacts recovered and for related documentation produced during cultural

resources investigations conducted for the project shall be stated. The well owner/operator shall identify a curation facility that could accept cultural resources materials resulting from cultural resources investigations.

- The contents, format, and review and approval process of all interim and final cultural resources reports shall be described and shall meet the requirements outlined in Mitigation Measure CUL-1i.

MM CUL-1d **Prepare Plan for the Inadvertent Discovery of Human Remains.** In approving a well stimulation treatment permit, DOGGR shall require as a condition of permit approval that the cultural resources specialist submit a discovery plan for human remains (CUL-1d. The plan shall include the following requirements: if human remains are discovered as part of project activities, the well owner/operator and DOGGR or other agency acting as CEQA lead agency for a larger project involving well stimulation treatment shall coordinate with the county coroner and NAHC to make the determinations and perform the management steps prescribed in HSC Section 7050.5 and PRC Section 5097.98. Compliance with State law for discoveries occurring on private or State lands requires the following steps:

- Notification of the county coroner to determine if an investigation regarding the cause of death is required.
- If the coroner determines the remains are of prehistoric Native American origin, the coroner shall notify the NAHC.
- Upon notification the NAHC shall identify the Most Likely Descendent (MLD), and provide the MLD an opportunity to reinter the remains with appropriate dignity.
- If the NAHC fails to identify the MLD or if the parties cannot reach agreement as to how to reinter the remains as described in California PRC Section 5097.98(e), the landowner shall reinter the remains at a location not subject to further disturbance.
- DOGGR shall ensure the protections prescribed in PRC Section 5097.98(e), are performed, such as the use of conservation easements and recording of the location with the relevant county.
- Additional requirements may be specified in the Cultural Resources Management and Treatment Plan (Mitigation Measure CUL-1c).

MM CUL-1e **Provide Cultural Resources Specialist with the Authority to Halt Earth Disturbing Activities.** In approving a well stimulation treatment permit after determining that there is a substantial likelihood that the proposed well stimulation treatment activities could cause significant adverse effects on known or unknown unique

archaeological resources, underground historical resources, or human remains, DOGGR shall require as a condition of permit approval that the well owner/operator submit a written document granting authority to halt project-related activities to the cultural resources specialist (as defined in CUL-1a) and cultural resources monitors in the event of a discovery or possible damage to a cultural resource. Redirection of project-related activities shall be accomplished under the direction of the project supervisor in consultation with the cultural resources specialist. The details of this agreement shall be stipulated in the Cultural Resources Management and Treatment Plan as required in Mitigation Measure CUL-1d.

MM CUL-1f **Conduct a Cultural Resources Worker Environmental Awareness Program.** In approving a well stimulation treatment permit after determining that there is a substantial likelihood that the proposed well stimulation treatment activities could cause significant adverse effects on known or unknown unique archaeological resources, underground historical resources, or human remains, DOGGR shall include a permit condition requiring that, prior to the initiation of well stimulation treatments in areas of high or undetermined cultural resource sensitivity, the applicant shall train all construction personnel in in a Worker Environmental Awareness Program (WEAP). DOGGR shall also require that, for the duration of project activities, this training be provided to all new workers within their first week of employment at the project site. The training shall be prepared by the cultural resources specialist (as defined in CUL-1a) in consultation with local Native Americans and shall incorporate the traditions and beliefs of local Native American groups into the presentation. The presentation may be conducted by any qualified cultural resources specialist and a Native American, if possible, and may be presented in the form of a video. A consulting fee or honorarium shall be negotiated with the local Native American consultants and presenter and paid to them for their participation. The training may be discontinued when project activities are completed or suspended, but must be resumed when project activities resume.

The training shall include:

1. A discussion of applicable laws and penalties under the law;
2. Samples or visuals of artifacts that might be found in the project vicinity;
3. A discussion of what such artifacts may look like when partially buried, or wholly buried and then freshly exposed;
4. A discussion of what prehistoric and historical archaeological deposits look like at the surface and when exposed during ground-disturbance, and the range of variation in the appearance of such deposits;

5. A discussion of what local Native American beliefs are, how those beliefs are related to cultural resources that may be found in the area, and the appropriate respectful behavior towards sacred places and objects;
6. Instruction that all cultural resources specialists have the authority to halt ground disturbance in the area of a discovery to an extent sufficient to ensure that the resource is protected from further impacts, as determined by the cultural resources specialist (as defined in CUL-1a);
7. Instruction that employees are to avoid areas flagged as sensitive for cultural resources;
8. Instruction that employees are to halt work on their own in the vicinity of a potential cultural resources discovery and shall contact their supervisor and the cultural resources specialist (as defined in CUL-1a), and that redirection of work would be determined by the project supervisor and the cultural resources specialist;
9. An informational brochure that identifies reporting procedures in the event of a discovery;
10. An acknowledgement form signed by each worker indicating that he or she has have received the training which shall be submitted to DOGGR or, if applicable, another agency acting as CEQA Lead Agency; and
11. A sticker that shall be placed on hard hats indicating that environmental training has been completed.

MM CUL-1g **Monitor Earth Disturbing Activities for Cultural Resources.** In approving a well stimulation treatment permit after determining that there is a substantial likelihood that the proposed well stimulation treatment activities could cause significant adverse effects on known or unknown unique archaeological resources, underground historical resources, or human remains, DOGGR shall include a permit condition requiring that well stimulation activities which may adversely impact cultural resources be monitored by a cultural resources specialist. Monitors shall assist project staff to avoid impacts to known cultural resources and shall identify, record, evaluate and determine appropriate treatment for any resources inadvertently discovered during ground-disturbance. The personnel involved in monitoring, the qualifications of those personnel, the appropriate locations for monitoring, and the monitoring intensity shall be shall be stipulated in the Cultural Resources Management and Treatment Plan (CUL-1d). However, at a minimum monitoring shall be conducted by a qualified cultural resources specialist familiar with the types of cultural resources that could be encountered within the approved project area, and under direct supervision of the cultural resources specialist (CUL-1a). All cultural resources personnel shall be approved

by DOGGR, or, if applicable, another agency acting as CEQA Lead Agency. If cultural resources are encountered inadvertently treatment shall occur per Cultural Resources Management and Treatment Plan (CUL-1d).

MM CUL-1h **Provide Native American Monitors during Earth Disturbing Activities.** In approving a well stimulation treatment permit after determining that there is a substantial likelihood that the proposed well stimulation treatment activities could cause significant adverse effects on known or unknown unique archaeological resources, underground historical resources, or human remains of possible Native American origin, DOGGR shall include a permit condition requiring that Native American monitors be present at culturally sensitive locations specified by DOGGR or, if applicable, another agency acting as CEQA Lead Agency. The Cultural Resources Management and Treatment Plan (CUL-1d) shall indicate the types of locations where Native American monitors shall be required, the number of required Native American monitors and shall specify the tribal affiliation of the required Native American monitor for each location. The well owner/operator shall retain and schedule any required Native American monitors.

MM CUL-1i **Prepare Cultural Resources Documents for the Monitoring of Earth Disturbing Activities.** In approving a well stimulation treatment permit after determining that there is a substantial likelihood that the proposed well stimulation treatment activities could cause significant adverse effects on known or unknown unique archaeological resources, underground historical resources, or human remains, DOGGR shall impose a permit condition requiring that the project cultural resources specialist document results in interim and final reports as necessary. Interim reports, usually associated with long-term monitoring projects, shall be submitted to the well owner/operator and appropriate State regulatory agency daily, weekly, monthly, and/or annually. The contents and timing of these reports shall be stipulated in the Cultural Resources Management and Treatment Plan (CUL-1d).

Final reports for archaeological resources, human remains, and some landscapes shall be written by or under the direction of an archaeologist meeting the Secretary of the Interior Professional Qualifications Standards. Final reports for built environment resources and some landscapes shall be written by or under the direction of an architectural historian meeting the Secretary of the Interior Professional Qualifications Standards. Reports shall be provided in the California Office of Historic Preservation's (OHP) *Archaeological Resource Management Reports: Recommended Contents and Format (OHP, 1990)* and local agency formats. Final documents shall report on all field activities including dates, times and locations, results, samplings, and analyses. All survey reports, Department of

Parks and Recreation (DPR) 523 forms, data recovery reports, and any additional research reports not previously submitted to the California Historical Resource Information System (CHRIS) and the State Historic Preservation Officer (SHPO) shall be included as appendices. Additional reporting requirements may be specified in the Cultural Resources Management and Treatment Plan (CUL-1d).

MM CUL-1j **Curate all Discovered Cultural Resources Associated with Earth Disturbing Activities.** In approving a well stimulation treatment permit after determining that there is a substantial likelihood that the proposed well stimulation treatment activities could cause significant adverse effects on known or unknown unique archaeological resources, underground historical resources, or human remains, DOGGR shall include a permit condition requiring that any and all archaeological materials retained as a result of the cultural resources investigations (survey, testing, data recovery) be curated in accordance the California State Historical Resources Commission's *Guidelines for the Curation of Archaeological Collections (HRC, 1993)*, into a retrievable storage collection in a public repository or museum. Fees for curation shall be provided by the well owner/operator. Although rare, identification and evaluation of non-archaeological resources may result in collection and curation of objects. The treatment of these objects shall be addressed on a case by case basis. Additional curation requirements may be specified in the Cultural Resources Management and Treatment Plan (CUL-1d).

Paleontological Resources: All Impacts

Impact: PALEO-1: Destroy or disturb surface or near-surface significant paleontological resources

MM PALEO-1a **Require Information and Evaluate Paleontological Resources.** DOGGR shall require, as part of the application for a well stimulation treatment permit, that the applicant include an initial report prepared by a qualified paleontologist acceptable to DOGGR identifying and summarizing, based on a thorough literature review and reconnaissance-level visual survey of the project site, all reasonably available known information about the likelihood that paleontological resources exist on or in areas reasonably proximate to the project site.

Potential Additional Informational Requirements: In unusual circumstances, the effects of temporary, one-time well stimulation treatment activities on paleontological resources may be so severe as to cause significant effects to such resources. Therefore, after considering the qualified paleontologist's initial report, DOGGR shall consider whether it is appropriate to require the applicant to provide, as part of a complete permit application, further, more detailed site-specific information on the subject of paleontological resources based on detailed

field surveys. In determining whether to require such detailed field surveys, DOGGR shall also consider factors such as the level of existing disturbance at the proposed project site, the magnitude of the proposed well stimulation operation, and the intensity of related activities at the subject well site and in immediately surrounding areas, including the occurrence of multiple well stimulation treatment operations. Where DOGGR determines, after considering all such information and factors, that there is a substantial likelihood that the proposed well stimulation treatment activities could cause significant adverse effects on known or unknown paleontological resources, DOGGR shall require the qualified paleontologist to completed field surveys in areas identified as having an undetermined or high paleontological resource potential. Such surveys shall be prepared to DOGGR's satisfaction. DOGGR shall further require that the applicant submit an inventory of significant paleontological resources within the affected area based on these field surveys. As part of the inventory report, the paleontological sensitivity rankings of geologic units examined in the field shall be evaluated and refined based on the results of the pedestrian surveys. Such inventory reports shall be prepared to DOGGR's satisfaction.

MM PALEO-1b **Develop Paleontological Resource Mitigation Plan.** Before approving a well stimulation treatment permit after determining that there is a substantial likelihood that the proposed well stimulation treatment activities could cause significant adverse effects on known or unknown paleontological resources, DOGGR shall require as a condition of permit approval, following completion and approval of the paleontological resources inventory, a Paleontological Resource Mitigation Plan (PRMP), which shall be prepared to DOGGR's satisfaction. The PRMP shall be prepared by a Qualified Paleontologist and shall be based on Society of Vertebrate Paleontology (SVP) (2010) Impact Mitigation Guidelines and meet all regulatory requirements.

The PRMP shall identify construction impact areas of undetermined and high sensitivity for encountering significant resources and the approximate depths at which those resources are likely to be encountered. The PRMP shall outline a coordination strategy to ensure that one or more qualified paleontological monitors shall conduct full-time monitoring of all ground disturbance in sediments determined to have a high sensitivity. Sediments of undetermined sensitivity shall be monitored on a part-time basis (as determined by the Qualified Paleontologist). Sediments with low sensitivity shall not require paleontological monitoring. The PRMP shall detail the significance criteria to be used to determine which resources shall be avoided or recovered for their data potential. The PRMP shall also detail methods of recovery; preparation and analysis of specimens; final curation of specimens at a designated, federally accredited museum repository; data analysis; and reporting. The PRMP shall specify that all paleontological work undertaken by

the oil well field proponents on public lands shall be carried out by qualified, permitted paleontologists with the appropriate current permits.

MM PALEO-1c **Retain Qualified Paleontological Resources Staff.** In approving a well stimulation treatment permit after determining that there is a substantial likelihood that the proposed well stimulation treatment activities could cause significant adverse effects on known or unknown paleontological resources, DOGGR shall include a condition requiring the applicant to engage the services of a Qualified Paleontologist and a Paleontological Resource Monitor. Per SVP (2010) Impact Mitigation Guidelines, "a Qualified Paleontologist is defined as a practicing scientist who is recognized in the paleontological community as a professional and can demonstrate familiarity and proficiency with paleontology in a stratigraphic context. A paleontological Principal Investigator shall have the equivalent of the following qualifications:

1. A graduate degree in paleontology or geology, and/or a publication record in peer reviewed journals; and demonstrated competence in field techniques, preparation, identification, curation, and reporting in the state or geologic province in which the project occurs. An advanced degree is less important than demonstrated competence and regional experience.
2. At least two full years professional experience as assistant to a project paleontologist with administration and project management experience; supported by a list of projects and referral contacts.
3. Proficiency in recognizing fossils in the field and determining their significance.
4. Expertise in local geology, stratigraphy, and biostratigraphy.
5. Experience collecting vertebrate fossils in the field."

A Paleontological Resource Monitor is defined as a person who possesses "the equivalent of the following qualifications:

1. BS or BA degree in geology or paleontology and one year experience monitoring in the State or geologic province of the specific project. An associate degree and/or demonstrated experience showing ability to recognize fossils in a biostratigraphic context and recover vertebrate fossils in the field may be substituted for a degree. An undergraduate degree in geology or paleontology is preferable, but is less important than documented experience performing paleontological monitoring, or
2. AS or AA in geology, paleontology, or biology and demonstrated two years of experience collecting and salvaging fossil materials in the State or geologic province of the specific project, or

3. Enrollment in upper division classes pursuing a degree in the fields of geology or paleontology and two years of monitoring experience in the State or geologic province of the specific project.
4. Monitors must demonstrate proficiency in recognizing various types of fossils, in collection methods, and in other paleontological field techniques."

MM PALEO-1d

Conduct a Paleontological Resources Worker Environmental Awareness Program. In approving a well stimulation treatment permit after determining that there is a substantial likelihood that the proposed well stimulation treatment activities could cause significant adverse effects on known or unknown paleontological resources, DOGGR shall include a permit condition requiring that, prior to the initiation of well stimulation treatments in areas of high or undetermined paleontological sensitivity, the applicant shall train all construction personnel in a Paleontological Resources Worker Environmental Awareness Program (WEAP) regarding the recognition of possible subsurface paleontological resources and protection of all paleontological resources during construction. Training shall inform all construction personnel of the procedures to be followed upon the discovery of paleontological materials. All personnel shall be instructed that unauthorized collection or disturbance of protected fossils shall not be allowed. Violators shall be subject to prosecution under the appropriate State and federal laws, and violations shall be grounds for removal from the project. Unauthorized collection or disturbance of fossil materials may constitute grounds for the issuance of a stop work order. The following issues shall be addressed in training or in preparation for construction:

- All construction contracts shall include clauses that require construction personnel to attend training so they are aware of the potential for inadvertently exposing subsurface paleontological resources, their responsibility to avoid and protect all such resources, and the penalties for collection, vandalism, or inadvertent destruction of paleontological resources.
- The oil well field proponents shall provide a background briefing for supervisory personnel describing the potential for exposing paleontological resources, the location of any potential areas of high sensitivity, and procedures and notifications required in the event of discoveries by project personnel or paleontological monitors. Supervisory personnel shall enforce restrictions on collection or disturbance of fossils.
- Upon discovery of paleontological resources by paleontologists or construction personnel, work in the immediate area of the find shall be diverted and the Qualified Paleontologist notified. Once the find has been inspected and a preliminary assessment made, then the Qualified Paleontologist shall notify DOGGR and any involved Lead Agency and proceed with data recovery in

accordance with the approved Mitigation Plan consistent with Mitigation Measure PALEO-1b (Develop Paleontological Resource Mitigation Plan).

MM PALEO-1e **Monitor Earth Disturbing Activities for Paleontological Resources.** Where DOGGR has determined that there is a substantial likelihood that the proposed well stimulation treatment activities could cause significant adverse effects on known or unknown paleontological resources, and DOGGR has therefore required the preparation of a paleontological sensitivity assessment and Paleontological Resource Mitigation Plan consistent with Mitigation Measure PALEO-1b (Develop Paleontological Resource Mitigation Plan), DOGGR shall require, as a permit condition for a well stimulation treatment permit, that the applicant ensure that full-time construction monitoring is conducted by the Paleontological Resource Monitor in areas determined to have high sensitivity. Sediments of undetermined sensitivity shall be monitored by a Paleontological Resource Monitor on a part-time basis (as determined by the Qualified Paleontologist). Monitoring shall entail the visual inspection of excavated or graded areas and trench sidewalls. The monitor may also screen sediments to check for the presence of microvertebrates if they are believed to be present.

In areas that were not determined to have either an undetermined level or a high sensitivity for encountering significant paleontological resources, all construction personnel shall be charged with notifying supervisors of an accidental discovery of any such resources. Upon notification, a supervisor shall ensure a Paleontological Resource Monitor conducts an immediate evaluation of the find to determine if it is a unique paleontological resource. If the resource is a unique paleontological resource, mitigation shall occur as specified in Mitigation Measure PALEO-1b. Site-disturbing activities on other parts of the site may continue while paleontological mitigation takes place.

In addition to the recovery of paleontological resources, the recovery of relevant geologic data is essential. Data recovery would include the recording of stratigraphic data as an ongoing task during monitoring in order to provide context for any eventual fossil discoveries. In paleontologically sensitive areas, or in peripheral areas that can provide context for the geology and paleontology, outcrops and cut exposures shall be examined, and observed geologic features shall be recorded in field notes. The goal of this work is to define the nature of fossil-bearing sedimentary units within the project area, determine their areal extent and depositional contacts, and record any evidence of sediment structures or deformation. Standard geologic data collected include lithologic descriptions (i.e., color, sorting, texture, structures, and grain size, and compositional percentages), stratigraphic relationships (i.e., bedding type, thickness, and contacts), stratigraphic section measurement, and geographic position (i.e., Universal Transverse Mercator [UTM] coordinates).

MM PALEO-1f **Provide Qualified Paleontological Resources Monitor with Authority to Halt Earth Disturbing Activities.** In approving a well stimulation treatment permit after determining that there is a substantial likelihood that the proposed well stimulation treatment activities could cause significant adverse effects on known or unknown paleontological resources, DOGGR shall include a condition requiring that, in the event that a paleontological resource is discovered, the Paleontological Resource Monitor shall have the authority to temporarily divert the construction equipment around the find until it is assessed for scientific significance, and collected. Diversion and adjustment of construction activities shall occur only in coordination with construction personnel, once the Construction Supervisor has determined it is safe to do so. A temporary construction exclusion zone of at least 50 feet, consisting at a minimum of lath and flagging tape, shall be erected around the discovery. The exclusion zone acts as a buffer around the discovery and is maintained for safety. The size of the buffer may be increased or decreased once the monitor adequately explores the discovery to determine its size and significance.

MM PALEO-1g **Prepare Paleontological Resources Report for the Monitoring of Earth Disturbing Activities.** In approving a well stimulation treatment permit after determining that there is a substantial likelihood that the proposed well stimulation treatment activities could cause significant adverse effects on known or unknown paleontological resources, DOGGR shall include a condition requiring that, at the conclusion of any laboratory work and museum curation of any discovered unique paleontological resources, a final report describing the results of the paleontological resource monitoring efforts associated with the project shall be prepared. The report shall include a summary of the field and laboratory methods; an overview of the project area geology and paleontology; a stratigraphic column; a description of the site and its relationship to other nearby and/or similar fossil localities; a list of taxa recovered (if any); an analysis of fossils recovered (if any) and their scientific significance; recommendations; and a list of references used. A complete set of field notes, photographs, and any newly developed geologic field maps should also be included. In addition, a map shall be appended to the report depicting areas that were monitored for paleontological resources; the map also shall delineate any project areas that shall require monitoring should any future site developments occur. A draft of the report shall be submitted to DOGGR, and the final report shall be prepared to DOGGR's satisfaction. If the monitoring efforts produced fossils, then a copy of the report shall also be submitted to the designated museum repository.

MM PALEO-1h **Curate all Discovered Paleontological Resources Associated with Earth Disturbing Activities.** In approving a well stimulation treatment permit after determining that there is a substantial likelihood that the proposed well stimulation treatment activities could cause significant adverse effects on known or unknown paleontological resources, DOGGR shall include a condition requiring that all significant fossils collected shall be prepared in a properly equipped paleontology laboratory to a point ready for curation no more than 60 days after all fieldwork is completed. Preparation shall include the careful removal of excess matrix from fossil materials and stabilizing and repairing specimens, as necessary. Following laboratory work, all fossils specimens shall be identified to the lowest taxonomic level, cataloged, analyzed, and delivered to an accredited museum repository for permanent curation and storage. The cost of curation is assessed by the repository and is the responsibility of the oil well field proponents.

Environmental Justice

Impact EJ-1: Disproportionately affect minority or low-income populations

MM EJ-1a **Track Characteristics of Affected Populations in the Vicinity of Well Stimulation Treatments.** As part of every new well stimulation application, DOGGR shall require the owner/operator to provide the following in a single letter to DOGGR:

- Number(s) of the U.S. Census Tract(s), Block Group(s), or Block(s) in which the well stimulation(s) would occur.
- From the most currently available U.S. Census dataset (including American Community Survey 5-Year Estimates) or other acceptable data source:
  - The total population of: (1) the Census Tract, Block Group, or Block, (2) the city (if an incorporated area), and (3) the County in which the well or wells are located.
  - The percentage minority population for each of these geographic areas. The minority population and percentage is to be calculated consistent with the methodology provided within the U.S. Council on Environmental Quality (CEQ) Environmental Justice Guidance (1997) or other applicable federal or California standards.
  - The low-income population percentage for each of these geographic areas. The low-income population and percentage is to be calculated using the methodology or standards cited above.

Where an agency other than DOGGR (e.g., a local government or another State agency) is the CEQA Lead Agency for a proposed project including well stimulation treatment while DOGGR is acting as a Responsible Agency, DOGGR shall encourage the Lead Agency to include the above-described information in the draft environmental document circulated for public review. Such suggestions from

DOGGR can be communicated to the Lead Agency through the following means: informal consultation on a pending Negative Declaration or Mitigated Negative Declaration; comments on a publicly circulated Negative Declaration or Mitigated Negative Declaration; comments on a Notice of Preparation; comments on a Draft or Final EIR; or comments on a draft or final document prepared by a State Lead Agency as the "functional equivalent" of a Negative Declaration, Mitigated Negative Declaration, or Draft or Final EIR pursuant to a certification granted under PRC Section 21080.5.

Geology, Soils, and Mineral Resources

Impact GEO-1: Expose people or structures to potential substantial adverse effects as a result of rupture of a known fault, seismically induced groundshaking, and/or ground failure

MM GEO-1a* **Avoid Active Faults if Necessary.** DOGGR shall require, as part of the application for a well stimulation treatment permit, that the applicant provide documentation to DOGGR and demonstrate to DOGGR's satisfaction that the location and trend of the proposed well will not be within or enter into an active earthquake fault, unless the applicant can show to DOGGR's satisfaction that established or proposed well control and well shut-in procedures will adequately address the consequences of a rupture of a known fault, seismically induced ground shaking, and/or ground failure occurring during the well stimulation process. These procedures shall be included within the Spill Contingency Plan for the affected well required by Section 1722.9 of Title 14 of the California Code of Regulations.

MM GEO-1b* **Implement an Appropriate Setback if Necessary.** In approving a well stimulation treatment permit, DOGGR shall impose a condition that prohibits the applicant from conducting well stimulation treatments within an appropriate setback of a known active fault as established by the DOC, unless the applicant can show to DOGGR's satisfaction that established or proposed well control and well shut-in procedures will adequately address the consequences of a rupture of a known fault, seismically induced ground shaking, and/or ground failure occurring during the well stimulation process. These procedures shall be included within the Spill Contingency Plan for the affected well required by Section 1722.9 of Title 14 of the California Code of Regulations.

MM GEO-1c **Implement Industry Accepted Practices.** In approving a well stimulation treatment permit, DOGGR shall impose a condition that requires the applicant to implement industry accepted practices during the well stimulation technique to monitor and apply the minimum pressure required to achieve desired reservoir

rock fracture. DOGGR requirements currently do not allow fracture pressures to exceed pressures that would result in fracturing of overlying geologic units or zones other than the target fracture zone. Prior to approval of a well stimulation permit, the applicant shall submit a plan to the satisfaction of DOGGR that specifies the monitoring to be conducted during fracturing treatments by use of applicable microseismic fracture mapping, tilt measurements, tracers, or proppant tagging as deemed applicable by DOC.

MM GEO-1d **Conduct Ground Monitoring.** In approving a well stimulation treatment permit that would authorize within an urban area (i.e., an area with a population over 50,000, as defined by the U.S. Census Bureau) the emplacement of well stimulation fluids into an oil or gas formation that has not been previously subject to well stimulation activity and/or into an oil or gas formation for which DOGGR does not yet possess adequate information about formation fracture geometries, DOGGR shall impose a permit condition requiring that the applicant conduct ground monitoring to characterize as-built fracture geometries prior to, during, and post-hydraulic fracturing. Monitoring shall also be conducted during fracturing treatments by use of applicable microseismic fracture mapping, tilt measurements, tracers, or proppant tagging as deemed applicable by DOGGR. Copies of ground monitoring records shall be provided to DOGGR for review and approval within 30 days of well stimulation treatment to DOGGR.

MM GEO-1e* **Include an Earthquake Response Plan within the Spill Contingency Plan.** In approving a well stimulation treatment permit, DOGGR shall impose a condition requiring the applicant to demonstrate to for DOGGR's satisfaction that the spill contingency plan required by Section 1722.9 of Title 14 of the California Code of Regulations adequately addresses the consequences of an earthquake occurring during the well stimulation process, for however many well stimulation treatments are proposed to occur simultaneously at any given time. The Spill Contingency Plan shall include requirements for adequate on-site personnel and equipment that may be necessary to conduct post-earthquake inspection and repair plans to evaluate any damage that has occurred. The Spill Contingency Plan shall include spill prevention, control and countermeasure plans to address the hazardous substances associated with well stimulation activities. The inspection procedures shall ensure the integrity of the mechanical systems and well integrity of wells used for stimulation or wastewater injection and idle wells that might have become conduits for escaping fluids or gases. The plan shall include procedures describing the necessary steps to be taken after service is disrupted in order to make the facilities secure, operational and safe as soon as possible.

Impact GEO-2: Result in substantial soil erosion or the loss of topsoil

MM SWR-1a Require Stormwater Pollution Prevention Plan.

MM SWR-2a Implement Erosion Control Plan.

Impact GEO-3: Be located on a geologic unit or soil that is unstable and result in on- or off-site landslide, lateral spreading, subsidence or collapse

MM GEO-3a Prepare Geotechnical Report if Necessary. As part of the application for a well stimulation treatment permit, DOGGR shall require that the applicant provide a geotechnical report or other equivalent information to demonstrate to DOGGR's satisfaction that the location of a well pad is not in an area that is unstable, or could become unstable during well stimulation activities, or result in on- or off-site landslide, lateral spreading, subsidence or collapse.

Greenhouse Gas Emissions

Impact GHG-1: Generate greenhouse gas emissions that may have a significant impact on the environment

MM GHG-1a Prevent Methane Emissions from Associated Gas and Casinghead Gas. In approving a well stimulation treatment permit, DOGGR shall require as a condition of permit approval that the applicant to implement "Gold-level" protocols established by the EPA Natural Gas STAR Program (EPA, 2014c) to recover for reuse or destroy CH_4 in associated gas and casinghead gas as follows:

- Recover for beneficial use all associated gas produced from the reservoir, regardless of well type, except for gas produced from wildcat and delineation wells or as a result of system failures and emergencies. Beneficial use does not include flaring. Recovery for beneficial use includes capture for resale or reuse of the gas as a fuel or feedstock.
- For each well with annual average emissions of casinghead gas greater than or equal to 60 grams per hour or a mass emissions equivalent of a 10,000 ppm leak of natural gas, levels targeted by the EPA Natural Gas STAR Program, capture casinghead gas for beneficial reuse or route casinghead gas to a flare if on a CO_2-equivalent basis the amount of gas for maintaining the pilot is less than the amount of vented casinghead gas.

This mitigation measure and its requirements shall cease to have effect as soon as requirements established by the Air Resources Board (ARB) or the local air district to address the same impact from well stimulation activities (e.g., Impact GHG-1: Generate greenhouse gas emissions that may have a significant impact on the environment) become effective.

MM GHG-1b **Reduce Emissions by Implementing Clean Development Mechanism (CDM) Strategies.** In approving a well stimulation treatment permit, DOGGR shall require as a condition of permit approval that the applicant implement the following emission control strategies defined by UNFCCC "Approved Methodologies" for projects in the Clean Development Mechanism (CDM) program, as follows:

- Recovery and utilization of gas from oil fields that would otherwise be flared or vented. (AM0009. Version 7.0 (11/8/2013).)
- Leak detection and repair in gas production, processing, transmission, storage and distribution systems and in refinery facilities. (AM0023. Version 4.0.0 (9/29/2011).)
- Flare (or vent) reduction and utilization of gas from oil wells as a feedstock. (AM0037. Version 2.1 (3/28/2008).)
- Recovery of gas from oil wells that would otherwise be vented or flared and its delivery to specific end-users. (AM0077. Version 1.0 (2/12/2009).)

This mitigation measure and its requirements shall cease to have effect as soon as requirements established by the Air Resources Board (ARB) or the local air district to address the same impacts from well stimulation activities (Impact GHG-1: Generate greenhouse gas emissions that may have a significant impact on the environment) become effective.

MM GHG-1c **Detect and Quantify Fugitive and Vented Methane and Carbon Dioxide.** In approving a well stimulation treatment permit, DOGGR shall impose a condition requiring that the applicant install methane and carbon dioxide sensors at existing wells and new wells within the radius of influence of a planned well stimulation in order to monitor possible leaks or venting of methane gas. Exceptions can be made where the landowners on whose property potentially affected wells occur refuse to allow the installation of the sensors. DOGGR shall collect data and study methane leaks and other vented or fugitive emission sources. To the extent feasible, DOGGR shall coordinate its research efforts with the ARB. A summary of findings shall be made available to the public by January 1, 2016. The ARB Draft Test Protocol "Detection and Quantification of Fugitive and Vented Methane, Carbon Dioxide, and Volatile Organic Compounds from Crude Oil and Natural Gas Facilities" (December 2010) may be used as a means of complying with this measure.

This mitigation measure and its requirements shall cease to have effect as soon as requirements established by the Air Resources Board (ARB) or the local air district to address the same impacts from well stimulation activities (Impact GHG-1:

Generate greenhouse gas emissions that may have a significant impact on the environment) become effective.

MM AQ-2a Reduce Hydrocarbon Emissions from Well Stimulation Treatments.

MM AQ-2b Reduce Emissions from Portable Equipment and Mobile Sources.

Impact GHG-2: Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases

MM GHG-2a Require Applicant to Enter into Mitigation Programs or Agreements for GHG Emissions not Covered by or Exempt from ARB's Cap and Trade Program. Where DOGGR determines that a proposed well stimulation treatment would result in cumulatively considerable levels of GHG emissions not covered by or exempt from ARB's Cap and Trade Program, DOGGR shall consider potentially feasible means of reducing such GHG emissions. Emissions that cannot be feasibly reduced may be offset. One potential strategy is to require the Applicant to participate in a proposed or established program (other than ARB's Cap and Trade Program) for offsetting greenhouse gas emissions operated by an air pollution control district, or air quality management district. Another strategy may be to require the Applicant to retire and surrender Registry Offset Credits that are listed on an ARB-approved Offset Project Registry. A Registry Offset Credit used for CEQA mitigation by a covered entity cannot also be used for compliance under the Cap and Trade Program. Where feasible mitigation is available to reduce GHG emissions from well stimulation treatment activities to less than significant levels, DOGGR shall impose such measures in approving well stimulation treatment permits.

MM AQ-2a Reduce Emissions from Well stimulation Treatments.

MM AQ-2b Reduce Emissions from Portable Equipment and Mobile Sources.

MM GHG-1c Detect and Quantify Fugitive and Vented Methane and Carbon Dioxide.

Hazards and Hazardous Materials

Impact HAZ-1: Release hazardous materials into the environment from a spill or leak

MM HAZ-1a* Ensure that Spill Contingency Plan Provides Adequate Protection Against Leaks or Discharges of Dangerous Fluids and Other Potentially Dangerous Materials

In approving a well stimulation treatment permit, DOGGR shall require as a condition of permit approval that the applicant demonstrate to DOGGR's satisfaction that the spill contingency plan required by Section 1722.9 of Title 14 of the California Code of Regulations is sufficient to prevent any leaks, spills or other discharges of well stimulation fluids, flowback fluids, produced water,

hazardous chemicals, contaminated surface water runoff, oil, or other potentially dangerous materials that might occur before, during, and after the well stimulation process from reaching the soil at all site pads. Potentially viable options for achieving such a result, which shall be considered on a case by case basis, may be the installation of a physical barrier between the pad and the ground or the use of plastic sheets under equipment with the potential to leak or discharge pollutants. The use of barriers or other control devices shall not interfere with safety protocols during well stimulation operations.

MM HAZ-1b **Require the Operator to Conduct an Annual Inventory of Its Well Stimulation Equipment and Report of the Aged Infrastructure and Its Likelihood of Failure Leading to Spills or Leaks to DOGGR.**

This applies to the Wilmington, Inglewood, and Sespe Oil and Gas Fields.

In approving a well stimulation treatment permit, DOGGR shall require as a condition of permit approval that the applicant conduct an annual inventory of the well stimulation equipment and supporting infrastructure and report to DOGGR. In combination with the other requirements of SB 4 and field operations, this mitigation measure will provide DOGGR with information to consider in determining the likelihood of failure of aged equipment and infrastructure. DOGGR will work with the operator to guard against failure of older infrastructure and may consider specifics such as cathodic protection, pipeline metal thickness, and other factors. This applies only to equipment and infrastructure associated with well stimulation treatments including well stimulation fluids with hazardous materials. DOGGR will determine what specific measures may need to be considered regarding the likelihood for older equipment and infrastructure failure. DOGGR will also cooperate with other agencies as needed to ensure compliance with other relevant regulations that may be outside of DOGGR authority such as the hazardous liquid pipeline safety act (California Government Code Sections 51010-51019.1).

* *Seven of the project's final mitigation measures will be converted into proposed regulations and subjected to a formal rulemaking process under the Administrative Procedure Act. When the final regulations are in place, they will appear in DOGGR's regulations in Title 14 of the California Code of Regulations. These mitigation measures include: GW-1a; GW-1b; SWR-1b; GEO-1a; GEO-1b; GEO-1e; and HAZ-1a.*

Groundwater Resources

Impact GW-1: Cause or contribute to overdraft conditions

Impact GW-2: Lower groundwater levels through pumping, resulting in significant and unreasonable land subsidence or significant and unreasonable impacts to nearby water wells or surface water

MM GW-1a* **Use Alternative Water Sources to the Extent Feasible.** Prior to issuance of a well stimulation treatment permit for stimulation proposed inside or outside of existing oil and gas fields, DOGGR shall work with the applicant to determine the quantity of water to be used, and the source and supplier(s) of the water. DOGGR shall in general consider recycled water and saline water to be the preferred water sources for well stimulation treatments, and shall require an applicant for a well stimulation permit to conduct a feasibility study to determine if recycled water or alternative water sources (including produced water, flowback water, or saline groundwater) may effectively be used for well stimulation. The feasibility study shall be incorporated into the applicant's proposed Water Management Plan, as required by CCR Title 14, Section 1783.1(a)(23)).

Based on the results of the final version of the feasibility study, prepared to DOGGR's satisfaction, the well owner/operator/service provider shall be required, through the final version of the Water Management Plan, to use recycled or saline water to the maximum extent feasible, as determined by DOGGR. The source of water for the well stimulation treatment permit, including groundwater, shall also be included in the Water Management Plan.

The primary objective of the draft study on the feasibility of using recycled water or saline water submitted with the permit application is to demonstrate all of the following: that the applicant has made good faith efforts to identify any produced water, flowback water, saline groundwater, or other source of recycled water potentially available for use in well stimulation treatment; that the proposed well stimulation treatment will use any such available source(s) to the maximum extent feasible; and that the proposed strategy would not cause adverse effects on drinking water sources, protected groundwater, or the environment. At a minimum, the draft Study must identify: (1) the amount of produced water, flowback water, saline groundwater, or other source of recycled water that the applicant has determined could be feasible to use for well stimulation; (2) whether the produced water, flowback water, saline groundwater, or other source of recycled water under consideration would likely be used for future drinking water supplies; and (3) whether any saline groundwater aquifer being considered as a source is connected to freshwater aquifers. The draft Study shall be integrated

into the proposed Water Management Plan, which is required by DOGGR's permanent regulations for well stimulation treatments under CCR Title 14, Section 1783.1(a)(23). The Study shall be finalized after review and input by DOGGR as part of the process by which DOGGR considers issuance of a well stimulation treatment permit.

In making its own determinations regarding how much recycled or saline groundwater may feasibly be used for well stimulation, and the availability of any non-recycled water intended to be used for the well stimulation, DOGGR shall consider all relevant economic, legal, social, and technological factors, consistent with the concept of "feasibility" as it occurs in CEQA, the State CEQA Guidelines, and CEQA case law. DOGGR may also consider such information as: adopted urban water management plans; an assessment of whether the intended water supply system has projected water supplies available during the intended period of use that will meet the demand associated with the well stimulation project in addition to the water system's existing and planned uses, including municipal, agricultural and manufacturing uses; written contracts or other proof of entitlement to an identified water supply; and any capital outlay program for financing the delivery of a water supply.

In the event that DOGGR receives well stimulation treatment permit applications for which recycled water, saline water, or an assured non-recycled supply as described above cannot be feasibly obtained, DOGGR shall either deny the permit or require the applicant to identify a feasible alternative means of obtaining a substitute water supply.

After the issuance of a well stimulation treatment permit and completion of well stimulation treatment, the permittee shall document and report the actual amount of recycled water or saline groundwater used and the reasons for any deviation from the conditions of approval derived from the final Study. The permittee shall integrate this information into the Post-well Stimulation Treatment Report, as required by CCR Title 14, Section 1789 et seq.

MM GW-1b **Minimize Groundwater Impacts.** If groundwater use is proposed as one of the sources of water in a well stimulation treatment application, DOGGR shall ensure that the use of such groundwater will not cause or substantially contribute to an "Undesirable result," as defined below, within any groundwater basin or subbasin. To effectuate this policy, DOGGR shall do the following. DOGGR shall require an applicant to fund an independent review that evaluates the potential for any proposed use of groundwater to cause or substantially contribute to an "Undesirable result." The review must be conducted by a Certified Hydrogeologist in the State of California. Any such evaluation shall include documentation on basin or subbasin conditions from the Department of Water Resources, from another reputable source, and/or from any "Local Agency," as defined in Water

Code Section 10721(m), that has approved a "Groundwater Sustainability Plan" pursuant to California Water Code Section 10727.

The Certified Hydrogeologist's review shall consider conditions within the potentially affected basin or subbasin, the location of proposed pumping, and the volumes to be extracted. The analysis shall also address local hydrogeological impacts, including impacts on local water levels, nearby wells, and any interconnected surface water bodies, such as a stream. The potential for inelastic land subsidence to result from lowering of water levels shall also be evaluated. Potential land subsidence impacts to be evaluated include: loss of conveyance capacity in canals, streams, or channels; diminished effectiveness of levees; damage to surface or subsurface infrastructure such as roads, buildings or pipelines; or development of earth fissures that can damage structures or shallow aquifers.

If the Certified Hydrogeologist determines, with DOGGR's concurrence, that the proposed use of groundwater from any basin or subbasin would cause or substantially contribute to an Undesirable result, DOGGR shall either prohibit the use of such groundwater use or shall require as a condition of permit approval that the applicant use recycled water, saline water, produced water, or other water sources that would not result in a net increase in groundwater extraction from any such basin or subbasin.

Similarly, DOGGR shall either deny the proposed permit or require as a condition of approval that the applicant use recycled water, saline water, produced water, or other water sources that would not result in a net increase in groundwater extraction, if the Certified Hydrogeologist's analysis demonstrates that the proposed groundwater pumping will: (1) lower water levels below screens and/or pumps in any nearby well, such that the well would be incapable of supporting existing land uses; (2) result in a significant and unreasonable increase in inelastic land subsidence due to groundwater withdrawals; or (3) result in significant and unreasonable decline in surface water flow.

DOGGR may conclude that a net increase in groundwater extraction from any "High Priority" or "Medium Priority" basin, as categorized by the Department of Water Resources pursuant to Water Code Section 10722.4, will not occur if the groundwater to be used under the proposed well stimulation treatment permit is in compliance with all applicable orders, rules, regulations, policies and allocation of groundwater extraction rights provided for in (i) any groundwater adjudication subject to the continuing jurisdiction of the Superior Court of California, or (ii) any approved "Groundwater Sustainability Plan" developed pursuant to California Water Code Section 10727 by a "Local Agency" as defined in Water Code Section 10721(m). Additionally, DOGGR may allow the use of groundwater extracted from any basin or subbasin that does not meet these criteria if the applicant can demonstrate to DOGGR's satisfaction that the use of such water will be fully offset

through delivery of an equivalent amount of surface water to affected basin or subbasin water users to be used either in lieu of groundwater or for groundwater recharge purposes.

For purposes of this mitigation measure, "Undesirable result" is defined in Water Code Section 10721(w), and means one or more of the following effects caused by groundwater conditions occurring throughout the basin:

(1) Chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply if continued over the planning and implementation horizon. Overdraft during a period of drought is not sufficient to establish a chronic lowering of groundwater levels if extractions and recharge are managed as necessary to ensure that reductions in groundwater levels or storage during a period of drought are offset by increases in groundwater levels or storage during other periods.

(2) Significant and unreasonable reduction of groundwater storage.

(3) Significant and unreasonable seawater intrusion.

(4) Significant and unreasonable degraded water quality, including the migration of contaminant plumes that impair water supplies.

(5) Inelastic land subsidence that substantially interferes with surface land uses.

(6) Depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water.

Impact GW-3: Adversely impact groundwater quality through surface spills or leaks during well stimulation

MM HAZ-1a **Ensure that Spill Contingency Plan Provides Adequate Protection Against Leaks or Discharges of Dangerous Fluids and Other Potentially Dangerous Materials.**

Impact GW-4: Migration of well stimulation fluids or formation fluids including gas to protected groundwater through non-existent or ineffective annular well seals

MM GW-4a **Demonstrate that Wells within the ADSA Have Effective Cement Well Seals and Monitor Wells during Well Stimulation Treatment.** As required in the permanent SB 4 regulations, the operator shall provide an analysis of the Axial Dimensional Stimulation Area (ADSA) (Section 1784) and provide details on all wells within a review area of twice the ADSA. Also as required by the SB 4 regulations, the operator shall design the well stimulation treatment so as to ensure that the well stimulation treatment fluids or hydrocarbons do not migrate and remain geologically and hydrologically isolated to the hydrocarbon formation (Section 1784). Nothing within this mitigation measure replaces those requirements. But

in addition, and as a condition for permit approval, DOGGR shall also require the operator to specifically monitor certain DOGGR-selected wells within the ADSA during a well stimulation treatment to demonstrate that the wells are not serving as a conduit for upward migration of formation fluids or gas, either through the annular space, well bore, or the well casing, into the protected groundwater zone. DOGGR shall select which wells within the ADSA are required for monitoring, but at a minimum, these wells will include: (1) wells that have been stimulated previously, (2) idle wells, and (3) other accessible wells if deemed necessary by DOGGR. Plugged and abandoned wells are often inaccessible due to being sealed below grade. Active wells are not included in this mitigation measure because those wells are already subject to monitoring.

Mitigation Measure GW-4a applies to wells within the ADSA *other than the well being used for well stimulation.* Pressure monitoring of the well used for stimulation is already required by the SB 4 regulations. Further, new wells used for stimulation are subject to more stringent requirements for well seals by revised Mitigation Measure GW-4b.

MM GW-4b* **Install a Well Seal across Protected Groundwater for New Wells Subject to Well Stimulation Treatments.** DOGGR shall require as a condition of permit approval that the applicant demonstrate to DOGGR's satisfaction that a well used for well stimulation treatments contains an annular 500-foot cement seal extending across the base of protected groundwater and that the integrity of the seal will prevent unintended migration of fluid. This applies to all new wells that will be subjected to well stimulation. For new shallow wells drilled in areas where protected groundwater is present, this requirement is amended to require cementing the entire casing string from the bottom of the well to the surface. DOGGR will determine the proper casing and cementing depth for the protection of protected groundwater. In no event will this requirement conflict with existing DOGGR regulations requiring casing depth limits for the adequate anchorage of blow-out prevention equipment and safe drilling operations.

DOGGR must approve the method for determining the base of protected groundwater, but will consider best management practices using available data on produced water quality and/or industry-accepted interpretation methods of geophysical (electric) logs.

Current well construction requirements found in DOGGR's regulations (see CCR Title 14, Sections 1722.2 through 1722.6) require cement placement in surface casing from the base of the casing to the surface and preferably through the freshwater zone (3,000 mg/L TDS). Furthermore, DOGGR regulations require the use of a second string of casing if the surface casing does not extend through the base of freshwater (3,000 mg/L TDS). However, the depth of subsequent casing

strings might not extend through the zone of protected groundwater. This mitigation measure (MM GW-4b) will result in a seal across the base of protected groundwater (<10,000 mg/L TDS) for all new wells subject to well stimulation treatment. Requiring a 500-foot seal across the base of protected groundwater would protect groundwater resources in deeper wells.

MM GW-4c **Install Methane Sensors on Wells Subject to Well Stimulation Treatments.** For all wells subject to well stimulation, DOGGR shall require, as a condition of approval for a well stimulation permit, that the applicant install a methane sensor to monitor potential leaks or venting of methane gas. In order to provide additional monitoring for potential migration up ineffective well seals, wells shall be equipped with a device approved by DOGGR to allow for continuous monitoring at the wellhead for methane migration up the well annular space. As part of the permit application, the applicant shall propose a monitoring program for DOGGR approval that provides details on sensor manufacturer, installation, calibration, settings/units, and measurements. Gas detectors shall be operated (1) before the test to determine variability in baseline readings, (2) for the complete duration of the test, and (3) for a specified time period after the test has been completed, as specified by DOGGR.

Impact GW-5: Migration of well stimulation fluids or formation fluids including gas into protected groundwater through damaged or improperly abandoned wells

MM GW-5a **Conduct Surface Geophysical Surveys or Apply Other Field Methods to Locate Improperly Abandoned Wells and Mitigate.** DOGGR shall require, as part of the application for a well stimulation treatment permit, that the applicant demonstrate to DOGGR's satisfaction that a record review has been conducted and, if warranted, require a surface geophysical survey or used other suitable field methods to locate any improperly abandoned wells within the ADSA of the well to be stimulated. If records exist with sufficient data to determine the condition of the well, DOGGR will require, as a condition of the stimulation permit, that the operator ensure that the well has hydrologic and geologic isolation. If conduit wells are located, the applicant shall mitigate the potential pathway in a manner approved by DOGGR. Site-specific mitigation measures shall be considered, including modifying the design of the well stimulation treatment or moving the location of a proposed treatment to another well. If pathways cannot be mitigated, DOGGR shall require modifications to the stimulation design or not approve the permit.

Impact GW-6: Improper disposal of flowback in injection wells could potentially impact groundwater quality

MM GW-6a **Require Wastewater Disposal Wells to Inject Only into Exempted Aquifers to Protect Groundwater.** In approving a well stimulation treatment permit, DOGGR shall impose a condition prohibiting the disposal of well stimulation fluids through the use of a Class II injection well that could inject such fluids into an "aquifer" or part thereof that has not been properly determined to be an "exempt aquifer" or part thereof for purposes of federal regulations under the Safe Drinking Water Act. Documentation of the existence of a proper exemption status shall be demonstrated to the satisfaction of DOGGR based on the most recent information reasonably available to DOGGR. For purposes of this mitigation measure, "aquifer" is "a geological 'formation,' group of formations, or part of a formation that is capable of yielding a significant amount of water to a well or spring," as defined in 40 CFR Section 144.3, and an "exempted aquifer" is an "aquifer" that is not treated as an "underground source of drinking water" based on criteria set forth in 40 CFR Section 144.7 and 40 CFR Section 146.4.

Impact GW-7: Inability to identify specific impacts to groundwater quality from well stimulation activities

MM GW-7a **Add a Tracer to Well Stimulation Fluids or Develop a Reasonable Method to Distinguish These Fluids in the Environment.** After consultation with the Regional Water Board with jurisdiction over injection and groundwater, DOGGR shall require, as a condition of approval for a well stimulation treatment permit, that the applicant provide for a tracer or some other reasonable method to allow well stimulation fluids to be distinguished from other fluids or chemicals. This could consist of an added tracer using an inert constituent that could be used to identify the presence of well stimulation fluids. Alternatively, it could be an intrinsic tracer, or some naturally occurring component that makes the well stimulation fluids chemically unique. Potential geochemical changes in the subsurface during injection or migration shall be considered. Use of a tracer shall be required to be disclosed to the public under Section 1788 of the permanent SB 4 regulations. The proposed regulations specifically require that the applicant require the composition and disposition of all well stimulation treatment fluids other than water, including "any radiological components or tracers injected into the well as part of the well stimulation treatment, a description of the recovery method, if any, for those components or tracers, the recovery rate, and specific disposal information for the recovered components or tracers a radiological component or tracer injected" (Section 1788 (15)).

Surface Water Resources

Impact SWR-1: Violate water quality standards or waste discharge requirements, provide substantial additional sources of polluted runoff, or otherwise substantially degrade or diminish surface water quality

MM SWR-1a **Require Stormwater Pollution Prevention Plan.** In approving a well stimulation treatment permit for proposed hydraulic fracturing or acid well stimulation treatment operations, including the construction of new wells intended for hydraulic fracturing or acid stimulation, regardless of the size of the well(s) or the amount of land surface affected, DOGGR shall require as a condition of permit approval that the applicant develop and implement stormwater pollution prevention plans consistent with the provisions of the California General Permit for Discharges of Storm Water Associated with Construction Activity for construction, installation, operation and take-down of hydraulic fracturing and acid stimulation treatment equipment. Stormwater pollution prevention plans developed for a well field or other aggregate of similar well development projects related to well stimulation may, if approved by DOGGR and at DOGGR's discretion, serve as compliance with this mitigation measure provided practical assurance is given that an individual project less than one acre is applicable to the stormwater pollution prevention plan and will comply with it.

MM SWR-1b* **Surface Water Protection.** The applicant for a well stimulation treatment permit shall submit to DOGGR maps, photographs, and other information, prepared by a qualified hydrologist acceptable to DOGGR, that describe or show any perennial, intermittent or ephemeral streams or other water bodies within 300 feet of the proposed well stimulation treatment and of any surface disturbance associated with the proposed stimulation treatment. Information provided shall include, as a minimum: (a) water body name, if applicable; (b) characteristics (stream, pond, lake, wetland); (c) whether the water body is perennial, intermittent or ephemeral; (d) normal summer and winter flow rate, if available, or estimated; (e) habitat characteristics (required in MM BIOT-1a); (f) distance and ground slope between the well pad and water body; (g) contributing watershed area; and (h) expected drainage patterns at the location of the proposed well stimulation treatment. DOGGR shall consider this information in determining whether to approve the proposed well stimulation treatment permit, and shall require that protection and minimization of potential impacts to identified surface water be addressed in the site layout design, Stormwater Pollution Prevention Plan, worker training, spill contingency and response plans, and site restoration plans.

DOGGR shall not approve applications for well stimulation where the well pad will be less than 100 feet from a perennial water body, or an intermittent or ephemeral water body, if DOGGR determines, based on the qualified hydrologist's

evaluation, that open surface water or flow is normally present at that location and season at the scheduled time for well stimulation. Normally present means day-to-day perennial or seasonal base flow or presence of surface water.

Exceptions to the 100-foot setback from surface waters may be granted at DOGGR's discretion if the applicant can demonstrate to DOGGR's satisfaction that a setback of 100 feet from these surface water resources cannot feasibly be achieved and/or is unnecessary to avoid significant effects on potentially affected water bodies (e.g., because construction of a temporary or permanent berm is an adequate substitute for a setback or that existing structures at the well site will operate as a de facto berm). The applicant shall submit a written justification for a proposed narrower setback, along with any proposed substitute mitigation intended to avoid significant effects on surface water resources. The justification shall explain why the proposed narrower setback is as wide as is feasible and/or is unnecessary under the circumstances. DOGGR shall not issue a well stimulation treatment permit for a proposal with a setback of less than 100 feet unless DOGGR independently determines, based on substantial evidence, that a 100-foot setback is infeasible or unnecessary, and that the proposed well stimulation, with or without any relevant mitigation measure(s) or condition(s) of approval, will not cause a significant effect to the potentially affected water bodies. In making its own determination regarding whether a 100-foot setback or a relevant potential lesser setback is infeasible, DOGGR shall consider, at a minimum, information relating to the contributing watershed area, local climate, past disturbance in the affected area, existing protections and controls, ground slope, relevant economic, legal, social, and technological factors, any RWQCB recommendations, habitat conditions, or any other information deemed appropriate by the applicant and accepted as such by DOGGR, consistent with the concept of "feasibility" as it occurs in CEQA, the State CEQA Guidelines, and CEQA case law.

In assessing the feasibility of, and need for, a 100-foot setback, DOGGR may, at its discretion, consider groups of permit applications, even for an area as large as an entire established oil or gas field. In doing so, DOGGR may consider maps, photographs, and other relevant information supplied by the applicant(s) or DOGGR. Such a comprehensive evaluation, if approved by DOGGR and at DOGGR's discretion, may result in compliance with this mitigation measure for more than one proposed permit, provided that practical assurance is given that all individual permits within any larger group of permits will comply with the requirements of this measure.

After the issuance of a well stimulation treatment permit and within 60 days after the cessation of a well stimulation treatment, the operator shall submit to DOGGR a map and other information depicting or describing surface water resources and the actual surface disturbance areas to document the actual setback or the extent of disturbance, if any, in surface waters. Where the surface disturbance has encroached into the minimum setback required by the condition(s) of approval,

DOGGR shall determine whether the extent and effect of the disturbance are sufficient to require the applicant to undertake some sort of environmental restitution or remediation that could achieve indirectly the practical equivalent of the level of surface water protection that the setback area in the permit condition(s) was intended to achieve. In deciding what kind of restitution or remediation, if any, is appropriate, DOGGR may consult with the State Water Resources Control Board, a Regional Water Quality Control Board, or the Department of Fish and Wildlife.

MM SWR-1c **Provide Adequate Flood Protection.** An engineer-certified statement or analysis of flood conditions at the site shall be included in all applications for new well stimulation treatment permits for new or existing wells, including permits involving any temporary or permanent storage of material in surface pits, and other ancillary infrastructure such as pipelines, access roads, and other structures created for the transportation and storage of product.

In approving a well stimulation treatment permit, DOGGR shall require as a condition of permit approval that wells, equipment, materials and wastes shall be protected from flooding and flood-related erosion during drilling and during the application of any well stimulation treatments, and that there be, as demonstrated by the statement or analysis of flood conditions, no net increase in flooding resulting from site construction. DOGGR shall also require that any new permanent infrastructure placed in the floodplain be demonstrated to conform to local floodplain development standards without causing diversions to the detriment of other property, and that flood protection measures be adequate to provide protection against the 100-year flood estimated by current methods to account for any changes that may have occurred to the climate. New wells located in areas covered by the 2012 California Central Valley Flood Protection Plan (CDWR, 2012) and targeted in the 2012 California Central Valley Flood Protection Plan for 200-year protection shall be protected against a 200-year flood. Protective measures shall be appropriate for the site and anticipated flood conditions and risk, and may include, but not necessarily limited to: drilling and well stimulation in the dry season, flood forecasting and contingency plans, elevation of well pad and containment features to above the 100-year flood level and/or outside the flood flow path, and flood proofing, such as bolting or otherwise securing, of equipment and containment features that, if flooded, could introduce pollutants to the water.

DOGGR may at its discretion, consider a single engineering study sufficient for a well field or other cohesive aggregate of wells provided that each new permit application demonstrate compliance with the overall study that has been previously approved by DOGGR.

MM SWR-1d **Protect Surface Water Reservoirs.** DOGGR shall prohibit and shall not approve well stimulation permits for hydraulic fracturing and acid well stimulation treatments for new wells outside of existing, established oil fields in watersheds above, and with clear and unimpeded flow paths to, open reservoirs used for the collection and storage of water for municipal and domestic supply.

Exceptions may be granted where, after receiving an analysis by an independent third party water quality expert paid by the applicant but under contract to DOGGR and after consulting with the reservoir operator, DOGGR determines, based on substantial evidence, that hydraulic fracturing and acid well stimulation treatments pose no discernable danger to water quality in the open reservoirs or surface waters. Evidence of no discernable danger to be taken into consideration by DOGGR in granting exceptions, at DOGGR's discretion, may include such information as: absence of a clear, unimpeded flow path between the new well or well field and the reservoir surface, the distance and ground slope between the new well or well field from the reservoir surface, hydrologic and hydraulic separation of the new well or well field from the reservoir watershed (using a runoff calculation appropriate for the local flood control jurisdiction but not less than a 100-year 24-hour precipitation event), emergency response plans, clean-up bonds, and other site-specific measures or demonstrations.

MM BIOT-2a **Prevent Hazards to Fish and Wildlife.**

Impact SWR-2: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site

MM SWR-2a **Implement Erosion Control Plan.** In approving a well stimulation treatment permit, DOGGR shall impose a condition requiring the development of an erosion and siltation plan satisfactory to DOGGR prior to the construction of any new well, access roads, pipelines, transmission lines or other infrastructure created for the purpose of hydraulic fracturing or acid well stimulation treatment. The erosion and siltation plan shall address the potential for encroachment into any adjacent floodplain, and include best and site-appropriate erosion control measures for construction and long-term operation of the well facility and associated access, pipeline and transmission infrastructure. Erosion control measures could include such items as riprap stabilization, slope breaks, sediment barriers, constructed drainage courses, waterbars, revegetation, or other measures as appropriate for the site. The erosion-control plan shall address long-term maintenance and operation of erosion-control features, and the site shall be subject to inspections during and after construction and after rainfall events, and required remedial directions by DOGGR. Inspections shall verify that no disturbed sediment from the

site reaches surface waters and that there has been no induced gully or rill formation or induced bank erosion.

Impact SWR-3: Substantially diminish surface water quantity

MM SWR-3a **Ensure Adequate Water Availability.** Prior to issuance of a well stimulation treatment permit, DOGGR shall work with the applicant to determine the quantity of water to be used, and to identify the source and specific supplier(s) of the water. DOGGR shall require the applicant to provide written assurance that the identified supplier(s) has(have) a sufficient supply to serve the applicant throughout the duration of the proposed well stimulation treatment.

In the event that DOGGR receives well stimulation treatment permit applications for which an assured supply as described above cannot be obtained, DOGGR shall either deny the permit or require the applicant to identify a feasible alternative means of obtaining a water supply, including recycled water or groundwater, that meets DOGGR standards and does not cause or substantially contribute to an "Undesirable result," as defined in Mitigation Measure GW-1a.

Impact SWR-4: Create flood hazard by substantially altering existing drainage patterns, substantially increasing the rate or amount of surface runoff, impeding or redirecting flood flows, or exposing people or structures to flooding

MM SWR-1b **Provide Adequate Flood Protection.**

Noise and Vibration

Impact NOI-1: Cause exposure of persons to or generation of excessive noise levels or a substantial increase in ambient noise levels

MM NOI-1a **Control Noise Levels near Sensitive Land Uses.** In approving a well stimulation treatment permit for well stimulation treatment activities proposed within 900 feet of a property containing a sensitive receptor, including residential, school, or hospital land uses, DOGGR shall impose a condition(s) requiring the applicant to incorporate noise control features to reduce all noise from well stimulation activities to Ldn to 70 dBA or less at the nearest residential property lines. These conditions include, but are not limited to:

- Install 16-ft high noise barriers between residential land uses and well pad,
- Place pump diesel engine drives into enclosures that provide 15 dBA reduction, and
- Install best available muffler technology on all diesel engines.

This performance standard includes cumulative noise should multiple well stimulations occur simultaneously and affect the same sensitive receptor(s).

If the above is technically infeasible, then DOGGR shall require that the applicant provide temporary lodging for the duration of well stimulation treatments.

Public Services

Impact PUB-1: Require new or physically altered governmental facilities in order to maintain acceptable service ratios, response times, or to other performance objectives for fire, police, or schools

MM PUB-1a **Assess Public Service Ratios and Ensure Adequate Compensation.** Prior to issuance of a well stimulation treatment permit for well stimulation treatment activities either inside or outside of an existing oil and gas field, DOGGR shall consult with the local land use agency to calculate and demonstrate what number of wells being stimulated simultaneously and cumulatively within a service provider boundary would cause an unacceptable service ratio to police, fire, school services, or any other utility service system owned and operated by the local agency.

In the event that DOGGR receives well stimulation treatment permit applications exceeding the thresholds defined by the local agencies and service providers, DOGGR shall further coordinate with the local land use authority to establish whether service ratios would be reduced to unacceptable levels or capacities of service systems would be exceeded such that new or expanded facilities are needed.

Whenever DOGGR determines that approval of a proposed well stimulation treatment will result in unacceptable levels or capacities of service systems and that new or expanded facilities are needed, DOGGR shall deny the permit or shall require the applicant to identify an alternative feasible means of ensuring that the proposed well stimulation treatment will not result in unacceptable levels or capacity of service systems.

MM HAZ-1a **Ensure that Spill Contingency Plan Provides Adequate Protection Against Leaks or Discharges of Dangerous Fluids and Other Potentially Dangerous Materials.**

MM TR-1a **Prepare Traffic Plan.**

Recreation

Impact REC-2: Cause disruptions in designated recreation areas

MM REC-2a **Coordinate Well Stimulation Treatment Schedule with Managing Officer(s) for Affected Recreation Areas.** As part of the application for a well stimulation treatment permit, DOGGR shall require that the applicant submit information regarding the existence of any recreational areas within 1,500 feet of the proposed well stimulation treatment activities. Where such recreation areas have been identified, the information submitted by the applicant shall further address how the applicant developed the treatment schedule in consultation with the authorized officer(s) or the agencies of all such recreational areas within 1,500 feet of well stimulation treatment activities. Through consultation efforts with the agencies that manage recreational resources which would be affected by well stimulation treatments, and subject to the discretion of the authorized officer(s) responsible for management of the affected resource(s), the applicant shall ensure the following occurs unless otherwise instructed by the affected agencies:

- Well stimulation treatment activities are scheduled to avoid heavy recreational use periods (including major holidays) to the maximum extent feasible, with the understanding that such efforts may not always be feasible;
- Staging areas for project-related equipment, materials, and vehicles are located in areas with least possible effect on recreational activities and opportunities; and
- Timetables for the required period of usage of each staging area are developed and adhered to in coordination with all affected resource agencies.

In approving a well stimulation treatment permit, DOGGR shall impose conditions of approval requiring the applicant to protect recreational resources pursuant to the strategies listed above. Such conditions shall require that the applicant to document the coordination and provide this documentation to DOGGR no less than 60 days prior to well stimulation activities.

MM REC-2b **Provide Noticing of Closures and Identify Alternative Recreation Areas.** DOGGR shall require, as part of the application for a well stimulation, that the applicant accomplish the following in coordination with the authorized recreation officer(s) or the agencies of all recreational areas located within 1,500 feet of the proposed well stimulation treatment activities:

- Identify recreational areas (i.e., trails, parks, day-use areas) that would be closed during well stimulation treatment activities; and
- To the extent feasible, identify alternative recreational areas for each resource that would be made unavailable to the public due to project construction or maintenance activities.

In approving a well stimulation treatment permit, DOGGR shall adopt a condition requiring the posting of public notice including the anticipated construction or

maintenance activity schedule, the timeframe of the closure, and identify alternative recreational areas at all recreational areas to be closed due to well stimulation treatment activities. To adequately inform the public and affected parties, the applicant shall implement multiple types of public noticing, including but not limited to, mailings, email blasts, website postings, or signage.

DOGGR shall require that the applicant document these coordination efforts to identify and provide noticing of alternative recreational areas and submit this documentation to the DOGGR no less than 60 days prior to well stimulation activities that would occur within one-half mile of recreation areas that would be affected by such activities.

Risk of Upset/Public and Worker Safety

Impact RSK-1: Create a hazard to the public or environment through crude oil transport and reasonably foreseeable accidents and releases

MM RSK-1a **Increase the Number of CPUC Rail Inspectors.** This mitigation measure is outside of DOGGR's jurisdiction and control. The CPUC is encouraged to request the State legislature to increase the number of CPUC rail inspectors. The CPUC is responsible for the enforcement of federal and state safety requirements, but has approximately 50 authorized personnel in the Railroads Operations and Safety branch. In the June 2014 report, "Oil by Rail Safety in California," the IRSWG states that this level of support is not enough to accommodate rail car, track, railroad crossings, and bridge inspections, as well as other investigations. Adding additional rail inspectors to the CPUC would assist this agency in meeting its obligations for safety enforcement. Having additional inspectors would allow the CPUC to conduct increased track inspections along crude oil routes.

MM RSK-1b **Expedite the Phase-out of Older Tank Cars.** This mitigation measure is outside of DOGGR's jurisdiction and control. PHMSA issued Safety Advisory 2014-01 to phase out older DOT-111 cars, but did not specify a specific date for when the phase out should be completed. The CPUC is encouraged to request USDOT to expedite the phase-out of older tank cars.

MM RSK-1c **Implement New Accident Prevention Technology.** This mitigation measure is outside of DOGGR's jurisdiction and control. The CPUC is encouraged to request the acceleration of implementing a new accident prevention technology. Positive Train Control (PTC) and Electronically Controlled Pneumatic Brakes (ECP) are two new accident prevention technologies that could reduce the risk of accidents. PTC incorporates GPS tracking to prevent train-to-train collisions, derailments, and unauthorized train movements. ECP applies an instant braking system to all cars,

instead of relying on manual control of pneumatic brakes. The intent of these techniques is to automatically stop the train if the engineer fails to take an appropriate action to prevent the train from violating its authority limits or speed restrictions. Simulations have shown than the difference between the average stopping distance using manual control and the EPC one can be greater than 1,700 feet.

MM RSK-1d **Monitor and Enforce New Speed Limits.** This mitigation measure is outside of DOGGR's jurisdiction and control. The CPUC is encouraged to develop a plan to monitor and enforce new speed limits for crude oil tanks traveling through urban areas. DOGGR shall request railroads to comply with the DOT comprehensive rulemaking proposal to improve the safe transportation of large quantities of flammable materials by rail, issued in July 2014.

MM RSK-1e **Monitor the Implementation of Trackside Safety Technology.** This mitigation measure is outside of DOGGR's jurisdiction and control. The CPUC is encouraged to monitor the implementation of trackside safety technology. Installation of wayside defective bearing detectors, every 40 miles along tracks with trains carrying 20 or more crude oil cars, would indicate potential defective equipment and allow for maintenance to prevent an accident.

MM RSK-1f **Improve Emergency Preparedness and Response Programs.** This mitigation measure is outside of DOGGR's jurisdiction and control. CalOES, OSPR, and CalEPA are encouraged to develop an inventory of emergency response resources and equipment for responding to the release of large amounts of crude oil along routes. All participating agencies should coordinate their programs for maximum efficiency.

Recommendations by the IRSWG in the area of emergency preparedness include the following:

- Review and Update Local, State, and Federal Emergency Response Plans
- Request improved guidance from United States Fire Administration on resources needed to respond to oil fires caused by rail incidents
- Provide additional funding for local emergency responders
- Improve emergency response capabilities
- Increase emergency response training

MM RSK-1g **Provide Real-Time Shipment Information to Emergency Responders.** This mitigation measure is outside of DOGGR's jurisdiction and control. The CPUC is encouraged to request railroads to provide real-time shipment information to emergency responders. Providing advanced information to communities on weekly shipments and routes of crude oil and well stimulation fluid products, production water and flow back fluid would benefit State, county and local agencies.

MM RSK-1h **Provide Additional Accident and Injury Data to the State.** This mitigation measure is outside of DOGGR's jurisdiction and control. The CPUC is encouraged to request railroads to provide additional accident and injury data to the State. These data can be used to conduct risk assessments and better evaluate the transport of oil by rail.

Impact RSK-2: Create a hazard to the public, workers, or environment through a reasonably foreseeable accidental release of hazardous materials due to a hose leak or connection leak while pumping well stimulation treatment fluids

MM RSK-2a **Reduce the Inventory/Volumes Handled with the Hazardous Chemicals.** Prior to approval of a well stimulation treatment permit, DOGGR shall impose a condition requiring the applicant to implement a strategy of reducing the inventory of the hazardous materials with the aim to reduce the total mass of potential accidental releases, and thus, also the consequences and effects for workers and public in the surroundings.

MM RSK-2b **Conduct a Facility Siting Study or a Quantitative Risk Assessment.** Prior to approval of a well stimulation treatment permit, DOGGR shall require the applicant to conduct a facility siting study using the accepted industry standards, including API Recommended Practice 752: Management of Hazards Associated With Location of Process Plant Buildings and API 753 Management of Hazards Associated With Location of Process Plant Portable Buildings, to select the best location of all equipment and buildings, and to ensure the proper features to confine and minimize the spill surface. If a prior Facility Siting study or Quantitative Risk Assessment has already been conducted, the operator should review the study accordingly, to reflect the new well stimulation treatment operations. This would reduce the evaporation rate of the liquid spill, and also the area affected. Use of drainage and ensuring some slope in the spill area is an effective practice to reduce the consequences and effects of the hazardous material release. These studies shall identify the need for installation of effective isolation systems. Isolation systems ensure a reduction of the leak duration, and thus, a reduction of

the total mass released. This reduces the consequences and effects of an accidental hazardous material release. If any increase in pipeline and/or vessel operating pressure and/or hydrogen sulfide concentration is proposed, the applicant shall conduct a facility siting study or quantitative risk assessment to demonstrate to satisfaction of DOGGR that such increase would not generate an incremental risk. The results of these studies, will also ensure that all the potential risks are within the tolerable limit established by the operators. In order to be able to assess the risk and to define the tolerability criteria, the operators should have a risk matrix (which depicts likelihood and consequences). Additionally, operator can refer to risk assessment standards regarding tolerability criteria (e.g. HSE UK standards).

MM RSK-2c **Ensure Mechanical Integrity Through Compliance with Permanent Regulation.** Prior to approval of a well stimulation treatment permit, DOGGR shall require the applicant to establish a mechanical integrity testing and maintenance program for all equipment used in well stimulation treatments, consistent with Section 1782 of the permanent regulation. The program shall identify the frequency of testing and inspection of process equipment, and shall provide for testing before the commencement of well stimulation activities. This mitigation measure is intended to ensure an effective management procedure is in place to ensure the safety of the operation.

Impact RSK-4: Create a hazard to the public, workers, or environment through a reasonably foreseeable accidental pressure changes during flowback activity caused by blocked pump discharge, sudden change in downhole condition, or human error

MM RSK-4a **Conduct a Process Hazard Analysis (PHA) Followed by a Layer of Protection Analysis (LOPA) to Ensure Installation of Proper Safety Interlocks.** Prior to approval of a well stimulation treatment permit, DOGGR shall require the applicant to conduct a PHA followed by a LOPA to determine if the current safeguards allow that the residual risk is as low as reasonably practicable (ALARP). DOGGR shall review the PHA and LOPA for adequacy and approve them if they are adequate. In approving a well stimulation treatment permit where the PHA shows an unacceptable level of risk, DOGGR shall impose conditions reducing such risks to acceptable levels. The results of these studies, will also ensure that all the potential risks are within the tolerable limit established by the operators. In order to be able to assess the risk and to define the tolerability criteria, the operators should have a risk matrix (which depicts likelihood and consequences).

Impact RSK-5: Generate risks to public safety by causing a flammable atmosphere in the flowback tank

MM RSK-5a **Prepare and Implement the Procedures to Avoid Pump Cavitation during all Well Stimulation Activities.** Prior to approval of a well stimulation treatment permit, DOGGR shall require the applicant to prepare proper operating procedures for all well stimulation activities. The procedures shall include the volumes, rates, and pressures of fluids used during stimulation. Additionally, the operating procedures should address the steps of each operation and the hazards related to them. The operating procedures should also include the consequence of deviation and the steps to correct in case of deviation. DOGGR shall review and approve the operating procedures. This mitigation measure is intended to avoid a pump cavitation by ensuring proper operating procedures, thus, it would minimize the frequency of cavitation.

MM RSK-5b **Verify the Need of Installation of Flame Arresters on the Tank Vents.** Prior to approval of a well stimulation treatment permit, DOGGR shall require the applicant to conduct an evaluation of the need for installation of flame arrestors on the tank vents. The National Fire Protection Association (NFPA) 30 Flammable and Combustible Liquids Code, API recommended Practice 2210 and API recommended Practice 2028 provide guidance on how to evaluate. DOGGR shall review and approve the evaluation. If a need is identified in the evaluation, DOGGR shall require the applicant to install flame arrestors on the tank vents. This mitigation measure is intended to stop fuel combustion by extinguishing the flame, which would help reduce the consequence of an ignition.

MM RSK-5c **Prepare and Implement a Control of Ignition Sources Plan.** Prior to approval of a well stimulation treatment permit, the applicant shall prepare and commit to implementing a control of ignition sources following NFPA 30. This mitigation measure is intended to avoid the presence of an ignition source in the installation to minimize the frequency of occurrence. If the operator already has a Control of Ignition Sources Plan, this should be updated accordingly to the new stimulation treatment permit, to cover any additional potential for ignition source.

Impact RSK-6: Increase risks to public safety by exposing the public to accidental hazardous materials releases from pipelines

MM RSK-6a **Increase Inspection of Mechanical Integrity.** This mitigation measure is outside of DOGGR's jurisdiction and control. Existing regulations (49 CFR 195.452 (j)(2/3)) already require that various factors (e.g., pipeline age, population, environmental sensitivity) be included in establishing the mechanical integrity assessment frequency interval. The Office of the State Fire Marshal is encouraged, under its authority to inspect operator's testing and maintenance reports (Government

Code 51015(b)), to review the mechanical integrity assessment documents required by 49 CFR Part 195.452 to ensure that the internal/external inspection frequency selected is adequate for the level of risk.

MM RSK-6b **Improve Leak Detection Capability.** This mitigation measure is outside of DOGGR's jurisdiction and control. The Office of the State Fire Marshal is encouraged to review its pipeline system data base to verify that existing pipelines have a basic SCADA-based leak detection system with computational pipeline monitoring (CPM). For high consequence areas (HCAs), including environmentally sensitive areas, the CSFM should request pipeline operators to provide documentation of how they comply with 49 CFR 195.452, *Pipeline Integrity Management in High Consequence Areas*, paragraph (3), *Leak detection*. An operator should have a means to detect leaks on its pipeline system. An operator should evaluate the capability of its leak detection means and modify, as necessary, to protect the high consequence area. An operator's evaluation should, at least, consider, the following factors: length and size of the pipeline, type of product carried, the pipeline's proximity to the high consequence area, the swiftness of leak detection, location of nearest response personnel, leak history, and risk assessment results. The CSFM should review the measures implemented and determine if the measures adequately mitigate the risk, or whether other mitigation for improving timely leak detection using Best Available Technology (BAT) such as acoustic sensor or fiber optic cable monitoring is needed.

MM RSK-6c **Reduce Mainline Valve Spacing.** This mitigation measure is outside of DOGGR's jurisdiction and control. Existing Government Code 51016 requires that "the State Fire Marshal shall study the spacing of valves which would limit spillage into standard metropolitan statistical areas and environmentally sensitive areas…" Section 51016 also grants the California State Fire Marshal authority to adopt regulations to require additional valves on existing, new or replacement pipelines as necessary to protect the public interest. The Office of State Fire Marshal is encouraged to review the requirements of this section of the Code to determine whether any further benefit can be obtained by requiring remote operation capability on some existing valves and selectively adding more remotely operated isolation valves to existing pipeline segments within HCAs. The Office of State Fire Marshal is encouraged to recommend any new legislation that might be necessary to modify existing requirements in order to make them more effective.

Impact RSK-7: Expose workers and public to hazardous levels of airborne silica during the use of proppant

MM RSK-7a **Use Alternative Proppant (e.g., Sintered Bauxite, Ceramics, Resins) or Use Alternative Proppant Delivery System.**

Use Alternative Proppant (e.g., Sintered Bauxite, Ceramics, Resins): In approving well stimulation treatment permits, DOGGR shall impose a condition of approval suggesting the use of an alternate to silica sand as a proppant. DOGGR shall encourage the selection of appropriate materials that lack any harmful properties. Before authorizing the use of other proppants, DOGGR shall require the applicant to conduct a hazard evaluation to demonstrate use of silica or an alternative proppant would not introduce new hazards.

Use Alternative Proppant Delivery System. Additionally, in approving well stimulation treatment permits, DOGGR shall impose a condition of approval requiring the use of an alternative proppant delivery system that is a closed system and results in less dust and truck traffic than traditional methods. In response to US OSHA's silica dust health alert, several oil services firms have developed innovative solutions for delivery and handling of proppant. As one example of an alternative proppant delivery system, sand is loaded into specially designed ISO containers at the sand mine and shipped by rail to depots near the oil and gas producing regions (e.g., Bakersfield). Since the containers are enclosed, the dust hazard is eliminated due to unloading sand from bulk rail cars and transferring to bulk truck trailers at the depots. Using an alternative delivery system provides additional advantages and may not require changing the type of proppant to avoid new hazards. The containers are stackable and are lifted on top of the proppant blending unit for transfer by gravity (through a sock) into the blender to reduce dust. This process should eliminate several dust producing steps including pneumatic conveying of sand from the bulk truck trailers into silos, and belt conveying from the silos to the blender.

MM RSK-7b **Reduce Emissions from Dust-Causing Activities.** In approving a well stimulation treatment permit, DOGGR shall require the applicant to prepare and comply with a dust abatement plan that addresses emissions of fugitive dust during all stages of well stimulation treatment and does not allow the particulate matter (PM10) levels to exceed 50 $\mu g/m^3$. Particulate matter consists of solid particles and liquid droplets suspended in the air. Where applicable, the operator can refer to the existing local regulations regarding air pollution to demonstrate that the PM10 levels are below the threshold of 50 $\mu g/m^3$.

Transportation and Traffic

Impact TR-1: Generate additional truck traffic and disrupt traffic operations

MM TR-1a **Prepare Traffic Plan.** Prior to issuance of a well stimulation treatment permit for a well in an area outside of existing oil and gas fields where 10 or more wells have been or are being drilled and stimulated by a single applicant within one square mile, DOGGR shall require that the applicant prepare and submit a proposed Traffic Plan for DOGGR's consideration and approval.

DOGGR shall request that the transportation department of the city or county with jurisdiction over potentially affected roadways and Caltrans (if applicable) review and give recommendations on the adequacy of the proposed Traffic Plan, and assist in identifying the number of anticipated truck trips to be generated by well stimulation, their proposed routes, and the time of day when trucks shall operate, and in evaluating whether the anticipated traffic would cause exceedance of an established LOS standard on local, state, and interstate haul routes and roadways used for project access. If the traffic associated with the proposed well stimulation treatment is found to exceed an LOS standard established by the city, county, county congestion management agency, or Caltrans for affected roads or highways, then the applicant and DOGGR shall work with the transportation department and/or Caltrans on acceptable traffic control measures, which shall be included in the Traffic Plan.

As decided by DOGGR after consultation with the city or county with jurisdiction over potentially affected roadways, the applicable congestion management agency, and/or Caltrans, the Traffic Plan shall include some or all of the following components and requirements that the applicant shall implement:

- Identify the number of anticipated truck trips to be generated by well stimulation, their proposed route, and the time of day when trucks shall operate;
- Define the locations of project access points and location;
- Evaluate baseline conditions of local, state and interstate routes used by trucks (see Mitigation Measure TR-2a);
- Identify and make provision for circumstances requiring the use of flag persons, warning signs, lights, barricades, cones, etc., to provide safe work areas in the vicinity of the project site and to warn, control, protect, and expedite vehicular and pedestrian traffic;
- Implement traffic control (flag persons, signage, barricades, cones, etc.) along all roadway segments that have substandard width (less than 18 feet);
- Include signage placed along all proposed water and proppant haul routes and alternate haul routes at appropriate intervals notifying drivers of the presence of construction traffic on those roadways;
- Address the potential for project-related traffic to impede emergency response vehicles and present a specific training and information program for project

workers and drivers to ensure awareness of emergency procedures from project-related accidents and spills, including those in the project's Spill Contingency Plan required by DOGGR's existing and ~~proposed~~ permanent regulations;

- All project-related truck drivers are informed of and required to adhere to the designated traffic haul routes, if applicable.

The measures included in the Traffic Plan shall be consistent with any applicable guidelines outlined by the local agency, Caltrans, and the U.S. Department of Transportation's Manual on Uniform Traffic Control Devices. In addition, an Encroachment Permit is required for any work in the ROW of any State or county-maintained road.

Impact TR-2: Inadvertently damage road rights-of-way

MM TR-2a **Repair Roadway Damage.** As part of the application for a well stimulation treatment permit in an area outside of existing oil and gas fields where 10 or more wells are drilled by a single applicant within one square mile, DOGGR shall require the applicant to include information intended to establish baseline road conditions. Such conditions shall be established by photographing, videotaping or otherwise documenting existing conditions of all affected rural roadways and residential streets. The evaluation of the structural condition of the existing pavement shall be performed by a soils engineer. After receiving this information regarding baseline road conditions, DOGGR shall consult with the city or county with jurisdiction over potentially affected roadways and Caltrans (if applicable) before determining whether the information is sufficient. DOGGR shall not issue a well stimulation treatment permit in the absence of sufficient information regarding baseline road conditions.

In approving a well stimulation treatment permit, DOGGR shall require the applicant to enter into a Roadway Repair Agreement with the public works department of the city or county with jurisdiction over affected roadways or with Caltrans with respect to state highways in order to secure an Encroachment Permit, and to post a cash damage bond. This agreement would identify where trucks can be driven, their size and weights and time of day. The road use agreement would hold the applicant responsible for damages and repairs to roads and related infrastructure that may be impacted by truck use. Local agency may hold applicants responsible for any roadway pavement damage and may charge them a fee to mitigate/rehabilitate the damage on roadway pavement.

In approving a well stimulation treatment permit, DOGGR shall impose a condition requiring the applicant, within 60 days after well drilling and stimulation is

completed, to meet with the local Lead Agency and Caltrans (if applicable) to review the baseline road conditions and survey these same roadways and residential streets in order to identify any damage that has occurred.

The permit condition shall further require that, following completion/compensation of the identified public ROW repairs, the applicant shall provide to DOGGR and the local Lead Agency a letter signed by the local public works department and Caltrans (if applicable) stating their satisfaction with the repairs.

Impact TR-3: Cause traffic safety hazards for vehicles, bicyclists, and pedestrians

MM TR-1a Prepare Traffic Plan.

Impact TR-4: Transport hazardous materials

MM TR-4a Know Spill Prevention Measures. DOGGR shall require as a condition of approval for a well stimulation permit that the applicant include, as part of the Spill Contingency Plan required by Section 1722.9 of Title 14 of the California Code of Regulations, a requirement that each truck driver know how to carry out the emergency measures described in the Spill Contingency Plan (therefore reducing roadway hazards if an accidental spill were to occur).

In approving a well stimulation treatment permit, DOGGR shall impose a condition requiring that, prior to transporting project-related hazardous materials, the applicant submit a log to DOGGR demonstrating that every driver has received and reviewed the applicable portions of the Spill Contingency Plan.

For well stimulation in an area outside of existing oil and gas fields where 10 or more wells have been or are being drilled by a single applicant within one square mile, these aforementioned requirements may be incorporated into the Traffic Plan required as part of Mitigation Measure TR-1a (Prepare Traffic Plan).

Impact TR-6: Temporarily interfere with emergency response

MM TR-1a Prepare Traffic Plan.

Utilities and Service Systems

Impact UTL-3: Exceed existing municipal wastewater treatment provider capacities

MM UTL-3a Assess Wastewater Quality and Ensure Adequate Capacity to Process Wastewater at Municipal and Private Wastewater Treatment Plants. Prior to issuance of a well stimulation treatment permit for well stimulation treatment

either inside or outside of an existing oil and gas field~~s~~, DOGGR shall coordinate with the applicant to calculate the quantity of wastewater, if any, expected to be delivered to a municipal or private wastewater treatment plant and to demonstrate that the wastewater would be of an acceptable quality for treatment. In approving a well stimulation treatment permit for an applicant that proposes to rely on a municipal or private treatment plant for the disposal of wastewater, DOGGR shall impose a condition of approval that requires the applicant to provide DOGGR, prior to commencement of well stimulation, with certification from the operator of the affected municipal or private wastewater treatment plant, or other dispositive written proof confirming that the volume of wastewater to be delivered would not exceed the facility's capacity.

In the event that DOGGR receives a well stimulation treatment permit application wherein the amount of wastewater proposed to be delivered to a municipal or private treatment plant would exceed the available capacity of the treatment facility, DOGGR shall deny the permit or shall require the applicant to identify an alternative feasible means of ensuring the adequate, environmentally safe disposal of the wastewater.

Impact UTL-4: Exceed permitted solid waste capacity of landfills

MM UTL-4a **Assess Non-Hazardous Solid Waste Generation and Ensure Adequate Capacity to Accept Solid Waste at Municipal and Private Solid Waste Facilities.** Prior to issuance of a well stimulation treatment permit for well stimulation treatment either inside or outside of existing oil and gas field~~s~~, DOGGR shall coordinate with the applicant to calculate the quantity of non-hazardous solid waste to be delivered to a municipal or private solid waste facility and demonstrate that the waste is non-hazardous. In approving a well stimulation treatment permit, DOGGR shall impose a condition of approval that requires the applicant to provide DOGGR, prior to commencement of well stimulation, with certification from the operator of the affected municipal or private solid waste disposal facility, or other dispositive written proof confirming that the amount of non-hazardous waste to be delivered would not exceed the facility's capacity.

In the event that DOGGR receives well stimulation treatment permit applications wherein the amount of non-hazardous solid waste delivered to a municipal or private solid waste disposal facility would exceed the available capacity of the facility, DOGGR shall deny the permit or shall require the applicant to identify an alternative feasible means of ensuring the adequate, environmentally safe disposal of the non-hazardous wastes.

EXHIBIT A TO MITIGATION POLICY MANUAL: APPENDIX D TO FINAL EIR:

"Guidelines and the Environmental Checklist for Future Environmental Reviews and Clearances"

Appendix D

Guidelines and Environmental Checklist for Future Environmental Reviews and Clearances

Appendix D: Future Environmental Reviews and Clearances

D.1 Introduction

The Environmental Impact Report (EIR) prepared for compliance with Public Resources Code Division 3, Chapter 1, Section 3161 (b)(3), provides an analysis of activities associated with well stimulation treatments that could occur in oil and gas wells within the State that were drilled either prior to September 20, 2013, or could be drilled after September 20, 2013. Pursuant to Public Resources Code Section 3157 of Division 3, Chapter 1, oil and gas well stimulation treatments are defined as "any treatment of a well designed to enhance oil and gas production or recovery by increasing the permeability of the formation. Well stimulation treatments include, but are not limited to, hydraulic fracturing treatments and acid well stimulation treatments. Well stimulation treatments do not include steam flooding, water flooding, or cyclic steaming. Additionally, such treatments do not include routine well cleanout work,

routine well maintenance, routine removal of formation damage due to drilling, bottom hole pressure surveys, or routine activities that do not affect the integrity of the well or the formation."

For the purposes of the EIR, the "Project" focuses on the physical acts that are associated with hydraulic fracturing, acid fracturing, and acid matrix stimulation as they apply to both existing and future oil and gas wells within California. These physical acts are described in detail in EIR Section 7 (Description of the Project). Within the EIR, oil and gas well stimulation treatments throughout the State are analyzed programmatically according to six Study Regions having boundaries that are identical to the administrative boundaries of the Division of Oil, Gas and Geothermal Resources (DOGGR's) six Districts. In addition to the EIR's generalized programmatic analysis, the Inglewood, Wilmington, and Sespe Oil and Gas Fields (EIR Study Regions 1 and 2, respectively) are evaluated at a more detailed level of programmatic analysis. The EIR's generalized programmatic analysis of each Study Region is found in EIR Section 10 (Programmatic Analysis of the Project). The EIR's programmatic analysis of the three specific Oil and Gas Fields is contained in EIR Section 11 (Programmatic Level Analysis of Specific Oil and Gas Fields).

With respect to all of the EIR's programmatic coverage, DOGGR has prepared a checklist as a tool for determining whether the mitigation measures recommended in EIR Sections 10 and 11 are sufficient to provide for full compliance with the California Environmental Quality Act (CEQA) for oil and gas well stimulation activities that could be carried out in the future. This checklist has been designed to ensure that, in undertaking such analyses, DOGGR, acting as the Lead Agency under CEQA will make all relevant inquiries, including whether a proposed future activity has been formulated in a manner that complies with all applicable mitigation requirements. This checklist is provided in Section D.3.

Acting as the Lead Agency under CEQA, DOGGR must evaluate the activities associated with each proposed future oil and gas well stimulation treatment to determine whether such activities have been adequately examined in the EIR. Such evaluations must ascertain whether these future activities would have effects that were not examined in the EIR's programmatic analysis. If the answer is in the negative (i.e., the proposed future activities would *not* have any environmental effects that were not previously examined), then DOGGR may conclude that the proposed future activities are within the scope of the EIR's programmatic analysis and no new environmental review and documentation under CEQA would be required (State CEQA Guidelines Section 15168(c)(2) and (4). On the other hand, if the proposed future activities would result in an effect that was not adequately examined in the EIR's program analysis (i.e., the future activities were *not* within the scope of the EIR, then additional environmental review and documentation must be prepared (State CEQA Guidelines Section 15168 (c)(1)). Depending on the severity of the new effect(s), a Negative Declaration, Mitigated Negative Declaration, or an EIR must be prepared for CEQA compliance.

D.2 Evaluation of Environmental Impacts

The checklist provided in Section D.3 is to be used to determine whether future proposed oil and gas well stimulation treatments within the State have been adequately examined in EIR's programmatic analysis to allow for approval without a further environmental review and documentation, or whether a Negative Declaration, a Mitigated Negative Declaration, or an EIR is required under CEQA. Additional environmental analysis is required when proposed future oil and gas well stimulation activities would result in new environmental effects not analyzed in the EIR.

Environmental effects are not necessarily limited to the items contained in the checklist or the effects disclosed in the EIR's programmatic analysis. For this reason, the checklist includes a row for "Other Impacts" under each resource category.

Acting as the Lead Agency under CEQA, DOGGR must bear in mind that when proposed future oil and gas well stimulation treatments are not within the scope of the EIR's programmatic analysis, a determination as to whether an EIR, Mitigated Negative Declaration or Negative Declaration is required is subject to the "fair argument" standard. In short, when there is a fair argument, based on substantial evidence in the record, that the proposed future activities may have a significant effect, or effects, on the environment, an EIR is required.

D.2.1 Within the Scope of the EIR

The use of the checklist provided in Section D.3 will guide DOGGR in its determination as to whether proposed future oil and gas well stimulation treatments are within the scope of the EIR's programmatic analysis. A proposed future oil and gas well stimulation activity is "within the scope of the EIR" when it meets all of the following qualifications:

- It is described in and is consistent DOGGR's proposed permanent regulations for well stimulation treatments and with one or more of the Mitigation Measures and Best Management Practices (BMPs) contained in EIR Section 10 (Programmatic Analysis of the Project);
- It is within the geographic scope of the area analyzed in the EIR; and
- Its environmental effects, including site-specific effects, were adequately examined in the EIR's programmatic analysis in sufficient detail to allow DOGGR to make a fully informed decision regarding those effects in the absence of additional site-specific environmental review under CEQA.

D.2.2 Documentation

The analysis contained in the checklist should identify the following:

- **Prior Analysis Used.** Identify and state where the EIR is available for review, and identify the specific sections and page numbers within the EIR that include relevant information.
- **Additional Studies Prepared and References Cited in Support of the Findings of the Analysis.** Additional studies should be attached to the checklist; new references should be available for public review. In those instances when the EIR does not adequately examine the site-specific effects of proposed future oil and gas well stimulation treatment activities, the existence of new or additional studies supporting the conclusion that such activities would not cause significant effects will not be sufficient by itself to justify dispensing with additional environmental review. In these instances, sufficient supporting documentation and analysis in the checklist must be completed, or additional, site-specific environmental review under CEQA will be required.
- **Applicable Mitigation Measures.** Identify the specific mitigation measures identified in the EIR's programmatic analysis that apply to reduce the impact, or impacts, of the proposed future oil and gas well stimulation treatment activities to a level of less than significant.
- **Effect of Mitigation Measures.** Describe the extent to which the identified mitigation measures will address site-specific conditions and impacts for the proposed future oil and gas well stimulation treatment activities.
- **New effects.** Identify which effects, if any, of the proposed future oil and gas well stimulation treatment activities are new in that they were not adequately examined in the EIR. In this context, new effects may include those resulting from changed circumstances that may call into question the analysis in the EIR. If DOGGR finds new effects not addressed in the EIR, it may not conclude that the activity and its

effects were "within the scope of the EIR" and new site-specific environmental review and documentation under CEQA will be required. Similarly, environmental effects identified in the EIR may be minimized or found to be less than significant without mitigation incorporated in the future due to technological advances; these effects and the reasons why they have been found to be less than significant shall be documented in the checklist as well.

- **New or Changed Mitigation Measures.** Describe in the checklist any new or refined mitigation measures that are necessary in order to support a Mitigated Negative Declaration for the proposed future oil and gas well stimulation treatment activities.

D.2.3 Substantial Evidence

The checklist determinations must be based on substantial evidence. Therefore, the checklist is expected to be accompanied by analytical discussions of the conclusions reached. Sections and pages from the EIR relied on for conclusions should be cited. As noted above, further information supporting conclusions can include additional studies or surveys undertaken to analyze the effects of proposed future oil and gas well stimulation treatment activities.

DOGGR should cite in the checklist the references that are relied upon for conclusions. Reference to a previously prepared or outside document should, when appropriate and necessary to allow readers to reconstruct DOGGR's thought processes, include a reference to the page or pages of the EIR where the statement is substantiated. A reference list should be attached to the checklist. These references will be part of the administrative record. Copies of the references should be kept on file by DOGGR in the event a member of the public requests to see them.

D.2.4 Checklist Resource Categories

The resource categories listed in the checklist match the resource issues analyzed in the EIR. The checklist analyst must review the corresponding environmental analysis and impact conclusions contained in the EIR's programmatic analysis and the pertinent adopted mitigation measures when determining whether any of the conditions of proposed future oil and gas well stimulation treatment activities require a Negative Declaration, Mitigated Negative Declaration, or EIR. Where possible, the checklist analyst should provide cross-references to pertinent the EIR's mitigation measures. The checklist analyst is also responsible for reviewing these mitigate measures and their effectiveness in reducing the effects of proposed future oil and gas well stimulation treatment activities. Written explanations supporting all conclusions should be included in the sections of the checklist available for discussions following the questions posed for each category of potential environmental impact.

D.2.5 Checklist Answers

Once DOGGR has determined that a particular physical impact would occur as a result of proposed future oil and gas well stimulation treatment activities, the checklist answers must indicate whether the impact is one of the following:

- **No New Impact:** an impact that is adequately examined in the EIR and is "within the scope of the EIR." No new environmental analysis needs to be prepared with respect to this kind of impact.
- **New Impact that is Less Than Significant:** a new impact that is not adequately examined (and thus is not "within the scope of the EIR") but is not significant under CEQA. This conclusion requires the preparation of a Negative Declaration under CEQA.

- **New Impact that is Mitigated to Less Than Significant:** a new impact that is not adequately examined (and thus is not "within the scope of the EIR") but, due to the proponent's willingness to incorporate new mitigation into its proposed future oil and gas well stimulation treatment activities, is clearly less than significant under CEQA. This conclusion requires the preparation of a Mitigated Negative Declaration under CEQA.
- **New Impact that is Potentially Significant:** a new impact that is not adequately examined (and thus is not "within the scope of the EIR") and is potentially significant under the "fair argument" standard. This conclusion requires the preparation of an EIR under CEQA.

The second and third determinations will need to be revisited after the completion of public review for a Negative Declaration or Mitigated Negative Declaration in order to determine whether comments on those documents from other agencies or members of the public include substantial evidence that the site-specific project may have significant environmental effects not adequately examined in the EIR. If such substantial evidence exists, the preparation of an EIR will be necessary, though the detailed analysis in the EIR may, as appropriate, be limited to those topics for which there may be significant environmental effects.

D.2.6 Mitigation Measures

The checklist analyst must review and apply the pertinent mitigation measures identified in the EIR for proposed future oil and gas well stimulation treatment activities as part of the examination of their potential to create new impacts. At the same time, the checklist analyst must consider whether the mitigation measures would result in an impact, or impacts, of its own and whether that impact, or impacts, was/were examined and disclosed in the EIR.

D.3 Checklist for Future Environmental Reviews and Clearances

The following pages of the appendix provide the checklist for future environmental reviews and clearances that will be used by DOGGR for future oil and gas well stimulation treatment activities.

ENVIRONMENTAL CHECKLIST
for Future Oil and Gas Well Stimulation Treatment Activities

1. **Project Title:** Click here to enter text.
2. **Lead Agency Name and Address:** Click here to enter text.
3. **Contact Person and Phone Number:** Click here to enter text.
4. **Project Location:** Click here to enter text.
5. **Project Sponsor's Name and Address:** Click here to enter text.
6. **Description of proposed activity, including relationship to the subject of the Analysis of Oil and Gas Well Stimulation Treatments in California EIR:**

   Click here to enter text.
7. **Surrounding Land Uses and Setting:**

   Click here to enter text.
8. **Other Public Agencies Whose Approval is Required:**

   Click here to enter text.

9. On the basis of this initial evaluation:

☐ I find that the later proposed activity will have effects that were not examined in the Analysis of Oil and Gas Well Stimulation Treatments in California EIR. Because these effects are or may be significant, an EIR is required.

☐ I find that the later proposed activity will have effects that were not examined in the Analysis of Oil and Gas Well Stimulation Treatments in California EIR. Because these effects are less than significant even without any mitigation beyond what is already required pursuant to the Analysis of Oil and Gas Well Stimulation Treatments in California EIR, a NEGATIVE DECLARATION will be prepared.

☐ I find that the later proposed activity will have effects that were not examined in the Analysis of Oil and Gas Well Stimulation Treatments in California EIR. Although these effects might be significant in the absence of additional mitigation beyond what is already required pursuant to the Analysis of Oil and Gas Well Stimulation Treatments in California EIR, revisions to the proposed activity have been made by or agreed to by the project proponent that would avoid the effects or mitigate the effects to a point where clearly no significant effects would occur. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that all of the effects of the proposed later activity were adequately examined in the Analysis of Oil and Gas Well Stimulation Treatments in California EIR, and that the proposed later activity will comply with all applicable mitigation requirements found in said document. State another way, the proposed later activity is within the scope of the project covered by the EIR required by Senate Bill 4. No new environmental document under CEQA is required.

Signature	Date
Printed Name	For

Aesthetics	**New Impact that is Potentially Significant**	**New Impact that is Mitigated to Less Than Significant**	**New Impact that is Less Than Significant**	**No New Impact**
AE-1. Substantially adversely affect scenic vistas.	☐	☐	☐	☐
AE-2. Substantially alter or damage scenic resources.	☐	☐	☐	☐
AE-3. Substantially degrade the existing visual character or quality of a site and its surroundings.	☐	☐	☐	☐
AE-4. Create new sources of substantial light and glare.	☐	☐	☐	☐
Other impact on Aesthetics.	☐	☐	☐	☐

Insert discussion here.

Agriculture and Forestry Resources	**New Impact that is Potentially Significant**	**New Impact that is Mitigated to Less Than Significant**	**New Impact that is Less Than Significant**	**No New Impact**
AGF-1. Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Important Farmland), as designated by the Farmland Mapping and Monitoring Program, to non-agricultural use.	☐	☐	☐	☐
AGF-2. Conflict with existing zoning for agricultural use or with Williamson Act contracts.	☐	☐	☐	☐
AGF-3. Conflict with existing zoning for, or cause rezoning of, forest land, timberland, or timberland zoned Timberland Production.	☐	☐	☐	☐
AGF-4. Result in the loss of forest land or conversion of forest land to non-forest use .	☐	☐	☐	☐
AGF-5. Directly or indirectly impair the use of agricultural land or forest land.	☐	☐	☐	☐
Other impact on Agriculture and Forestry Resources.	☐	☐	☐	☐

Insert discussion here.

Air Quality	New Impact that is Potentially Significant	New Impact that is Mitigated to Less Than Significant	New Impact that is Less Than Significant	No New Impact
AQ-1. Conflict with or obstruct implementation of an applicable air quality plan.	☐	☐	☐	☐
AQ-2. Increase criteria pollutants or precursor pollutants to levels that violate an air quality standard or contribute substantially to an existing or projected air quality violation.	☐	☐	☐	☐
AQ-3. Expose sensitive receptors to substantial pollutant concentrations.	☐	☐	☐	☐
AQ-4. Create objectionable odors affecting a substantial number of people.	☐	☐	☐	☐
Other impact on Air Quality.	☐	☐	☐	☐

Insert discussion here.

Biological Resources: Terrestrial	New Impact that is Potentially Significant	New Impact that is Mitigated to Less Than Significant	New Impact that is Less Than Significant	No New Impact
BIOT-1. Substantially reduce the habitat of a fish or wildlife species.	☐	☐	☐	☐
BIOT-2. Cause a fish or wildlife population to drop below self-sustaining levels.	☐	☐	☐	☐
BIOT-3. Substantially reduce the number or restrict the range of an endangered, rare, or threatened species.	☐	☐	☐	☐
BIOT-4. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS.	☐	☐	☐	☐
BIOT-5. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFW or USFWS.	☐	☐	☐	☐

Biological Resources: Terrestrial	New Impact that is Potentially Significant	New Impact that is Mitigated to Less Than Significant	New Impact that is Less Than Significant	No New Impact
BIOT-6. Have a substantial adverse effect on federally protected wetlands as defined by Section 404, of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.	☐	☐	☐	☐
BIOT-7. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.	☐	☐	☐	☐
BIOT-8. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.	☐	☐	☐	☐
BIOT-9. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Com¬munity Conservation Plan, or other approved local, regional, or state habitat conservation plan.	☐	☐	☐	☐
BIOT-10. Contribute to global climate change and consequent impacts to biodiversity.	☐	☐	☐	☐
Other impact on Biological Resources: Terrestrial.	☐	☐	☐	☐

Insert discussion here.

Biological Resources: Coastal and Marine	New Impact that is Potentially Significant	New Impact that is Mitigated to Less Than Significant	New Impact that is Less Than Significant	No New Impact
BIOCM-1. Substantially affect any species identified as a candidate, sensitive, or special status species or their habitat.	☐	☐	☐	☐
BIOCM-2. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.	☐	☐	☐	☐

Biological Resources: Coastal and Marine	New Impact that is Potentially Significant	New Impact that is Mitigated to Less Than Significant	New Impact that is Less Than Significant	No New Impact
BIOCM-3. Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal. etc.) through direct removal, filling, hydrological interruption, or other means.	☐	☐	☐	☐
Other impact on Biological Resources: Coastal and Marine.	☐	☐	☐	☐

Insert discussion here.

Coastal Processes and Marine Water Quality	New Impact that is Potentially Significant	New Impact that is Mitigated to Less Than Significant	New Impact that is Less Than Significant	No New Impact
CPMWQ-1. Change marine water chemical composition with respect to known hazardous substances; or the measured water temperature, salinity, conductivity, or turbidity	☐	☐	☐	☐
CPMWQ-2. Change the velocity or direction of ocean currents	☐	☐	☐	☐
CPMWQ-3. Change the velocity or direction of coastal and ocean winds	☐	☐	☐	☐
CPMWQ-4. Change the direction, size, or period of ocean waves.	☐	☐	☐	☐
CPMWQ-5. Increase the risk of a tsunami.	☐	☐	☐	☐
Other impact on Coastal Processes and Marine Water Quality.	☐	☐	☐	☐

Insert discussion here.

Commercial and Recreational Fishing	New Impact that is Potentially Significant	New Impact that is Mitigated to Less Than Significant	New Impact that is Less Than Significant	No New Impact
CRF-1. Cause long-term exclusion of important commercial and recreational fishing areas.	☐	☐	☐	☐
CRF-2. Result in substantial loss of total catch to commercial and recreational fishing industries.	☐	☐	☐	☐
Other impact on Commercial and Recreational Fishing	☐	☐	☐	☐

Insert discussion here.

Cultural Resources	New Impact that is Potentially Significant	New Impact that is Mitigated to Less Than Significant	New Impact that is Less Than Significant	No New Impact
CUL-1. Affect historic and built-environment resources.	☐	☐	☐	☐
CUL-2. Affect prehistoric resources.	☐	☐	☐	☐
CUL-3. Disturb human remains or cultural items, including funerary objects, sacred objects, and objects of cultural patrimony.	☐	☐	☐	☐
CUL-4. Affect cultural landscapes.	☐	☐	☐	☐
Other impact on Cultural Resources.	☐	☐	☐	☐

Insert discussion here.

Paleontological Resources	New Impact that is Potentially Significant	New Impact that is Mitigated to Less Than Significant	New Impact that is Less Than Significant	No New Impact
PALEO-1. Destroy or disturb surface or near-surface significant paleontological resources.	☐	☐	☐	☐
Other impact on Paleontological Resources.	☐	☐	☐	☐

Insert discussion here.

Environmental Justice	New Impact that is Potentially Significant	New Impact that is Mitigated to Less Than Significant	New Impact that is Less Than Significant	No New Impact
EJ-1. Disproportionately affect minority or low-income populations.	☐	☐	☐	☐
Other impact on Environmental Justice.	☐	☐	☐	☐

Insert discussion here.

Geology, Soils and Mineral Resources	New Impact that is Potentially Significant	New Impact that is Mitigated to Less Than Significant	New Impact that is Less Than Significant	No New Impact
GEO-1. Expose people or structures to potential substantial adverse effects as a result of rupture of a known fault, seismically induced groundshaking, and/or ground failure.	☐	☐	☐	☐
GEO-2. Result in substantial soil erosion or the loss of topsoil.	☐	☐	☐	☐
GEO-3. Be located on a geologic unit or soil that is unstable and result in on- or off-site landslide, lateral spreading, subsidence or collapse.	☐	☐	☐	☐
GEO-4. Be located on expansive soil creating substantial risks to life or property.	☐	☐	☐	☐
GEO-5. Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems	☐	☐	☐	☐
GEO-6. Result in the loss of availability of known mineral resource loss of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan.	☐	☐	☐	☐
Cause an induced seismic event including ground shaking and ground failure.	☐	☐	☐	☐
Other impact on Geology, Soils and Mineral Resources.	☐	☐	☐	☐

Insert discussion here.

Greenhouse Gas Emissions	New Impact that is Potentially Significant	New Impact that is Mitigated to Less Than Significant	New Impact that is Less Than Significant	No New Impact
GHG-1. Generate greenhouse gas emissions that may have a significant impact on the environment.	☐	☐	☐	☐
GHG-2. Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.	☐	☐	☐	☐
Other impact on Greenhouse Gas Emissions.	☐	☐	☐	☐

Insert discussion here.

Hazards and Hazardous Materials	New Impact that is Potentially Significant	New Impact that is Mitigated to Less Than Significant	New Impact that is Less Than Significant	No New Impact
HAZ-1. Relase hazardous materials into the environment from a spill or leak.	☐	☐	☐	☐
Other impact on Hazards and Hazardous Materials.	☐	☐	☐	☐

Insert discussion here.

Groundwater Resources	New Impact that is Potentially Significant	New Impact that is Mitigated to Less Than Significant	New Impact that is Less Than Significant	No New Impact
GWR-1. Cause or contribute to overdraft conditions.	☐	☐	☐	☐
GWR-2. Lower groundwater levels through pumping, resulting in significant and unreasonable land subsidence or significant and unreasonable impacts to nearby water wells or surface water.	☐	☐	☐	☐
GWR-3. Adversely impact groundwater quality through surface spills or leaks during well stimulation.	☐	☐	☐	☐
GWR-4. Migration of well stimulation fluids or formation fluids including gas to protected groundwater through non-existent or ineffective annular well seals.	☐	☐	☐	☐

Groundwater Resources	New Impact that is Potentially Significant	New Impact that is Mitigated to Less Than Significant	New Impact that is Less Than Significant	No New Impact
GWR-5. Migration of well stimulation fluids or formation fluids including gas in to protected groundwater through damaged or improperly abandoned wells.	☐	☐	☐	☐
GWR-6. Improper disposal of flowback in injection wells could potentially impact groundwater quality.	☐	☐	☐	☐
GWR-7. Inability to identify specific impacts to groundwater quality from well stimulation activities.	☐	☐	☐	☐
Other impact on Groundwater Resources.	☐	☐	☐	☐

Insert discussion here.

Surface Water Resources	New Impact that is Potentially Significant	New Impact that is Mitigated to Less Than Significant	New Impact that is Less Than Significant	No New Impact
SWR-1. Violate water quality standards or waste discharge requirements, provide substantial additional sources of polluted runoff, or otherwise substantially degrade or diminish surface water quality.	☐	☐	☐	☐
SWR-2. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site.	☐	☐	☐	☐
SWR-3. Substantially diminish surface water quantity.	☐	☐	☐	☐
SWR-4. Create flood hazard by substantially altering existing drainage patterns, substantially increasing the rate or amount of surface runoff, impeding or redirecting flood flows, or exposing people or structures to flooding.	☐	☐	☐	☐
Other impact on Surface Water Resources.	☐	☐	☐	☐

Insert discussion here.

Land Use and Planning	New Impact that is Potentially Significant	New Impact that is Mitigated to Less Than Significant	New Impact that is Less Than Significant	No New Impact
LU-1. Preclude existing or permitted land uses, or create a disturbance that would diminish the function of land uses.	☐	☐	☐	☐
LU-2. Physically divide an established community	☐	☐	☐	☐
LU-3. Conflict with applicable land use plans, policies, programs, ordinances or other land use regulations of agencies with jurisdiction over a project adopted for the purpose of avoiding or mitigating an environmental effect.	☐	☐	☐	☐
Other impact on Land Use and Planning.	☐	☐	☐	☐

Insert discussion here.

Population and Housing	New Impact that is Potentially Significant	New Impact that is Mitigated to Less Than Significant	New Impact that is Less Than Significant	No New Impact
POP-1. Induce substantial population growth.	☐	☐	☐	☐
POP-2. Displace substantial numbers of people or existing housing, necessitating the construction of replacement housing elsewhere.	☐	☐	☐	☐
Other impact on Population and Housing.	☐	☐	☐	☐

Insert discussion here.

Noise and Vibration	New Impact that is Potentially Significant	New Impact that is Mitigated to Less Than Significant	New Impact that is Less Than Significant	No New Impact
NOI-1. Cause exposure of persons to or generation of excessive noise levels or a substantial increase in ambient noise levels.	☐	☐	☐	☐
NOI-2. Cause exposure of persons to or generation of excessive groundborne vibration.	☐	☐	☐	☐

Noise and Vibration	New Impact that is Potentially Significant	New Impact that is Mitigated to Less Than Significant	New Impact that is Less Than Significant	No New Impact
Other impact on Noise and Vibration.	☐	☐	☐	☐

Insert discussion here.

Public Services	New Impact that is Potentially Significant	New Impact that is Mitigated to Less Than Significant	New Impact that is Less Than Significant	No New Impact
PUB-1. Require the need for new or physically altered governmental facilities in order to maintain acceptable service ratios, response times, or to other performance objectives for fire, police, or schools.	☐	☐	☐	☐
Other impact on Public Services.	☐	☐	☐	☐

Insert discussion here.

Recreation	New Impact that is Potentially Significant	New Impact that is Mitigated to Less Than Significant	New Impact that is Less Than Significant	No New Impact
REC-1. Increase the usage of recreation areas or facilities which would result in the physical deterioration of recreational resources.	☐	☐	☐	☐
REC-2. Cause disruptions in designated recreation areas.	☐	☐	☐	☐
Other impact on Recreation.	☐	☐	☐	☐

Insert discussion here.

Risk of Upset/Public and Worker Safety	New Impact that is Potentially Significant	New Impact that is Mitigated to Less Than Significant	New Impact that is Less Than Significant	No New Impact
RSK-1. Create a hazard to the public or environment through crude oil transport and reasonably foreseeable accidents and releases.	☐	☐	☐	☐
RSK-2. Create a hazard to the public or environment through a reasonably foreseeable accidental release of hazardous materials due to a hose leak or connection leak while pumping well stimulation treatment fluids.	☐	☐	☐	☐
RSK-3. Increase the potential for major oil spills due to ship groundings and collisions.	☐	☐	☐	☐
RSK-4. Create a hazard to the public or environment through a reasonably foreseeable accidental pressure changes during flowback activity caused by blocked pump discharge, sudden change in downhole condition, or human error.	☐	☐	☐	☐
RSK-5. Generate risks to public safety by causing a flammable atmosphere in the flowback tank.	☐	☐	☐	☐
RSK-6. Increase risks to public safety by exposing the public to accidental hazardous materials releases from pipelines.	☐	☐	☐	☐
RSK-7. Expose workers and public to hazardous levels of airborne silica during the use of proppant	☐	☐	☐	☐
Other impact on Risk of Upset/Public and Worker Safety.	☐	☐	☐	☐

Insert discussion here.

Transportation and Traffic	New Impact that is Potentially Significant	New Impact that is Mitigated to Less Than Significant	New Impact that is Less Than Significant	No New Impact
TR-1. Generate additional truck traffic and disrupt traffic operations.	☐	☐	☐	☐
TR-2. Inadvertently damage road rights-of-way.	☐	☐	☐	☐
TR-3. Cause traffic safety hazards for vehicles, bicyclists, and pedestrians.	☐	☐	☐	☐
TR-4. Transport hazardous materials.	☐	☐	☐	☐

Transportation and Traffic	New Impact that is Potentially Significant	New Impact that is Mitigated to Less Than Significant	New Impact that is Less Than Significant	No New Impact
TR-5. Change air traffic patterns.	☐	☐	☐	☐
TR-6. Temporarily interfere with emergency response.	☐	☐	☐	☐
Other impact on Transportation and Traffic.	☐	☐	☐	☐

Insert discussion here.

Utilities and Service Systems	New Impact that is Potentially Significant	New Impact that is Mitigated to Less Than Significant	New Impact that is Less Than Significant	No New Impact
UTL-1. Adversely affect utilities and service systems due to population growth from Project-related development.	☐	☐	☐	☐
UTL-2. Require new or expanded electrical or natural gas infrastructure.	☐	☐	☐	☐
UTL-3. Exceed existing municipal wastewater treatment provider capacities.	☐	☐	☐	☐
UTL-4. Exceed permitted solid waste capacity of landfills	☐	☐	☐	☐
Other impact on Utilities and Service Systems.	☐	☐	☐	☐

Insert discussion here.

Mandatory Findings of Significance	New Impact that is Potentially Significant	New Impact that is Mitigated to Less Than Significant	New Impact that is Less Than Significant	No New Impact
Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of an endangered, rare or threatened species, or eliminate important examples of the major periods of California history or prehistory?	☐	☐	☐	☐
Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☐	☐	☐
Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☐	☐