State Clearinghouse No. 2016101008
CSLC EIR No. 792

ADDENDUM TO ENVIRONMENTAL IMPACT REPORT

BECKER AND LEGACY WELLS ABANDONMENT AND REMEDIATION PROJECT

SUMMERLAND
SANTA BARBARA COUNTY, CALIFORNIA

CEQA Lead Agency:
California State Lands Commission
100 Howe Avenue, Suite 100 South
Sacramento, CA 95825

Established in 1938

January 2020

MISSION STATEMENT

The California State Lands Commission provides the people of California with effective stewardship of the lands, waterways, and resources entrusted to its care through preservation, restoration, enhancement, responsible economic development, and the promotion of public access.

CEQA DOCUMENT WEBSITE

www.slc.ca.gov/Info/CEQA.html

Project Geographic Location*

	Latitude	**Longitude**
Becker Well (completed March 2018)	34.419807	-119.603642
Treadwell 10	34.418446	-119.599887
C.H. Olsson 805	34.420001	-119.604371
Duquesne 910	34.417340	-119.591152
North Star 815	34.419560	-119.60260

* Point data provided from California State Lands Commission internal GIS lease database. Coordinates in decimal degrees.

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The cover photo was taken from a drone offshore Summerland Beach. The picture shows conditions at the time of the drone flight with additional computer vision processing using filters to highlight oil sheen detection.

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LIST OF ABBREVIATIONS AND ACRONYMS

A	AB	Assembly Bill
	APCD	Air Pollution Control District
	APM	Applicant Proposed Measure
C	Caltrans	California Department of Transportation
	CARB	California Air Resources Board
	CEQA	California Environmental Quality Act
	CH_4	Methane
	CO	Carbon monoxide
	CO_2	Carbon dioxide
	CSLC	California State Lands Commission
D	dB	Decibel
	dBA	A-weighted decibel
	DOGGR	California Division of Oil, Gas, and Geothermal Resources
E	EIR	Environmental Impact Report
F	FHWG	Fisheries Hydroacoustic Working Group
G	GHG	Greenhouse Gas
	GWP	Global warming potential
H	H_2S	Hydrogen sulfide
	HFCs	Hydrofluorocarbons
	Hp	Horsepower
M	m	meter
	MM	Mitigation Measure
	$MTCO_2e$	Metric tons of carbon dioxide equivalent
N	N_2O	Nitrous Oxide
	NAHC	Native American Heritage Commission
	NMFS	National Marine Fisheries Service
	NO_2	Nitrogen dioxide
	NOx	Nitrogen oxides
	NF_3	Nitrogen trifluoride
O	O_3	Ozone
P	Pb	Lead
	PFCs	Perfluorocarbons
	$PM_{2.5}$	particulate matter (less than 2.5 microns in diameters)
	PM_{10}	particulate matter (less than 10 microns in diameters)
	POLB	Port of Long Beach
	PTS	Permanent threshold shift
R	ROC	Reactive organic compound

	ROG	Reactive organic gases
S	SB	Senate Bill
	SBCAPCD	Santa Barbara County Air Pollution Control District
	SCH	State Clearinghouse
	SCAQMD	South Coast Air Quality Management District
	SEL	sound exposure level
	SF_6	Sulfur hexafluoride
	SO_2	Sulfur dioxide
	SO_x	Sulfur oxides
	SPL	sound pressure level
T	TTS	Temporary threshold shift
U	USCG	U.S. Coast Guard
	USFWS	U.S. Fish and Wildlife Service

1.0 INTRODUCTION

1.1 PROJECT LOCATION AND BACKGROUND

In August 2017, the California State Lands Commission (Commission or CSLC), as lead agency under the California Environmental Quality Act (CEQA; Pub. Resources Code, § 21000 et seq.), certified a Final Environmental Impact Report (EIR) [1] for the Becker and Legacy Wells Abandonment and Remediation Project (Project) (Item 82, August 17, 2017). The Project area is located on and immediately offshore Summerland Beach in the unincorporated community of Summerland, Santa Barbara County, approximately 6 miles east of the city of Santa Barbara and 5 miles west of the city of Carpinteria (Figure 1-1). Lookout Park, operated by Santa Barbara County Parks and Recreation Department, sits atop bluffs above the beach.

Within the area is the inactive Summerland Oil Field, an area of naturally occurring oil and gas seeps, where wells were drilled first from onshore and then from piers that extended into the Pacific Ocean between the 1890s and 1930s. The field was abandoned (i.e., wells plugged with cement and other material as was common at the time) in the early 1900s. There are no longer any responsible parties for this oil field, and it is now the responsibility of the State, under the regulatory authority of the Commission. Due to natural seeps or leaks from improperly abandoned legacy wells, oil sheens are intermittently observed in the water and on the sand at Summerland Beach.

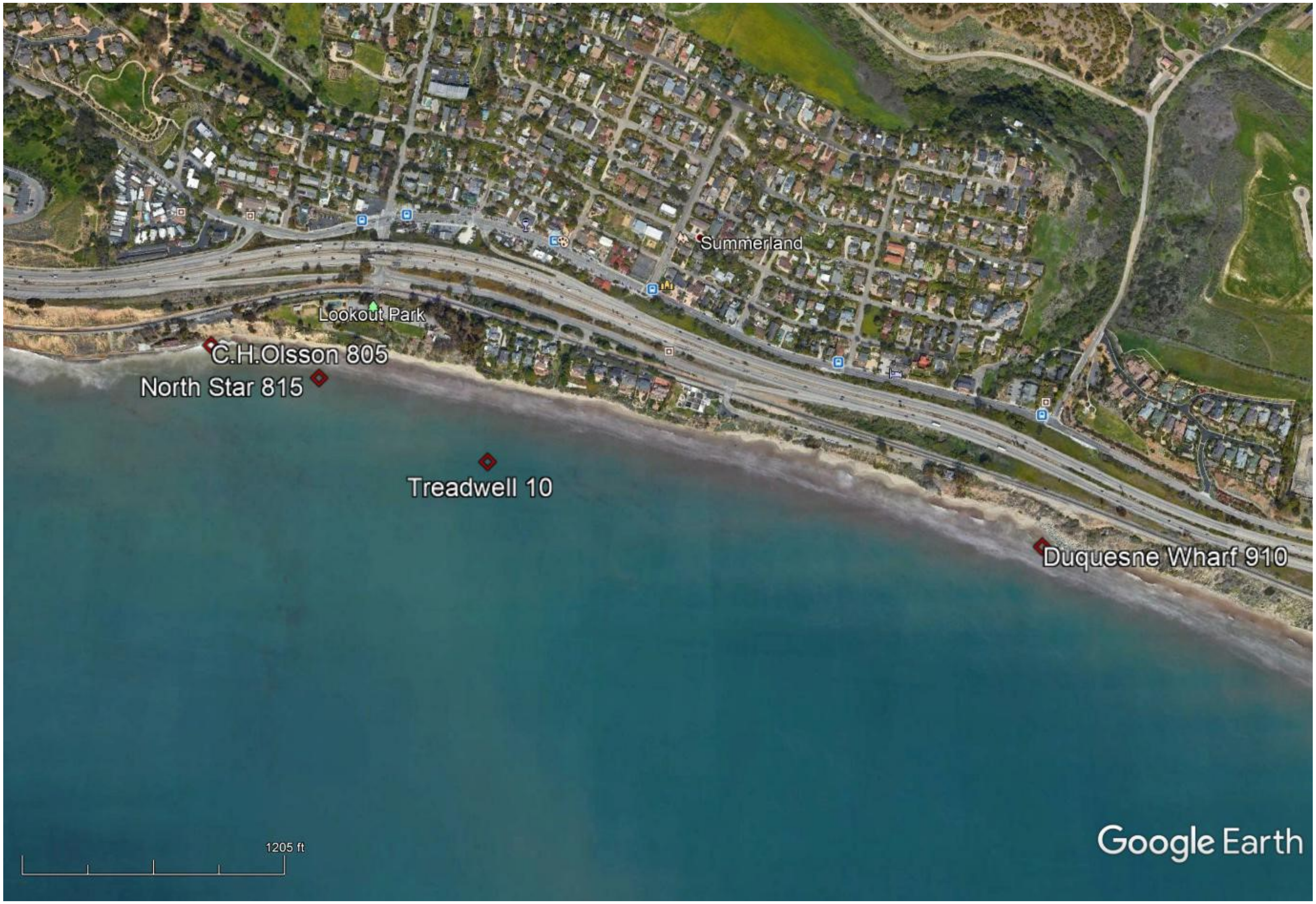
After assessing the Becker well in 2015 (Phase 1), the Commission prepared the EIR to evaluate Phase 2 abandonment activities, which included the following objectives:

- Abandon and seal the Becker well to current California Division of Oil, Gas, and Geothermal Resources (DOGGR) standards to alleviate oil leaking into the environment with minimum impacts to the beach and recreational resources.
- Abandon and seal other legacy wells, as appropriate, in the Summerland Beach area. Although not specifically identified in the EIR at the time, other legacy wells include Treadwell 10 (Treadwell), C.H. Olsson 805 (Olsson), Duquesne Wharf 910 (Duquesne), and North Star 815 (North Star) (see Figure 1-1). The names refer to the historic leases when the wells were in production.

The EIR covered the well abandonment approach and equipment considerations planned for the abandonment of the Becker well and similar shallow legacy wells located in the surf zone on Summerland Beach. Abandonment plans described in the EIR involved construction of a double-walled cofferdam around the well, with access to the well site provided from a jack-up barge.

[1] The "2017 Project Final EIR" (State Clearinghouse [SCH] No. 2016101008; CSLC EIR No. 792) is incorporated by reference (Appendix A) and available at: https://www.slc.ca.gov/ceqa/becker/.

Figure 1-1. Legacy Wells Location Examples



The EIR also provides information on alternative methods for abandoning legacy wells including an enhanced barge and pier, small cofferdam and pier, and large cofferdam and platform.

1.2 LEGACY WELL UPDATE

1.2.1 Becker Well

The Becker well was successfully abandoned in February/March 2018; however, the well was abandoned using a modified approach, utilizing a cylindrical cofferdam and pipe pile abandonment method. In addition, rather than access the well site via the jack-up barge method (which is no longer available on the west coast) as described in the EIR, a traditional anchored barge and tug were utilized as a more cost and time efficient option. The cofferdam and steel pipe pile were driven into the bedrock formation around the well using a vibratory hammer. The annulus between the well and the pipe pile was cleaned out and filled with cement, and a cap was welded onto the top of the pipe pile thereby entombing the Becker well preventing further leakage. The cofferdam was removed following abandonment of the well. The use of this modified approach on the Becker well abandonment was assessed and found to be less impactful than the approaches described in the EIR and, therefore, did not require an addendum.

1.2.2 Treadwell and North Star Wells

The Treadwell and North Star are offshore, subtidal leaking legacy wells requiring abandonment. The Treadwell abandonment is anticipated to take place in 2020. North Star abandonment operations have not yet been scheduled. For Treadwell, work would be broken up into 2 stages. The first stage would be dive work. This work would include exposing and removal of the cement well cap (see Section 2.2 for specifications). Due to a significant amount of sand built up around the well cap and miscellaneous debris buried within the work area, complete well cap exposure and removal is expected to take 5 days to complete.

The second stage would include cofferdam installation, well abandonment operations, and cofferdam removal (see Section 2.2 for specifications). The well abandonment activity is anticipated to take 4 days to complete. In all, Treadwell abandonment is estimated to last approximately 9 days.

North Star does not have a cement well cap attached to the wellhead. As a result, the North Star abandonment would follow the same procedure and timeline as the second stage of the Treadwell abandonment. This would require cofferdam installation, well abandonment operations, and cofferdam removal (see Section 2.2 for specifications). The North Star abandonment is expected to last approximately 4 days.

1.2.3 C.H. Olsson and Duquesne Wells

On July 3, 2019, an investigation to assess the current well conditions of C.H. Olsson 805 was implemented. The investigation took place during the early morning hours when the peak low tide allowed for onshore access of the well location. A front loader and excavator were moved in to excavate an approximate 10-foot by 10-foot by 10-foot area of sand to assess the condition of the wellhead and determine if future cofferdam installation would be possible. The well was found to have some obstructive debris within the area (boulders, cement, timber, etc.) which was moved out of the work area to increase efficiency of the future cofferdam installation. The investigation lasted for a few hours. Equipment mobilization from the staging area in Lookout Park parking lot to the work area on Summerland Beach began at approximately 2:30 a.m. and was completed at approximately 6:30 a.m. This included removal of all equipment and personal vehicles from the staging area.

The C.H. Olsson and Duquesne Well abandonments would not require any diving activity, as these wells are accessible during low tide. Additionally, these wells do not have associated cement well caps requiring removal. As a result, only well abandonment work previously covered under the EIR would be performed. This includes cofferdam installation, well abandonment operations, and cofferdam removal (see Section 2.2 for specifications). However, the onshore access to abandon these wells was not addressed in the EIR (see Section 1.4.1, *Onshore Beach Access*). The well abandonment activity for each well is anticipated to take approximately 4 days to complete.

1.3 PROJECT OBJECTIVES

The objective of the overall Project is to stop oil releases from one or more legacy Summerland area oil wells. As previously mentioned, these are “orphan” wells, meaning there is no responsible private party for the State to rely on to abandon the wells. These wells are the responsibility of the State and abandonment is paid for with funds allocated in the State budget. The Project objectives include minimizing environmental impacts with a cost-effective approach.

1.4 ADDENDUM PURPOSE AND NEED

The Commission, as CEQA lead agency, prepared this Addendum to the EIR because changes or additions to the EIR are needed, but such modifications do not require preparation of a subsequent EIR (State CEQA Guidelines, §§ 15164 and 15162). Pursuant to State CEQA Guidelines section 15162, a subsequent EIR is not required unless:

(1) Substantial changes are proposed in the project which will require major revisions of the previous EIR or negative declaration due to the involvement of new

significant environmental effects or a substantial increase in the severity of previously identified significant effects;

(2) Substantial changes occur with respect to the circumstances under which the project is undertaken which will require major revisions of the previous EIR or negative declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified effects; or

(3) New information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the previous EIR was certified as complete, shows any of the following:

A. The project will have one or more significant effects not discussed in the previous EIR or negative declaration;

B. Significant effects previously examined will be substantially more severe than shown in the EIR;

C. Mitigation measures or alternatives previously found not to be feasible would in fact be feasible, and would substantially reduce one or more significant effects of the project, but the project proponents decline to adopt the mitigation measure or alternative; or

D. Mitigation measures or alternatives which are considerably different from those analyzed in the previous EIR would substantially reduce one or more significant effects on the environment, but the project proponents decline to adopt the mitigation measure or alternative.

Since the Becker well abandonment, the Commission has continued to investigate other legacy wells in the Project area, including the Treadwell, Olsson, Duquesne, and North Star wells. Initial investigations have determined that an abandonment approach like the one used for Becker well, which utilized a traditional anchored barge, cylindrical cofferdam and pipe pile, would likely be an effective abandonment method for other legacy wells in the Project area; however, geologic conditions are slightly different at other well locations, with the bedrock formation estimated to be at a further depth. These variations may result in additional impacts not previously analyzed in the EIR; as a result, an Addendum is required under CEQA.

The purpose of this Addendum is to: (1) identify Project modifications that are necessary from those described in the EIR, (2) address potential environmental impacts associated with these necessary modifications, and (3) determine if additional mitigation measures are necessary to reduce potential impacts to less than significant levels. While four wells have been targeted for abandonment in this Addendum (Treadwell, North Star, Duquesne, and Olsson), these wells represent abandonment methodologies for three shorezone locations, including subtidal (Treadwell and North Star), intertidal (Duquesne), and onshore (Olsson). This Addendum is intended to cover future abandonments of other problematic legacy wells as needed in any of these three shorezone locations.

1.5 PROJECT MODIFICATIONS

The Project modifications evaluated in this Addendum include onshore beach access, use of a diesel impact hammer to drive pipe piles, and removal of a cement well cap (as found at the Treadwell 10 well). The modifications are evaluated to determine if they would produce any new significant environmental impacts or a substantial increase in the severity of significant effects previously identified in the EIR.

1.5.1 Onshore Beach Access

Due to the onshore and intertidal locations of a few leaking legacy wells, including C.H. Olsson and Duquesne, some wells are accessible from the beach during low tides. This allows for well abandonment activities to occur utilizing a low-tide onshore beach access approach (see Figure 1-2). Lookout Park parking lot would be temporarily utilized as needed and during high tide cycles as a staging area for abandonment-related equipment and vehicles. As the high tide recedes, equipment would be brought in through two access routes along Summerland Beach. C.H. Olsson would be accessed via the County beach access road from Lookout Park. Duquesne would be accessed via the County beach access road located off Finney Street. From the staging area in the Lookout Park parking lot, equipment operators would head east for a 0.25 mile down Wallace Avenue to Finney Street. The equipment operators would then head 0.1 mile down Finney Street to a County beach access road. Other leaking wells discovered along Summerland Beach could also be accessed from these routes.

1.5.2 Use of Diesel Impact Hammer

The EIR identified the use of a vibratory hammer as the Applicant Proposed Measure (APM-4). As stated in the EIR, vibratory hammers “generally produce less sound than impact hammers and are often employed as a mitigation measure to reduce the potential for adverse effects on fish that can result from impact pile driving”. The effects of the higher decibel (dB) levels associated with the impact hammer (approximately 15 to 25 dB higher than vibratory hammers) were not evaluated in the EIR; however, the more powerful diesel impact hammer may be required to drive the pipe pile to deeper depths during offshore well abandonment operations for other legacy wells in the Project area. The diesel impact hammer would be used at peak noise levels for a maximum duration of approximately 90 minutes or less.

1.5.3 Cement Well Cap Removal (Treadwell)

The Treadwell well is the only known leaking legacy well requiring cement well cap removal. Following positioning and anchoring of the barge over the Treadwell well, divers would temporarily displace sand with water jetting tools to fully expose the existing 6-foot wide by 4-foot tall cement well cap. For Treadwell, as of June 2019, approximately 20 inches of the well cap was exposed above the natural sea floor. Once the well cap has been further exposed using water jetting tools, divers would employ cold cutting methods and a pneumatic rivet buster to break up the cement well cap allowing access to the top of the original wellhead in preparation for well abandonment. The broken-up cement well cap would be moved out of the way and left on the sea floor. Complete cement well cap exposure is estimated to take 5 days to complete.

Figure 1-2. Onshore Beach Access to Legacy Wells

2.0 PROJECT ACTIVITIES

The Project, inclusive of the proposed modifications, would include the following primary components:

- Pre-project preparation activities; including investigation and assessment of each legacy well and all staging of equipment.
- Well abandonment operations, inclusive of
    - Installation of cofferdam
    - Removal of cement well cap (if applicable)
    - Installation of steel pipe piles
    - Removal of the cofferdam and equipment

2.1 PRE-PROJECT PREPARATION

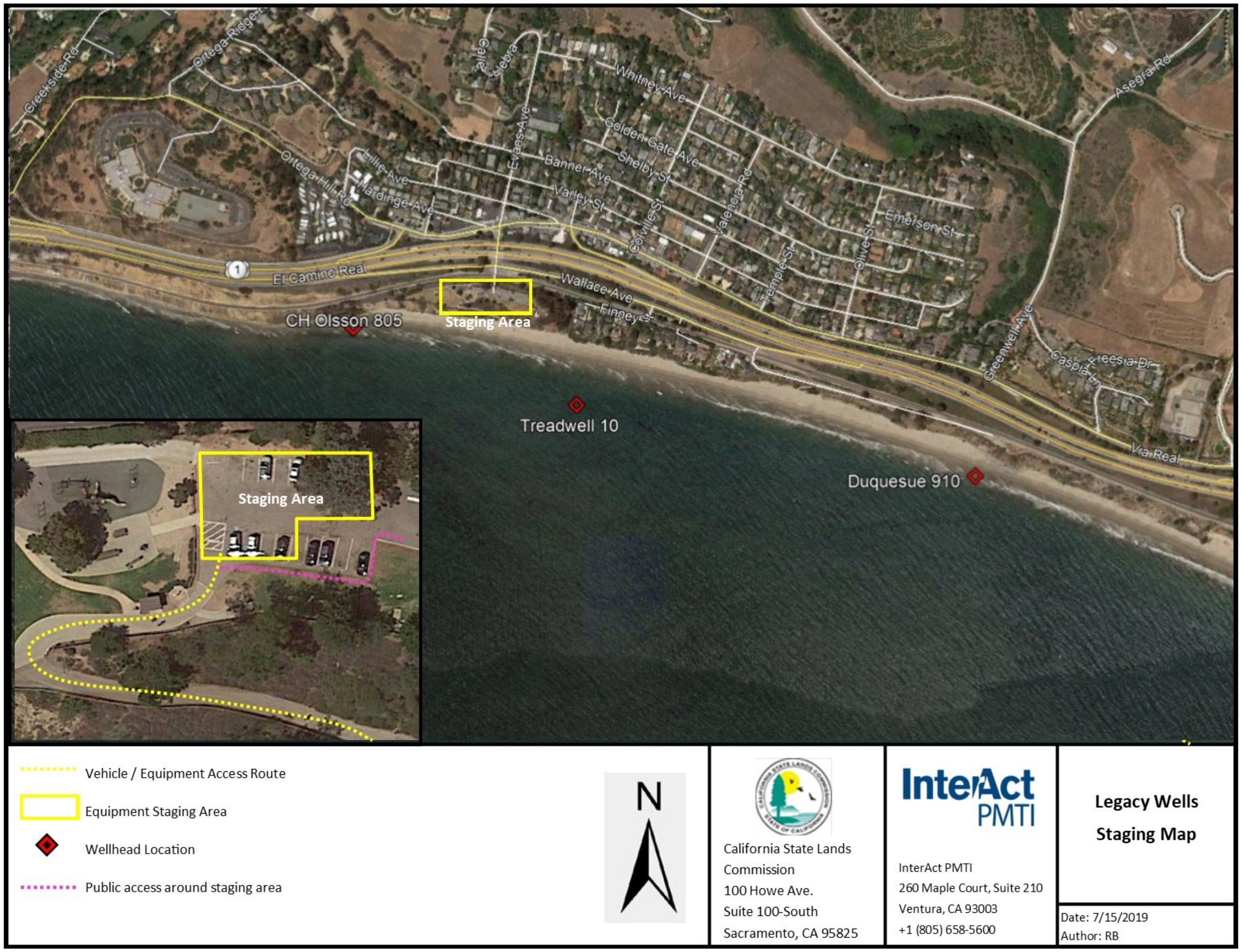
In accordance with the EIR, legacy well investigations were conducted to determine exact well location, assess the condition of the exposed well casing, to measure casing circumference and diameter and, where possible, to determine the source of leakage (internal or external). The investigation and assessment phase are a necessary first step to determine an abandonment program for each well. Most recently, investigations were conducted on the Treadwell 10 well in May 2019 and the C.H. Olsson 805 well in early July 2019. The current condition of the exposed casing, measurements of casing specifications and well locations were identified. In both cases, leak sources were detected. Further investigation and assessment of the Duquesne well would be necessary before detailed well abandonment activities can be planned.

As with the Becker well abandonment in 2018, the staging area would be located at Lookout Park (Figure 2-1) with an emergency response trailer placed in the staging area for the duration of the abandonment as specified in the Oil Spill Contingency Plan (APM-2). If a barge would be used for well abandonment, the contractor would conduct a bathymetric survey of the ocean floor to confirm that a fully loaded barge could be floated into position. The barge would then be positioned and anchored. If no barge is required, onshore beach access would be conducted as outlined in Section 1.5.1 and shown in Figure 1-2. The estimated schedule for Project activities is shown in Table 2-1.

Table 2-1. Project Schedule

Legacy Well	Anticipated Abandonment (Year)	Days to Complete
Treadwell	2020	9
C.H. Olsson	TBD	4
Duquesne	TBD	4
North Star	TBD	4

Figure 2-1. Legacy Wells Staging



2.2 WELL ABANDONMENT OPERATIONS

Well abandonment begins with the installation of an 8-foot diameter cofferdam around the legacy well. The cofferdam isolates the well area from the ocean, creating a workspace for welders and a platform from which to weld joints of pipe pile together. The cofferdam also prevents spills or releases of oily material from entering the ocean. A cylindrical cofferdam approach is planned, as it proved very effective for the Becker well abandonment, as shown in Figure 2-3. During abandonment, oil would be periodically skimmed from the water surface inside of the cofferdam and stored in a storage tank on a barge. Fluid not contaminated with hydrocarbons would be returned to the ocean prior to barge departure.

A vibratory hammer or diesel impact hammer would (if necessary) then be employed to drive in one 24-inch hollow steel pipe pile around the well to a depth approximately 93 feet below the mud line (15 feet into the surface of the impermeable Blue Clay bedrock) at the Treadwell location. During vibratory pile driving, obstructive resistance may be encountered that prevents the pipe pile from penetrating any deeper even after re-alignment of the pipe pile has been performed. A diesel impact hammer may then be utilized to drive the pipe pile to the required depth. A Pile and Conductor Drivability Support Study was prepared on the Treadwell well as an example. An analysis of the cumulative pipe pile driving time vs. penetration is presented as Figure 2-4. Figure 2-5 is a photograph showing the installation of a pipe pile during the Becker well abandonment. All pipe pile driving activities involving the combination of a vibratory hammer and impact hammer are anticipated to take between 45 and 90 minutes.

Pile driving activities would occur between the hours of 8:00 a.m. and 5:00 p.m., Monday through Friday. “Soft start” methods would be used for both vibratory hammer and impact hammer pile driving activities. Soft start procedures include beginning with reduced force and “ramping up” gradually to the necessary force. These soft start procedures would be implemented at the start of each day’s pile driving and at any time following the cessation of pile driving for a period of 30 minutes or longer (up to a maximum duration of approximately 90 minutes). For soft start procedures, the sound would be initiated for 15 seconds at reduced energy followed by a 30 second waiting period; this procedure would then be repeated two additional times prior to pile driving at maximum hammer performance. Pile driving would be continued until the required embedment is achieved.

Once the pipe pile has been set at the required depth, a high-pressure jetting tool would be employed, as needed, to remove sand from between the pipe pile and the wellbore. With the annular space between the pipe pile and the well casing cleared out, cement would then be pumped into the pipe pile and act as a first barrier to migration of hydrocarbons up the annular space. The final step of well abandonment would be to weld a steel plate on top of the pipe pile. The plate would act as a secondary barrier to migration of hydrocarbons.

Figure 2-3. Welders Seal a Cap on the Becker Well Inside the Cofferdam

Figure 2-4. Treadwell 10 Cumulative Steel Pipe Pile Driving Time vs. Penetration Analysis

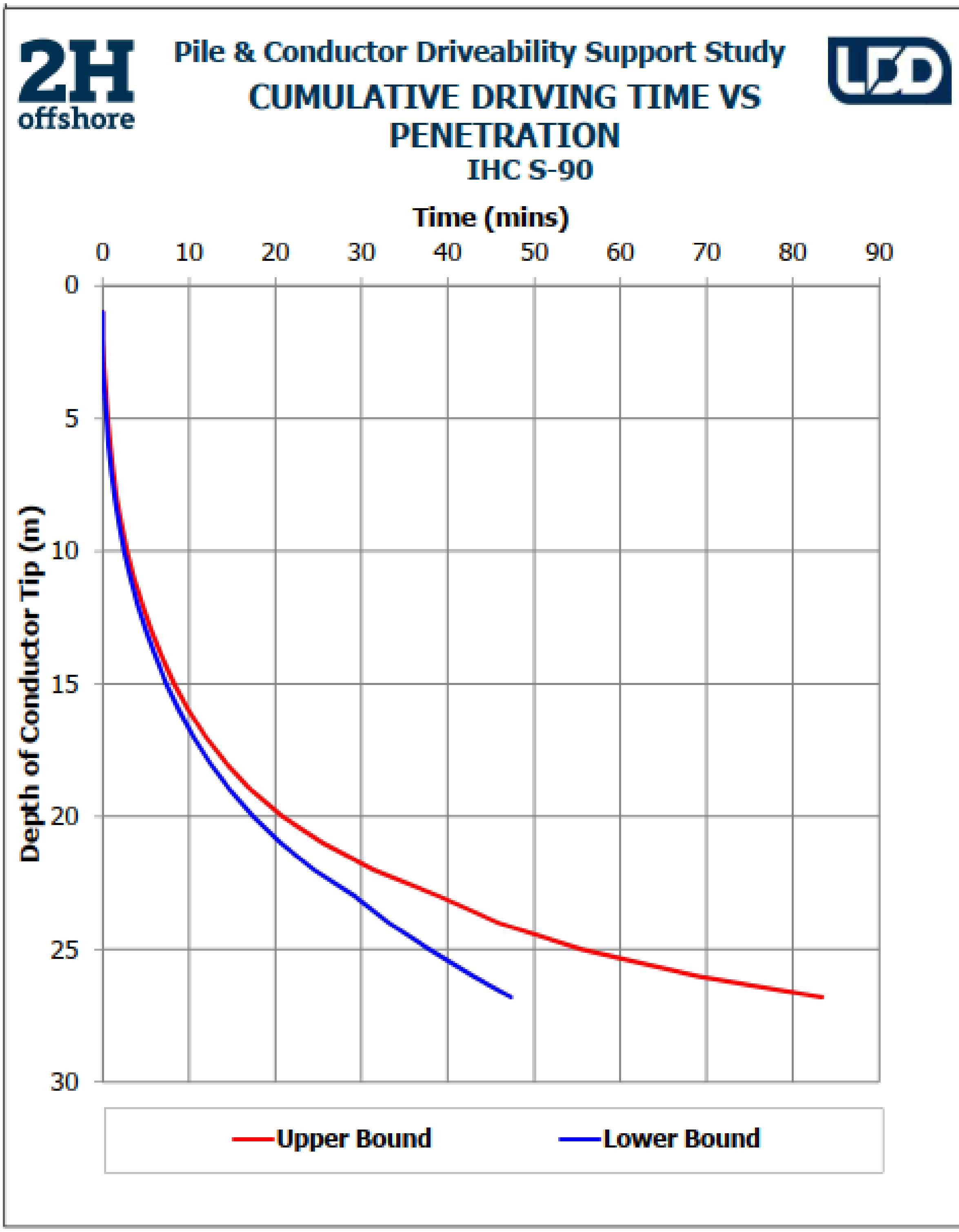


Figure 2-5. Installation of Steel Pipe Pile During Becker Well Abandonment

Figure 2-6. Becker Well Exterior Abandonment Plan

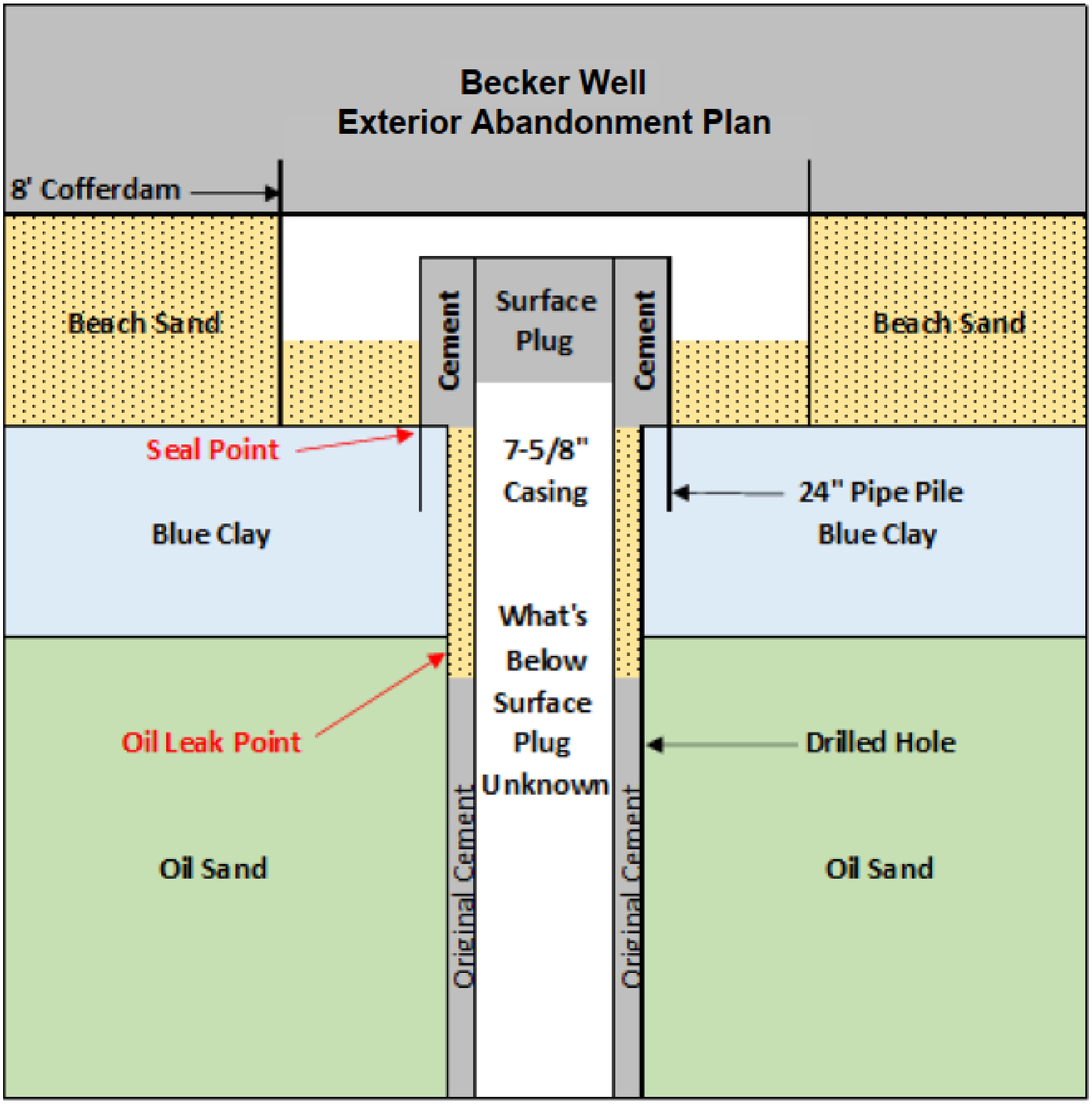


Figure 2-6 (above) shows a drawing of the Becker Well Exterior Abandonment Plan. The remaining legacy well abandonment projects would be implemented in the same manner. Table 2-2 lists the abandonment operation equipment.

Once the well abandonment is complete, cofferdam removal would begin. The same vibratory hammer used to install the cofferdam would also be utilized during removal, with the cofferdam being lifted by the vibratory driver and placed onto the barge. Fluid stored in the holding tank of the barge that is not contaminated with hydrocarbons would be discharged overboard prior to barge departure. If the cofferdam becomes stuck and is unable to be removed, the cofferdam would be cut 5 feet below the mud line (if feasible), removed, and stored on the barge. The low portion of the cofferdam would be left in place. Table 2-2 lists the equipment needed for cofferdam removal.

2.3 REVISED EQUIPMENT REQUIREMENTS

As mentioned in Section 2.2, future legacy offshore well abandonments may require the use of a diesel impact hammer for pile driving activities. Any offshore abandonment activities would also require the use of ocean-going vessels, an anchored derrick barge and a tug. For the abandonment of wells with a cement well cap (e.g., Treadwell), the crane barge and tug would be used with support by work boats. These types of operations should be completed in approximately 9 days. Additionally, any onshore beach-accessed well abandonment activities would require the mobilization of heavy equipment on Summerland Beach during low tide cycles. This onshore abandonment approach would not require the use of a barge or a diesel impact hammer for Project completion. This approach should be completed in approximately 4 days. Table 2-2 lists the equipment required for the various well abandonment work activities.

Table 2-2. Well Abandonment Equipment List

Onshore / Intertidal Wells – Low Tide Beach Access

Equipment Type	Horsepower (hp)	Hours/ Day	# Days
Generator	300 hp	12	4
65 Ton Crane Engine	275 hp	12	3
Hydro Crane Engine	300 hp	12	3
Excavator	153 hp	12	2
Bin Truck w/ Skid	400 hp	12	3
Rubber Tire Loader	196 hp	12	3
Cement Pump Truck	302 hp	12	1

Offshore / Subtidal Wells - 24 Hours/Day

Equipment Type	Horsepower (hp)	Hours/ Day	# Days
Derrick Barge - DB Salta Verde			
Crane Engine (2)	318 hp	6	5
Generator (2)	201 hp	24	5
Main Winch (1)	201 hp	2	5
Tug – Bernardine			
Main Engine (2)	500 hp	9	5
Generator (1)	87 hp	24	5
Assist Vessel(s)			
Mercury SeaPro Outboard Engines (2)	200 hp	2	5
Honda BF75-90 (2)	90 hp	2	5
Honda BF225 (2)	225 hp	4	5

Offshore / Subtidal Wells - 12 Hours/Day

Equipment Type	Horsepower (hp)	Hours/ Day	# Days
Derrick Barge - DB Salta Verde			
Crane Engine (2)	318 hp	3	4
Generator (2)	201 hp	12	4
Main Winch (1)	201 hp	1	4
Diesel Impact Hammer (1)	460 hp	1.5	1
Tug – Bernardine			
Main Engine (2)	500 hp	4.5	4
Generator (1)	87 hp	12	4
Assist Vessel(s)			
Honda BF225 (2)	225 hp	2	4

2.4 PERSONNEL REQUIREMENTS

There would be no change to the maximum number of personnel required for additional well abandonments from the number specified in the EIR. For a modified abandonment (such as Treadwell), onshore work would be completed by a crew stationed in Lookout Park. The first phase of offshore work would be completed by the barge crew and offshore diving crew; working 24 hours per day, for approximately 5 days. The second phase of offshore work would occur for approximately 4 days; working 12 hours a day. Work activities would require approximately 24 to 25 persons for 24-hour work and 14 to 15 persons for 12-hour work as shown in Table 2-3 and Table 2-4, respectively.

Table 2-3. Personnel Requirements – 24 Hours/Day (5)

Derrick Barge Crew Numbers	
Barge Master	2
Barge Deck Crew	8
Marine Mammal Observers	2-3
TOTAL	**12-13**
Dive Crew Numbers	
Diving Support Supervisor	2
Diving Support Team	8
TOTAL	**10**
Onshore Crew Numbers	
Technicians	2
TOTAL	**2**

Table 2-4. Personnel Requirements – 12 Hours/Day (4)

Derrick Barge Crew Numbers	
Barge Master	1
Barge Deck Crew	4
Marine Mammal Observers	2-3
TOTAL	**7-8**
Dive Crew Numbers	
Diving Support Supervisor	1
Diving Support Team	4
TOTAL	**5**
Onshore Crew Numbers	
Technicians	2
TOTAL	**2**

3.0 ENVIRONMENTAL ASSESSMENT

The following comparative analysis was undertaken to analyze whether the additional use of onshore access (as shown in Figure 1-2), a diesel impact hammer, or removal of a cement well cap during abandonment activities, would have any significant environmental impacts that were not previously addressed in the EIR. The comparative analysis discusses: 1) whether impacts are increased, decreased, or remain unchanged from the conclusions discussed in the EIR; and 2) whether any changes to existing mitigation measures or the inclusion of additional mitigation measures are warranted or required.

3.1 HAZARDOUS MATERIALS AND RISK OF UPSET

The EIR discussed the potential for an upset causing a release of hazardous materials, levels of public safety and spill risk that may be associated with the Project, including those issues that could adversely affect public health. The EIR identified that abandonment activities could increase risk above existing baseline operations and could produce a significant hazard to the public through the use or disposal of hazardous materials. As a result, the CSLC prepared an Abandonment and Contingency Plan (APM-1) detailing the abandonment procedures (assuming re-entry of the well) including: 1) the use of appropriate circulation fluids and/or drilling muds; 2) the type and sizing of circulation fluid pumps; 3) details of all abandonment contingencies. Additionally, a barge layout and anchor plan would be prepared as well as a refueling plan to ensure that drip pans and proper containment is used to prevent spillage. The EIR also states emergency response equipment must be available (APM-3) during the installation of the cofferdam and the well abandonment activities. The EIR also included a draft Oil Spill Contingency Plan[2] per APM-2 (Appendix D of the EIR) to address any potential leakage or spill of oil or materials, including the use of an onsite spill response team, use of absorbent pads, refueling requirements, material storage requirements, and the availability of spill response personnel in the event of a spill reaching the marine environment. The EIR determined that any impacts associated with hazards and risk of upset would be less than significant with mitigation.

The proposed modifications would result in similar hazardous materials impacts as those analyzed in the EIR. Hazardous materials impacts associated with onshore beach access include the leakage or spillage of fuel, hydraulic oils or lubricants from the equipment used during well abandonment operations and while staged at Lookout Park. These potential impacts would be addressed by APM-2 in both the prevention of an upset and subsequent response if one occurs. No further mitigation measures are required.

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[2] The Oil Spill Contingency Plan was finalized in December 2017 prior to the Becker well abandonment that occurred in February 2018.

Compared to the activities analyzed in the EIR, the onshore beach access, additional use of a diesel impact hammer, or cement well cap removal would not create new significant environmental effects or increase the severity of previously identified significant effects related to hazards and hazardous materials.

3.2 AESTHETICS

The EIR concluded that short-term relatively minor changes in the physical environment could affect the visual (aesthetic) perceptions of visitors to Lookout Park or adjacent residents. The leaking legacy wells that require abandonment are located both onshore and nearshore (see Figure 1-1) of Summerland beach and Lookout Park. As a result, abandonment activities would be visible to the public. The EIR concluded that due to their temporary nature, activities as seen from selected viewpoints in the area or from commercial or recreational vessels did not result in views that were out of character with surrounding visual conditions, nor did these activities significantly change existing visual conditions. The EIR analysis did not identify any significant effects to the visual character or environment (i.e., impacts were determined to be less than significant), and no mitigation measures were required.

Aesthetic impacts resulting from the additional use of a diesel impact hammer or cement well cap removal are unlikely to result in aesthetic impacts similar to the EIR; however, the need for onshore access to wells such as C.H. Olsson and Duquesne could result in impacts due to the use of heavy equipment and vehicles used in onshore beach-accessed well abandonment activities. The equipment would be driven from the Lookout Park staging area to the onshore wells via the two beach access routes identified in Figure 1-2. The heavy equipment, vehicles, and personnel would be visible during onshore well abandonment activities, during transportation to and from the staging area, and while parked in the staging area. As described in Table 2-1, the legacy wells that could be abandoned utilizing an onshore approach (C.H Olsson 805 and Duquesne 910) would only require approximately 4 days to complete; therefore, the aesthetic impacts due to onshore access would be considered temporary. In addition, equipment tracks on the beach would likely be covered with sand during the next tide cycle.

Offshore legacy well abandonment activities would not result in any long-term or permanent changes to the existing offshore, nearshore or onshore environments. Construction activities would be limited to a 2-week (or less) timeframe per well abandonment as weather and site conditions permit. Following removal of the barge, staging areas would be returned to pre-project conditions and no long-term or permanent impacts would result. Therefore, as stated in the EIR, impacts to visual resources from legacy well abandonment activities “are considered less than significant because of their short-term nature”. No new mitigation measures are necessary. Compared to the activities analyzed in the EIR, the use of an onshore access, a diesel impact hammer, or cement well cap removal would not create new significant environmental effects or increase the severity of previously identified significant effects related to aesthetics.

3.3 AIR QUALITY

This Addendum considers whether the potential emissions from the additional use of a diesel impact hammer or cement well cap removal would result in increased air emissions as compared to the project emissions calculated for the EIR. Specific consideration was given as to whether the use of the crane barge associated crew and supply boats, portable equipment used to support activities on the barge, and on-road vehicles for use in the Treadwell abandonment example plus potentially the abandonment of a second offshore well, can be accomplished within the potential emissions described in the EIR. Greenhouse gas (GHG) emissions are discussed in Section 3.7, *Greenhouse Gas Emissions*. Well abandonments using an onshore approach would not require the use of either a barge or a diesel impact hammer. This would result in fewer project emissions than the emissions estimates covered under the scope of the EIR.

The Project is located within the Santa Barbara County Air Pollution Control District (SBCAPCD), Ventura County Air Pollution Control District (APCD) and South Coast Air Quality Management District (SCAQMD). The SBCAPCD has jurisdiction over air quality attainment and stationary sources in the Santa Barbara County portion of the South Central Coast Air Basin. Criteria air pollutants of concern are ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (PM_{10} and $PM_{2.5}$), lead (Pb), sulfates, hydrogen sulfide (H_2S), vinyl chloride, and visibility reducing particles.

The County of Santa Barbara and SBCAPCD have not adopted daily or quarterly quantifiable emission thresholds for short-term construction emissions. In the absence of adopted thresholds, 25 tons per year is used as the significance threshold for construction emissions of reactive organic compounds (ROC) and nitrogen oxides (NOx). PM_{10} emissions should be estimated and mitigated, as required in the SBCAPCD Air Quality Attainment Plan (SBCAPCD 2015a).

For Ventura County APCD, temporary construction emissions (including portable engines and portable engine-driven equipment subject to California Air Resources Board [CARB] Statewide Portable Equipment Registration Program, and used for construction, repair, and maintenance activities) of reactive organic compounds (ROCs) and NOx are not counted towards a significance determination. However, construction emissions should be mitigated if ROC and NOx emissions from heavy-duty construction equipment would exceed 25 pounds per day. Ventura County APCD Rule 26 thresholds associated with offset requirements are: NOx and ROC: 5 tons per year and PM_{10}/sulfur oxides (SOx): 15 tons per year.

For SCAQMD, construction emissions thresholds are based on a pounds per day level for each pollutant (NOx 100 lbs/day, volatile organic compounds 75 lbs/day, PM_{10} 150 lbs/day, $PM_{2.5}$ 55 lbs/day, SOx 150 lbs/day, CO 550 lbs/day and lead 3 lbs/day).

The EIR concluded that an increase of emissions of criteria pollutants would occur due to construction activities related to barge transportation (tug engines), sheet pile installation related to installation of the cofferdam (crane and pile driver engines), well abandonment activities (well rig, cement engines, etc.), removal of the cofferdam, crew boat engine emissions and employee and equipment delivery on-road emissions. The EIR evaluated the use of a jack-up barge requiring three round trips between the Port of Long Beach and the Becker well project site.

The air quality calculations for this Addendum assumed the same modified approach as the Becker well abandonment (as described in section 1.2.1) with the additional use of a diesel impact hammer. The diesel impact hammer would be powered by a diesel engine with a maximum output capacity of 460 hp. The impact hammer would be run on an as-needed basis for a maximum duration of 90 minutes during pipe pile driving activities. Short term emissions associated with the use of a diesel impact hammer are described in Table 3-1 below.

Table 3-1. Diesel Impact Hammer Short Term Emissions

	NOx lb/day	ROG lb/day	CO lb/day	SO_2 lb/day	PM_{10} lb/day	$PM_{2.5}$ lb/day
Diesel Impact Hammer	2.67	0.30	2.57	0.06	0.15	0.14

ROG = reactive organic gases

As summarized in Table 3-2, and in Appendix B, the potential emissions for the proposed well abandonment campaign utilizing a diesel impact hammer and any onshore well abandonment activities are calculated to be less than the Becker well abandonment totals as described in the EIR (Section 4.3.4 and Table 4.3-1).

Table 3-2. Comparison of Project Construction Emissions (Tons Per Project)

2017 Project Final EIR (Becker Well Abandonment)

	NOx	ROC	CO	SOx	PM_{10}	$PM_{2.5}$
Santa Barbara County	0.96	0.08	0.52	0	0.04	0.33
Ventura County and South Coast AQMD[1]	1.57	0.12	0.89	0	0.05	0.05
Total	**2.54**	**0.20**	**1.4**	**0**	**0.09**	**0.09**

Offshore Project Modification (Subtidal Well Abandonment)

	NOx	ROC	CO	SOx	PM_{10}	$PM_{2.5}$
Santa Barbara County	1.45	0.15	0.72	0	0.04	0.04
Ventura County and South Coast AQMD[1]	0.11	0.01	0.11	0	0	0
Total	**1.55**	**0.16**	**0.83**	**0**	**0.04**	**0.04**

Onshore Project Modification (Onshore Well Abandonment)

	NOx	ROC	CO	SOx	PM_{10}	$PM_{2.5}$
Santa Barbara County	0.08	0.01	0.08	0	0.01	0.01
Total	**0.08**	**0.01**	**0.08**	**0**	**0.01**	**0.01**

[1] Emissions include the barge transiting through Ventura County and South Coast AQMD.

As noted above, well abandonments using an onshore approach would not require the use of either a barge or a diesel impact hammer. This would result in fewer project emissions than the emissions estimates covered under the original scope of the EIR. No additional impacts would be created from any onshore well abandonment activities.

Compared to the activities analyzed in the EIR, the modifications would not create new significant environmental effects or increase the severity of previously identified significant effects related to air quality. No additional mitigation is required.

3.4 BIOLOGICAL RESOURCES

The EIR evaluated potentially significant impacts to marine and terrestrial biological resources resulting from the Becker well abandonment activities and alternatives in Section 4.4, *Biological Resources*. Well abandonment activities associated with the additional use of a diesel impact hammer or cement well cap removal would mostly occur within the same areas as the Becker well abandonment and are expected to have similar impacts. However, the use of the onshore beach access as described in Section 1.4.1, could result in temporary impacts.

3.4.1 Terrestrial Biological Resources

The terrestrial shoreline adjacent to the abandonment sites supports a variety of coastal habitats, including sandy beach, coastal dune scrub, disturbed/recreational beach, coastal marsh, and estuaries. These habitats support several protected natural resources and threatened and endangered shorebird species.

Onshore well abandonment activities would be confined to the Lookout Park parking lot, established County beach access routes, and exposed hard-packed sand on Summerland Beach. Use of the parking lot would be coordinated with Santa Barbara County Department of Parks and Recreation and would be consistent with prior approvals. All heavy equipment and vehicles driven on Summerland Beach would follow the County beach access routes identified in Figure 1-2. Heavy equipment and vehicles would be driven down the paved access ramps to the beach. As previously stated, the onshore and intertidal wells can only be accessed during low tide cycles. This would allow for vehicles to be driven over the exposed hard-packed sand down to the onshore site avoiding any sensitive habitat that may be present along the beach. As described in the EIR, Lookout Park and Summerland Beach are recreational areas heavily used by humans. The native coastal dune scrub community was likely once one of the dominant terrestrial habitats in the area; however, vegetation near the abandonment sites currently consists primarily of non-native vegetation and invasive non-native weeds, and the native coastal dune scrub is mostly absent. Substantial recreational use of the beach has reduced the overall value of the habitat to most wildlife species.

As stated in the EIR, the nearest coastal marsh to the abandonment sites is the Carpinteria Marsh which is approximately 4 miles to the east. Other major wetlands in the general vicinity include Goleta Slough and Devereaux Slough, approximately 14 and 16 miles to the west, respectively. Additionally, some of the larger drainages in the vicinity (e.g., Santa Clara River, more than 24 miles to the south) also support estuarine habitats. Due to the large distances from the sites, Project-related impacts to either coastal marsh or estuarine habitat areas are not expected.

Species within the onshore area potentially include the California grunion (*Leuresthes tenuis*) and shorebirds (CSLC 2017). As Grunion leave the water during high tide in the spring and summer months to spawn at night, with peak spawning occurring between late March and early June. As the onshore and intertidal wells can be accessed only at low tide, equipment is not scheduled to be present on the beach during the hours of expected grunion spawning, should they be present. As stated in the EIR, Grunion are not threatened, endangered, or candidate species and the limited areas used for well abandonment would not result in significant impacts.

Several shorebird species that may occur in the onshore area include willet (*Catoptrophorus semipalmatus*), long-billed curlew (*Numenius americanus*), marbled godwit (*Limosa fedoa*), whimbrel (*Numenius phaeopus*), sanderling (*Calidris alba*), least sandpiper (*Calidris minutilla*), western sandpiper (*Caladris mauri*), and black-bellied plover (*Pluvialis squatarola*) (CSLC 2017). In addition, the western snowy plover *(Charadrius alexandrinus nivosus)*, which is listed as federally threatened, uses sandy beach habitat in the for foraging. Along the mainland coast near the abandonment sites are a few comparatively isolated sandy beaches. The snowy plover and federal- and state-endangered California least tern (*Sterna antillarum browni*) frequent the supratidal zone along these beaches. Similar to the EIR analysis, shorebirds would be expected to avoid the well areas during beach access and work activities. In addition, due to the temporary nature of the disturbance and other available foraging habitat nearby, impacts to bird species would be less than significant.

As noted above, heavy equipment and vehicles associated with onshore well abandonment would be driven primarily in areas that consist of disturbed/recreational beach that has been heavily impacted by the humans. Also, an oil spill contingency plan would be implemented to address the risk of equipment and vehicle leaks affecting terrestrial biological resources during onshore beach access. Lastly, an onsite environmental monitor would be present to ensure that movement of heavy equipment and vehicles does not threaten shorebirds or other wildlife in the vicinity. As a result, no new or substantially more severe impacts to sandy beach, coastal dune scrub, disturbed/recreational beach, or other onshore sensitive species or habitats are expected.

3.4.2 Marine Biological Resources

Continued well abandonment would generate temporary noise along the coastal and marine environments due to the use of pile drivers, diesel engines (located in the crane and tug, crew, and oil spill vessels), and pumps during abandonment activities. For the purpose of this Addendum, the use of a diesel impact hammer to drive one 24-inch pipe pile, in addition to the removal of a concrete well cap, was evaluated to determine whether significant noise or vibrations would occur, potentially impacting marine organisms. Noise from the diesel engines and pumps were previously evaluated in the EIR.

Pile driving would be conducted daily on weekdays from 8:00 a.m. to 5:00 p.m. until the one pipe pile is installed around the well. Weekend work may be necessary if complications arise with, for example, the removal of the concrete well cap on Treadwell 10. Once well abandonment activities are completed and the cofferdam and barge (if used) are removed (evaluated in the EIR; see Attachment A), there would be no additional activities on the beach. All abandonment activities are estimated to take 9 days, assuming no weather-related interruptions or delays.

During the 4-day abandonment phase of each well, noise levels would be temporarily elevated in the area, which may potentially impact marine mammals, sea turtles, birds, and fish. When analyzing the auditory effects of noise exposure, noise is categorized as either being impulsive (high peak sound pressure, short duration, fast rise-time, and broad frequency content) or non-impulsive (steady-state). For example, sonars, vessel, engines and vibratory pile driving are considered to be non-impulsive sources, while explosives, impact pile driving, and airguns are treated as impulsive sources. Marine species generally have lower thresholds for damage associated with impulsive noise than non-impulsive noise sources as a result of the high peak noise levels associated with impulsive noise (Popper et. al. 2014). Impacts to marine organisms from noise are generally defined as those causing permanent hearing loss and loss of hearing sensitivity (permanent threshold shift [PTS]), those causing a temporary impact to an organism's hearing abilities with a return to normal hearing (temporary threshold shift [TTS]), and those causing a change in an organism's behavior (NMFS 2018).

Sound and acoustic pressure resulting from pile driving could cause behavioral avoidance of the construction area and/or injury or permanent damage to marine organisms if conducted suddenly and at full force. During abandonment activities, the greatest construction noise, both in-water and in-air, is expected to occur during installation and removal of the cofferdam, and installation of the 24-inch pipe pile, with the latter being the greatest noise impact specific to abandonment. However, construction activities would occur either on the beach or just outside of the surf zone, in close proximity to substantial ambient noise which may mask noise from construction (NMFS 2018). Additionally, because the pipe pile will be driven within the cofferdam, noise levels may be reduced by 10 to 20 dB (Bellman 2014). Although these potential influences may reduce the sound levels from project activities, the historical pile installation measurements by the California Department of Transportation (Caltrans) and National Marine Fisheries Service (NMFS)were used in the analysis below, therefore, providing conservative estimates for potential impacts (Caltrans 2015, NMFS 2018).

Estimation of Impact Pile Driving Noise

Underwater sound measurement data for similar projects were reviewed to estimate sound levels for vibratory and impact hammer pile-driving activities during the installation the cofferdam. Data for this analysis are from the Caltrans (2015) Compendium of Pile Driving Sound Data, which contains measured underwater noise levels for various pile types and environments. Measurements are typically taken within 33 feet (10 meters [m]) of the pile driving activities, and as sound propagates through the water from the source, it loses intensity (transmission loss). Based on information from Caltrans (2015), sound levels for impact pile drivers, range from 180 to 220 dB_{peak}, with average sound levels ranging from 186 to 205 dB_{peak}. Data from similar arrangements as the Project Modification (10- to 15-inch steel H-piles) produced peak sound levels up to 190 dB_{peak}, with average sound levels of 180 dB (Noyo River, San Rafael Canal, and Ballena Isle Marina in generally shallow water). The analysis in this EIR Addendum relies on sound measurements obtained from similar projects and uses the simplified attenuation formula for shallow water, which is an accepted method to estimate transmission loss of sound through water (NMFS 2018) to calculate the sound levels at various distances from the source.

Potential Effects of Impact Pile Driving Noise on Marine Mammals

Impact pile driving generates both airborne and underwater noise. Airborne noise generated from pile driving could potentially impact pinnipeds (e.g., sea lions and harbor seals) if hauled out near the well site. The closest pinniped haul-out site is located in Carpinteria, approximately 6 miles from the Project area. Based on NMFS's (2018) in-air acoustic thresholds for pinnipeds (90 dB_{rms} for harbor seals, 100 dB_{rms} for other pinnipeds), pile driving noise would not exceed these thresholds at the haul-out site due to the distance from the Project area. Therefore, airborne noise during pile driving is not expected to result in a significant impact.

In 2018, NMFS revised guidelines for the assessment of in-water noise impacts on marine mammals (NMFS 2018). The NMFS Technical Guidance provides a new method for calculating the onset of PTS for various marine mammal groups based on the hearing characteristics of the groups (e.g., high-, mid-, and low-frequency cetaceans). Table 3-3 provides a summary of marine mammal hearing ranges and PTS onset threshold levels for impulsive sounds. Considering impact pile driving is likely to be used for the Project, impulsive noise thresholds were analyzed. The NMFS 2018 Technical Guidance, however, did not make any changes with respect to the behavioral disruption thresholds; therefore, NMFS's previous acoustic threshold for impulsive noise (160 dB_{rms}) is still applicable. There are no underwater acoustic thresholds established for sea otters; however, in light of experimental evidence, the U.S. Fish and Wildlife Service (USFWS) recently used NMFS's acoustic thresholds for otariids (eared seals) to determine underwater acoustic impacts to sea otters for pile driving activities in Elkhorn Slough, Monterey County (USFWS 2017). The same approach was taken in this analysis.

The impact to marine mammals from impact pile driving was examined using the average and the peak possible sound levels. The average sound levels from impact pile driving, without a cofferdam, range from 186 to 205 dB_{peak}. The average sound level used in the assessment of the impact on marine mammals was the highest average value possible: 205 dB. The peak sound levels possible from impact pile driving, without a cofferdam, range from 180 to 220 dB_{peak}. The peak sound level used in the assessment of the impact on marine mammals was the highest peak value possible: 220 dB.

Based on the revised PTS onset threshold guidelines provided by NMFS (2018), high-frequency cetaceans (true porpoises) have the lowest peak sound pressure level (SPL) and cumulative sound exposure level (SEL) threshold, and thus may experience PTS at the greatest distance from the impact pile driving source. For high-frequency cetaceans, the cumulative SEL threshold is 155 dB SEL and the peak SPL threshold is 202 dB SPL. The average sound levels generated from impact pile driving (205 dB) would exceed the high-frequency cetacean SEL threshold (155 dB SEL) to a distance of 100 m and would exceed the SPL threshold (202 dB SPL) to a distance of 10 m. The peak sound levels possible from impact pile driving (220 dB) would exceed the high-frequency cetacean SEL threshold (155 dB SEL) to a distance of 130 m and would exceed the SPL threshold (202 dB SPL) to a distance of 40 m. Dall's porpoise, a high-frequency cetacean found offshore the Project site, are typically found several hundred feet offshore (Jefferson and Braulik 2018) and are, therefore, expected to be predominately located beyond the range of experiencing PTS as a result of impact pile driving.

All other cetaceans (mid-frequency and low-frequency cetaceans) and pinnipeds (both phocids and otariids) have peak SPL and cumulative SEL thresholds above those of high-frequency cetaceans for the onset of PTS (see Table 3-3). Mid-frequency cetaceans, such as coastal bottlenose dolphins, have a cumulative SEL threshold of 185 dB and a peak SPL threshold of 230 dB, and can be found very close to shore (Table 3-3). The average sound levels generated from impact pile driving (205 dB) would exceed the mid-frequency cetacean SEL threshold (185 dB SEL) to a distance of 40 m and would not exceed the SPL threshold (230 dB SPL). The peak sound levels possible from impact pile driving (220 dB) would exceed the cumulative SEL threshold (185 dB SEL) to a distance of 70 m and would not exceed the SPL threshold (230 dB SPL). Low- and mid-frequency cetaceans and pinnipeds have cumulative SEL thresholds higher than high-frequency cetaceans and are not expected to experience PTS at distances beyond 85 m from the pile driver (based on the low-frequency cetacean SEL threshold). With the planned abandonment activities, which includes the installation of a cofferdam, noise levels would be further reduced, and the implementation of Mitigation Measure (MM) BIO-4b and MM BIO-4c (as provided in the EIR) would ensure potential impacts are reduced to less than significant.

For behavioral disruption, noise levels produced by impact pile drivers would exceed the 160 dB_{rms} threshold. Based on NMFS spreadsheet tools and acoustic calculations (using the simplified attenuation formula for shallow and near-shore waters (NMFS 2018), with an attenuation rate of 5 dB/10 m), the distance to the behavioral threshold for marine mammals would be up to 120 m for an impact pile driver without a cofferdam or other noise mitigation, and 70 m for an impact pile driver with sheet piles similar to those that may be used in the Project (12- to 15-inch steel H-piles, using peak values). As these distances to the behavioral disturbance threshold are closer to shore, it is anticipated that marine mammals would avoid this area of elevated noise, where behavioral disturbance could occur. Given the information above, the temporary, localized nature of impact pile driving, and the implementation of Mitigation Measure (MM) BIO-4b (soft-start procedures) and MM BIO4-c (marine mammal/sea turtle monitoring), potential impacts would be reduced to less than significant.

Table 3-3. Summary of Marine Mammal Hearing Ranges and PTS Onset Thresholds (Received Level) for Impulsive Noise

Hearing Group	Peak SPL (dB re 1 uPa)	Cumulative SEL (dB re 1uPa²s)[1]
Low-Frequency Cetaceans	219	183
Mid-Frequency Cetaceans	230	185
High-Frequency Cetaceans	202	155
Phocids (underwater)	218	185
Otariids (underwater)	232	203

Source: NMFS 2018

Acronyms: dB = decibel; PTS = permanent threshold shift; re 1 μPa = referenced to 1 microPascal; re 1 μPa^2s = referenced to 1 microPascal squared per second; SEL = sound exposure level; SPL = sound pressure level.

Notes:

[1] All cumulative SEL acoustic threshold levels (re 1 μPa^2s) incorporate marine mammal auditory weighting functions, while peak SPL thresholds should not be weighted.

Potential Effects of Impact Pile Driving on Fish and Sea Turtles

In 2008, the Fisheries Hydroacoustic Working Group (FHWG)[3] issued interim threshold criteria based on best available science for the onset of injury to fish from noise generated during pile driving, as shown in Table 3-4 (FHWG 2008).

For behavioral changes in fish, NMFS and USFWS generally have used 150 dB_{peak} as the threshold for behavioral effects on ESA-listed fish species, citing that sound pressure levels in excess of 150 dB_{peak} can cause temporary behavioral changes (startle and stress) that could decrease a fish's ability to avoid predators (Popper et al. 2014). However, no special-status fish species are anticipated to occur near the Project site.

Very few hearing studies have involved sea turtles (Popper et al. 2014). Sea turtles appear to be sensitive to low-frequency sounds with a functional hearing range of approximately 100 Hertz to 1.1 kiloHertz (Ridgway et al. 1969; Bartol et al. 1999; Ketten 2008; Martin et al. 2012). It has been suggested that sea turtle hearing thresholds should be equivalent to TTS thresholds for low-frequency cetaceans (Southall et al. 2007; Finneran and Jenkins 2012); however, more recently, the Acoustical Society of America standards committee suggested that turtle hearing was probably more similar to that of fishes than marine mammals (Popper et al. 2014). For this analysis, sea turtles were presumed to have the same thresholds as those fishes with swim bladders not involved in hearing. Thus, sea turtle mortality and mortal injury would be expected at pile driving

[3] Members of the FHWG include NMFS's Southwest and Northwest Divisions; California, Washington, and Oregon Departments of Transportation; CDFW; and U.S. Federal Highway Administration.

sound levels greater than a cumulative SEL threshold of 207 dB and peak SPL threshold of 210 dB_{peak} (Popper et al. 2014). Little information is available on sea turtle behavioral changes due to in-water noise. Behavioral changes for sea turtles would most likely be similar to marine mammals (160 dB) or fish (150 dB); therefore, impacts to sea turtle behavior would be similar to the conclusions above for marine mammals and fish.

Table 3-4. Interim Thresholds for Onset of Injury and Behavioral Effects in Fish from Impulsive Noise

	Peak SPL (dB re 1 μPa)	Cumulative SEL (dB re 1 μPa^2s)
Less than 2 grams*	206	183
Greater than or equal to 2 grams*	206	187
Behavioral effect threshold**	150	N/A

Sources: * NMFS 2008; ** Popper et al. 2014.
Acronyms: dB = decibel; N/A = no data available; re 1 μPa = referenced to 1 microPascal; re 1 μPa^2s = referenced to 1 microPascal squared per second; SEL = sound exposure level; SPL = sound pressure level.
Note: There are no formal criteria for continuous noise. The impulse noise thresholds are commonly applied for continuous noise in the absence of a specific threshold.

Based on NMFS spreadsheet tools and acoustic calculations (using the simplified attenuation formula applicable to shallow and near-shore waters [NMFS 2018], with an attenuation rate of 5 dB/10 m), impact pile driving would not exceed the injury thresholds established for fish or sea turtles. The distance to the behavioral disruption threshold for fish would be up to 140 m for an impact pile driver without a cofferdam or other noise mitigation, and 90 m for an impact pile driver with sheet piles similar to those that may be used in a project (using peak noise values). However, no special-status fish species are anticipated to occur near the Project area and, as these distances are close to shore, it is anticipated that sea turtles would rarely, if ever, occur within this area of elevated noise. Given the information above, the temporary, localized nature of impact pile driving and the additional cement cap removal, and the implementation of MM BIO-4b and MM BIO4-c, potential impacts would be reduced to less than significant.

Potential Effects of Impact Pile Driving Noise on Birds

While there are no official criteria for airborne or underwater noise thresholds for birds, recommended interim in-air guidelines to assess noise effects on birds are 125 dBA for PTS and 93 dBA (A-weighted dB) for TTS (Dooling and Popper 2007). For impact pile driving, typical noise levels at 50 feet from the source are around 101 dBA (Dooling and Popper 2007). The double-crested cormorant, a species of special concern, has been found nesting as recently as 2012 in the area. For example, the double-crested cormorant was identified approximately 2800 feet from the Treadwell 10 location. Using the equation from USFWS (2012)[4] to determine construction noise levels at a specific distance, birds at the 2012 nesting site would experience noise levels around 57.3 dBA during impact pile driving, which is less than both PTS and TTS thresholds. The remaining sensitive avian species are most commonly observed beyond the shelf break, in areas adjacent to submarine canyons and other deep-water features, or around the Channel Islands. As such, their presence near the Project area is unlikely. Therefore, in-air noise impacts to seabirds would be less than significant. Most terrestrial avian species, including the numerous species of shorebirds regularly observed in the area, are expected to temporarily avoid the Project area during the 9-day disturbance period. Due to the temporary nature of the disturbance and other readily available foraging habitat nearby, impacts to these bird species would be less than significant.

Diving seabirds include those that make shallow plunges from the water surface down to depths of 3 feet (1 m), make aerial plunges from various altitudes to depths of several feet, or dive to depths of tens of feet or more to feed. There is limited information on diving seabird sensitivity to underwater noise. Additionally, there are no underwater acoustic guidelines for diving seabirds. The U.S. Navy (2011) convened the Marbled Murrelet Science Panel to examine the potential impacts to the marbled murrelet due to underwater noise (Naval Facilities Engineering Command Northwest 2011). While the marbled murrelet is not found in the Project area, as it is a smaller bird than the cormorants, and noise impacts are generally a function of bird weight, the impacts on marbled murrelet are a conservative correlation to the birds in the area. The panel concluded that the recommended weighted auditory injury threshold for marbled murrelets is 202 dB SEL. The weighting used to calculate this threshold included corrections for hearing sensitivities and underwater exposure. Although noise impacts to birds would vary by species, this threshold would be generally applicable to other similarly sized seabirds. Additionally, behavioral changes in seabird activity in-water would most likely indirectly correlate to behavioral changes in fish, as the birds are diving to pursue fish species.

Diving seabirds are especially vulnerable approaching a sound source not only because birds have high hearing thresholds, but also because the sound-reflecting nature of the air-sea interface tends to trap waterborne sounds beneath the sea surface. As a result, seabirds on the water or diving in the area have the potential to be exposed to the maximum sound energy from pile driving. Near a pile driving site off Point Loma, California, least tern counts were lower on days with pile driving compared to days without pile driving (Naval Facilities Engineering Command Southwest 2014). Potential indicators of behavioral stresses due to noise on birds may include a startle response, difficulty

[4] L_{max} = Construction L_{max} at 50 feet - 25 * Log[D/D_o], where L_{max} is the highest A-weighted sound level occurring during a noise event at the time the noise is measured; at 50 feet is the reference measurement distance; D is the distance from the noise source, (2800 feet in this case), and D_o = the reference measurement distance (50 feet in this case).

detecting prey or predators, masking of communication sounds, physical displacement, and changing breeding or nesting sight locations. Awareness of seabird species and their responses are especially important since sensitive bird species, such as the double-crested cormorant, are found in the area (Table 4.4-1 in Attachment A). Based on the attenuation rate of 5 dB/10 m and the marine bird PTS threshold of 202 dB, impact pile driving would exceed this threshold out to 50 m when performing at peak noise levels and would be below the threshold with the planned abandonment activities, which includes the installation of a cofferdam. The maximum duration of impact hammer use would last approximately 90 minutes or less.

Since the duration of underwater sound exposure for diving seabirds is expected to be short (approximately 90 minutes or less), impacts resulting from impact pile driving are unlikely. As suggested by a Minerals Management Service (2001) Biological Evaluation, the “soft start” process (MM BIO-4b) may cause seabirds to disperse and thus serve as an avoidance measure preventing more direct effects. Seabirds in general relocate to an area where they are not bothered by physical or noise disturbance, to continue with their foraging, roosting, and other activities. A marine wildlife monitor would also be onsite to confirm no seabirds are within the Project area during peak noise periods.

Estimation of Handheld Pneumatic Rivet Buster Noise

A handheld pneumatic rivet buster will be used to remove the cement cap at the well. The process of this removal should take no more than 3 hours and the equipment sound level is reported to be 105 dBA, well below the conservative acoustic threshold for noise on marine mammals (160 dB_{rms}) and fish (150 dB_{peak}). Therefore, no significant impacts are predicted. However, the implementation of a “soft start” (MM BIO-4b) would be used to disperse any animals in the area, therefore further mitigating possible effects.

Overall Biological Impacts from Project Modification

Compared to the activities analyzed in the EIR, the onshore beach access, additional use of a diesel impact hammer, or concrete well cap removal, would not create new significant environmental effects or increase the severity of previously identified significant effects related to terrestrial and marine biological resources with implementation of the MMs identified in the EIR. However, MM BIO-4b has been revised to include the modifications as noted below:

MM BIO-4b. Soft Start. A “soft start” procedure shall be used during ~~vibratory~~ <u>all</u> pile driving activities to give marine mammals, sea turtles, birds and nearshore fish species an opportunity to move out of the area away from the sound source. Soft starts would be implemented at the start of each day's pile driving and at any time following the cessation of pile driving for a period of 30 minutes or longer. ~~For vibratory pile drivers,~~ <u>In addition,</u> the sound shall be initiated for 15 seconds at reduced energy followed by a 30-second waiting period; this procedure shall then be repeated two additional times prior to full pile driving.

3.5 CULTURAL RESOURCES

The EIR, Section 4.5, analyzed potential significant impacts to cultural resources associated with legacy well abandonment. Based on review of available data regarding archaeological and historic data and the results of previous seafloor surveys, the CSLC did not identify any known cultural resources within the area and concluded that no significant impacts would occur. During and since the Becker well abandonment, no previously unknown shipwrecks or cultural resources were identified during pre-Project surveys, well abandonment, or during any offshore surveys for legacy well investigatory purposes. Thus, Project Modification activities associated with legacy well abandonment in the Project area are not anticipated to result in impacts to any previously unknown resources or any new or more severe impacts to previously identified cultural resources.

Because the scope of the modifications are substantially similar to the scope of the EIR, and the MMs implemented during installation would be implemented during removal, the onshore beach access, additional use of a diesel impact hammer, or cement well cap removal would not create new significant environmental effects or increase the severity of previously identified significant effects related to cultural resources compared to the activities analyzed in the EIR.

3.6 CULTURAL RESOURCES – TRIBAL

As stated in the EIR, "Assembly Bill (AB) 52 (Gatto; Stats. 2014, ch. 532), which was enacted in September 2014, sets forth both procedural and substantive requirements for analysis of Tribal cultural resources, as defined in Public Resources Code section 21074, and consultation with California Native American Tribes." As part of implementing EO B-10-11, which concerns coordination with Tribal governments in public decision making, the CSLC (2016) adopted a Tribal Consultation Policy (Policy) to provide guidance and consistency in its interactions with California Native American Tribes (Item 61, August 19, 2016). The Policy, which was developed in collaboration with Tribes, other State agencies and departments, and the Governor's Tribal Advisor, recognizes that Tribes have a connection to areas that may be affected by CSLC actions and "that these Tribes and their members have unique and valuable knowledge and practices for conserving and using these resources sustainably" (CSLC 2016).

Enactment of AB 52 in 2014 does not itself constitute or give rise to one of the circumstances described in State CEQA Guidelines section 15162 mandating additional environmental review. In September 2015, CSLC staff submitted a Sacred Lands File and Native American Contacts List Request to the Native American Heritage Commission (NAHC). NAHC's response indicated a positive result for known presence of Native

American Tribal cultural resources in the Project area. The NAHC also provided a Native American contact list that CSLC staff used for outreach and coordination. To ensure culturally affiliated Tribes have the opportunity to provide information about Tribal cultural resources in the Project area and give meaningful input to the review process, the CSLC sent letters in March 2017, to the Tribal representatives identified by the NAHC. Letters were sent to the following Tribes and non-profit groups:

- Barbareno/Ventureno Band of Mission Indians
- Coastal Band of the Chumash Nation
- Chumash Tribal Representative
- Owl Clan (non-profit group)
- Santa Ynez Band of Mission Indians
- Santa Ynez Tribal Elders Council
- Wishtoyo Foundation (non-profit group)

In response, the CSLC received one communication (March 23, 2017) from a member of the Santa Ynez Tribal Elders Council deferring to other local Tribes. In September 2019, CSLC staff received an updated list of Tribal contacts from NAHC for the Project and included the following Tribes:

- Barbareno/Ventureno Band of Mission Indians
- Coastal Band of the Chumash Nation
- Northern Chumash Tribal Council
- San Luis Obispo County Chumash Council
- Santa Ynez Band of Chumash Indians
- yak tityu tityu yak tilhini – Northern Chumash Tribe
- Chumash Council of Bakersfield

On December 12, 2019, CSLC staff informed several Tribal representatives with interest in CSLC's oil and gas abandonment activities regarding this Addendum targeting additional well abandonments.

The EIR evaluated the type and significance of impacts that may occur as a result of the Legacy Well Abandonment Project and identified measures to avoid or substantially lessen any impacts found to be potentially significant. As described in Section 4.5, *Cultural and Paleontological Resources*[5], of the EIR, seven archaeological sites are located within 0.5 mile of the Project site, but none are within the Project boundaries. Some of these sites may meet the definition of a Tribal cultural resource. At this point, no other potential Tribal cultural resources have been identified for the Project area, including all leaking legacy well sites and the staging area in Lookout Park, although continuing

[5] Paleontological resources were moved from Section 4.5 of the 2017 Project Final EIR to Section 4.7, *Geology, Soils, and Paleontological Resources*, due to recent changes in environmental factors provided in Appendix G of the State CEQA Guidelines.

Tribal coordination would provide additional information on sites, features, places, cultural landscapes, sacred places, or objects with cultural value to a Tribe in the Summerland Beach area. Mitigation measures identified in 2017 Project Final EIR remain in effect for all well abandonment activities.

3.7 GEOLOGY, SOILS, AND PALEONTOLOGICAL RESOURCES

The Becker well abandonment resulted in temporary and short-term, localized impacts from disturbance of beach sediment and soils from construction activities. The EIR analyzed the type and significance of impacts associated with the other legacy well locations as well. The analysis determined that the area is subject to tidal influences and would likely return to its normal configuration shortly after the end of the temporary work and no impact is expected.

Offshore legacy well abandonment activity would cause minor disturbances to sediment in the immediate area; however; these impacts are anticipated to be less than significant. For legacy wells located offshore, divers would perform jetting techniques as needed to expose the subject wells for abandonment. Displaced sediment would settle back into place naturally, influenced by current and tidal fluctuations. No additional impacts to the offshore environment have been identified and no additional offshore mitigations are proposed.

Onshore activities and potential impacts, associated with the use of a diesel impact hammer and removal of the cement well cap, are consistent with those disclosed in the EIR, except for the use of the onshore beach access. All heavy equipment and vehicles driven on Summerland Beach would follow the beach access routes identified in Figure 1-2. Heavy equipment and vehicles would be driven down the paved access ramps to the beach. This would allow for the heavy equipment and vehicles to be driven over the exposed hard-packed sand down to the sites avoiding any sensitive geologic receptors that may be present along the beach. Limited soil erosion or compaction is expected as the heavy equipment and vehicles would follow the paved beach access routes and be driven on the sand. The shore-end contractor would then excavate to expose any leaking wells, which would temporarily displace beach sands.

No additional impacts to the environment have been identified and no additional onshore mitigation measures are proposed. Compared to the activities analyzed in the original EIR, the additional use of the onshore beach access, a diesel impact hammer, or cement well cap removal would not create new significant environmental effects or increase the severity of previously identified significant effects related to geology, soils, and paleontological resources.

3.8 GREENHOUSE GAS (GHG) EMISSIONS

GHGs are defined as any gas that absorbs infrared radiation in the atmosphere. GHGs include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), and nitrogen trifluoride (NF_3). The potential of a gas or aerosol to trap heat in the atmosphere is called global warming potential (GWP). The GWP of different GHGs varies because they absorb different amounts of heat. CO_2 is used to relate the amount of heat absorbed to the amount of the gas emissions; this is referred to as CO_2 equivalent (CO_2e). CO_2e is the amount of GHG emitted multiplied by the GWP. The GWP of CO_2, as the reference GHG, is one (1). Methane has a GWP of 25; therefore, 1 pound of methane equates to 25 pounds of CO_2e. Table 3-5 lists GHGs, their estimated lifetime in the atmosphere, and the GWP over a 100-year timeframe.

In California, the California Air Resources Board (CARB) is the primary agency responsible for providing information on implementing the GHG reductions required by the State pursuant to AB 32 (CARB 2014), the Global Warming Solutions Act of 2006, and its 2016 update, Senate Bill (SB) 32. Together, these laws require CARB to develop regulations that reduce GHG emissions to 1990 levels by 2020 and to 40 percent below 1990 levels by 2030.

Table 3-5. Global Warming Potential (GWP) of Various Gases

Gas	Life in Atmosphere (years)	100-year GWP (average)
Carbon Dioxide (CO_2)	50 - 200	1
Methane (CH_4)	12	25
Nitrous Oxide (N_2O)	120	298
Hydrofluorocarbons (HFCs)	1.5 - 264	12 - 14,800
Sulfur hexafluoride (SF_6)	3,200	22,800

Source: 40 Code of Federal Regulations (CFR) Part 98, Subpart A, Table A-1, effective January 1, 2015 (CSLC 2017). The 40 CFR Part 98 approach is used to estimate GHG emissions per million British Thermal Units, assuming 99.9% combustion efficiency.

The Santa Barbara County Air Pollution Control District (SBCAPCD), the Ventura County APCD and the SCAQMD implemented CARB's agenda for the Becker well abandonment as Project-related equipment was transported from the Port of Long Beach (POLB) within SCAQMD's jurisdiction, through Ventura County and into the Project area within SBCAPCD's jurisdiction. The SBCAPCD adopted a GHG threshold of 1,000 metric tons of carbon dioxide equivalent ($MTCO_2e$) per year and Ventura County and SCAQMD each enforce a threshold of 10,000 $MTCO_2e$. The additional use of a diesel impact hammer or cement well cap removal would fall under the same scope as the EIR.

The EIR analyzed GHG emissions and found the emission levels to be within the thresholds established by the local districts. Although the original analysis considered only the employment of a vibratory pile driver for all pile driving activities and a jack-up barge for well abandonment, the additional use of a diesel impact hammer and cement well cap removal should not surpass these thresholds. All other equipment used during the Project Modification was considered in the EIR. Appendix B displays emission levels related to transit through SCAQMD's jurisdictional area and Ventura County and emission levels related to transit and well abandonment operations in Santa Barbara County. Table 3-6 shows anticipated GHG emissions associated with abandonment implementation.

As shown in Table 3-6, Project activities would emit approximately 0.00 tons of N_2O, 0.01 tons of CH_4, and 137.10 tons of CO_2. Converting N_2O, CH_4, and CO_2 to metric tons of carbon dioxide equivalent ($MTCO_2e$) yields a total GHG emission estimation of 137.4 $MTCO_2e$ for the Project Modification. The estimated 137.4 $MTCO_2e$ is well below the SBCAPCD GHG threshold of 1,000 $MTCO_2e$ and the Ventura County and SCAQMD GHG thresholds of 10,000 $MTCO_2e$.

Table 3-6. Projected Modified Total Project GHG Emissions (Tons)

	CO_2	CH_4	N_20
Project Location			
Santa Barbara County	120.94	0.01	0.00
Ventura County and South Coast AQMD	16.16	0.00	0.00
Total Annual Emissions	**137.10**	**0.01**	**0.00**
GHG - $MTCO_2e$ Conversions	**1**	**25**	**298**

	Total $MTCO_2e$ / year
From 2017 Project Final EIR	**302**
For Project Modifications	**137.4**

Source: Summerland Legacy Well Abandonment Project Modification Estimated Total Emissions (Appendix B).
$MTCO_2e$ = metric tons of carbon dioxide equivalent

Use of the onshore beach access (rather than barge) to obtain access to wells would result in fewer overall GHG emissions. Since abandonment would not require the use of a barge and would be completed from a strict low tide onshore approach, impacts on air emissions would be significantly reduced. The Project modification would no longer require the transportation of a barge to the Project site from the POLB and back to the POLB. Additionally, the overall Project schedule for onshore well abandonment activities would be approximately 4 days. As a result, no new impacts on GHG emissions would be generated from the addition of onshore beach access.

Additionally, the total GHG emission estimation is expected to be below the levels projected in the 2017 Project Final EIR. As a result, the use of an impact hammer for pile driving activities would not create new significant environmental effects to GHG emissions; therefore, the impact remains less than significant.

3.9 HYDROLOGY AND WATER QUALITY

The only water quality impact identified in the EIR was the accidental discharge of petroleum hydrocarbons. The EIR determined this impact to be less than significant with mitigation. Overall, the abandonment activities were found to have beneficial impacts to the environment in terms of water quality because it will curtail the continued leakage of petroleum hydrocarbons from the legacy wells into surrounding waters. However, offshore legacy well abandonment activities may require exposing leaking wells with jetting tools. Jetting activities would result in small-scale, temporary sediment re-suspension and increased turbidity. The Commission previously determined that sediment re-suspension from well abandonment along the seafloor would be brief and localized to the work area. Minor amplitude compared to the natural background variability in the suspended sediment loads in this coastal region.

Similar to impacts associated with the EIR, impacts to water quality would have the potential to occur during any stage of well abandonment operations if an accidental release of petroleum hydrocarbons, or other similar substances, were to occur. To minimize any potential impacts, CSLC would follow the Oil Spill Contingency Plan (APM-2) and maintain oil spill emergency response equipment onsite (APM-3) during both offshore and onshore well abandonment activities. Implementation of these measures would reduce potential risks to water quality to less than significant. No new impacts have been identified and no new mitigation measures are required.

Compared to the activities analyzed in the EIR, the onshore beach access, additional use of a diesel impact hammer, or cement well cap removal would not create new significant environmental effects or increase the severity of previously identified significant effects related to hydrology and water quality.

3.10 NOISE

The additional use of a diesel impact hammer or cement well cap removal is expected to result in similar construction noise impacts as those associated with the EIR. Peak noise levels associated would occur during pipe pile driving with a diesel impact hammer. As the EIR only evaluated the use of a vibratory hammer for pile driving activities. Noise impacts to humans are discussed below. Noise impacts to wildlife were discussed in Section 3.4.

The EIR states: “Generally, a geotechnical assessment is needed in order to ensure that high-force methods (impact pile drivers) are not needed. However, due to the beach location and the presence of sand, a geotechnical analysis is not considered necessary”. Although the original analysis came to this conclusion, significant areas of resistance were encountered when driving the pipe pile during the Becker well abandonment. The vibratory hammer was only able to drive the pipe pile into the bedrock because of its relatively shallow depth at the Becker well site. In the case of the Treadwell 10 well and other legacy wells, the depth of the bedrock is expected to be significantly greater. A diesel impact hammer may be required to effectively drive the steel pipe pile into the bedrock to ensure an effective seal during well abandonment. Pipe pile driving is estimated to take less than 90 minutes to complete.

As shown in Table 3-7, the estimated in-air noise level for impact hammers is similar to the levels of vibratory hammers described in the EIR, therefore the analysis in the EIR is applicable. Peak project noise levels were modeled for the use of the vibratory hammer for the Becker well project as shown in Table 3-8. Noise levels at the listed receptors would be roughly the same for abandonment of the Olsson and Duquesne wells. Treadwell10 abandonment would result in lower peak noise levels given that it is roughly 30 feet further from the identified receptors.

Table 3-7. Sound Levels of Pile Drivers

Equipment/Activity	Sound Level, dBA, at 50 feet	Source
Sheet pile vibratory hammer, diesel	101	USEPA 1971
Impact hammer, diesel	101	Dooling and Popper 2007

Table 3-8. Modeled Impacts of Project Activities – Peak Levels

	Pile Driving		Well Abandonment	
	Peak CNEL	Leq, Peak Hour	Peak CNEL	Leq, Peak Hour
Location				
Residences: on the beach	88.2	81.5	71.0	64.4
Residences: within Summerland (North of Hwy 101)	79.7	73.0	62.6	55.9
Businesses	81.2	74.5	64.1	57.4
Lookout Park	95.2	88.5	77.6	71.0
Beach Areas	91.2	84.5	74.5	67.8

Note: Sound levels are only the project contribution and does not include background noise levels.

Generally, construction noise performed during the daytime hours is not considered to be a significant impact. Multiple jurisdictions allow for construction noise during daytime hours, including the Cities of Santa Barbara (County of Santa Barbara 2009) and Montecito. Use of the diesel impact hammer would only occur between 8:00 a.m. and 5:00 p.m., would be planned for weekdays, (MM NOI-1) and last for a maximum of 90 minutes. Weekend pile driving would only occur as a contingency if unforeseen complications and delays are encountered during earlier steps in the abandonment work. Area residents will be notified of the temporary work well in advance of project execution.

As shown in Table 3-7, the sound levels for impact hammers are similar to vibratory hammers and as such, the expected noise levels within in the project area would be the same. Peak noise levels would occur at Lookout Park and the beach-front residences located immediately adjacent to Summerland Beach. Certain project activities may be audible, however noise impacts on human resulting from the use of a diesel impact hammer is considered to be less than significant and no additional mitigation measures are required.

The EIR also analyzed increases in vibration related impacts from all well abandonment activities on the public. The distances at which vibrations could cause disturbances to residences are a function of the level of vibration and the geology of the soils. The EIR found distances to “residential annoyance” levels and resulting impacts would be less than 200 to 300 feet and would be less than significant. For offshore well abandonments, the cofferdam would likely reduce vibrations produced by the impact hammer. Consequently, any impact on humans related to vibrations resulting from impact pile driving activities are also considered less than significant.

3.11 RECREATION

The EIR analyzed potential impacts to recreational resources in the Project area, including major coastal recreation areas, open space, and parks. The coast and offshore waters within the Project area are in a region that offers a wealth of recreational opportunities due to its natural beauty, beaches and open space, topography, and climate. These include beach and recreational facilities within the Summerland area, more distant beaches and facilities in the cities of Santa Barbara and Carpinteria, and State parks up- and down-coast along the Gaviota Coast and in Ventura County. These areas support beach, boating, and a variety of other recreational activities associated with the coast and Pacific Ocean including surfing, commercial and recreational fishing, free and scuba diving, beach sports, hiking, and bird watching.

The EIR analyzed the potential impacts to Recreation and Recreational access from well abandonment activities. Impacts were found to be less than significant with mitigation. MM REC-1 ensures the contractor must repair any damage inflicted on Lookout Park infrastructure and access road to pre-Project status. Additionally, coordination with the Department of Parks and Recreation, the County, and CSLC staff regarding scheduling and location of Project activities on Lookout Park and Summerland Beach, would reduce potential short-term impacts from construction and well abandonment activities to the greatest extent feasible. These impacts are similar to those addressed in the EIR.

A few leaking legacy wells are located in onshore and intertidal locations, which are accessible from the beach during low tides (see Figure 1-2), for example, C.H. Olsson and Duquesne. Although onshore beach-accessed abandonment activities would significantly reduce project-related costs and impacts as less equipment would be required, short-term use of portions of the Lookout Park parking lot and the beach access roads may further impact recreational activities. Heavy equipment and project vehicles would be staged in a portion of the Lookout Park parking lot (see Figure 2-1). As equipment would be moved back and forth from the staging area during tide cycles, a portion of the Lookout Park parking lot would remain closed to the public during the period of well abandonment activities (approximately 4 days). As the high tide recedes, heavy equipment and vehicles would be brought in from the staging area along various access routes along Summerland Beach for pre-project preparation (see Figure 1-2). C.H. Olsson and any other potential leaking wells nearby would be accessed via the County beach access road from Lookout Park. Duquesne and any other potential leaking wells nearby would be accessed via the County beach access road located off Finney Street. This would cause temporary delays to public beach access between periods of work and equipment and vehicle staging in the Lookout Park parking lot during low tide cycles. Beach access parking along the western portion of Finney Street would be prohibited during the estimated 4 day well re-abandonment operation. Parking would still be available along the eastern portion of Finney Street. Temporary closures to the public beach access routes would occur on an as-needed basis during periods of equipment and vehicle mobilization and demobilization (see Figure 1-2). Public access on these routes would be delayed for approximately 10 minutes or less.

For safety purposes, during periods of onshore well abandonment, the public would be restricted from accessing the work area. MM HAZ-1 requires all areas within 300 feet of the construction and abandonment activities to be marked as closed to the public with appropriate fencing or “no entry” barrier tape. Personnel would be stationed to prevent entrance by members of the public into the restricted area. The remainder of the beach would be open to the public during any onshore well abandonment activities.

Onshore beach-accessed well abandonments would only require approximately 4 days to complete. As a result, any impacts on recreation would be localized and short-term in nature. In addition, MM HAZ-1 provides notice of the Project to local Summerland residences prior to the beginning of the beach closures. No long-term impacts to recreation are expected with the existing mitigation set in place. In addition, a beneficial impact would result due to well abandonment activities.

No new impacts have been identified and no new mitigation measures are required. Compared to the activities analyzed in the EIR, the onshore beach access would not create new significant environmental effects or increase the severity of previously identified significant effects related to recreation.

3.12 TRANSPORTATION

The EIR addressed marine transportation in the well abandonment areas, evaluated the type and significance of impacts that may occur as a result of the Project, and identified measures to avoid or substantially lessen any impacts found to be potentially significant. The EIR analyzed impacts associated with tug transportation to and from the POLB for up to three trips. Additionally, it evaluated the employment of two or three vessels per day to shuttle crews to the site, deliver equipment and supplies, and be available for emergency response and biological monitoring. The EIR also required the publication of U.S. Coast Guard (USCG) Local Notice to Mariners (MM TRM-1) at least 14 days prior to any Project related operations.

Although the scope of the EIR covers the use of a traditional anchored barge, due to the onshore and intertidal locations of a few leaking legacy wells, for example C.H. Olsson and Duquesne, some wells are accessible from the beach during low tides. This allows for well abandonment activities to occur utilizing a low-tide onshore beach access approach. Beach-accessed abandonment activities would significantly reduce project-related costs and impacts as less equipment would be required.

Onshore leaking wells would be accessed by equipment driven from the staging area in the Lookout Park parking lot to the County beach access road located off Finney Street (see Figure 1-2). Equipment operators would travel east for approximately 0.25 mile down Wallace Avenue to Finney Street, then 0.1 miles down Finney Street to the County beach access road. These streets service a small population of local residents who will be duly notified of the planned work schedule at least 2 weeks in advance. The equipment operators would drive the heavy equipment and vehicles at approximately 10 miles per hour over an approximate total 0.35 mile stretch of roads to reach the beach access ramp. This trip would occur twice per day over a 4-day timeframe. The travel time for each trip would take approximately 2 minutes. This would cause a brief delay to vehicular traffic along the road.

According to the EIR, peak hours of traffic are between 6:00 a.m. and 9:00 a.m. and 3:00 p.m. and 6:00 p.m. Equipment and vehicles would be transferred from the staging area down to Duquesne and back outside of the peak hours of traffic. With peak hours of traffic being avoided on Wallace Avenue and Finney Street, and given the short-term duration of onshore access use (approximately 4 days), impacts to transportation are expected to be short term and less than significant. Therefore, onshore beach access would not create new significant environmental effects or increase the severity of previously identified significant effects related to marine transportation. No new impacts have been identified and no new mitigation measures are required.

4.0 DETERMINATION AND ADDENDUM CONCLUSION

As detailed in Section 3.0 above, this Addendum to the Final EIR certified by the Commission as lead agency under CEQA in August 2017, supports the conclusion that the use of onshore beach access, diesel impact hammer, or cement well cap removal do not result in any new significant environmental effects or a substantial increase in the severity of previously identified significant effects. No new information regarding adverse impacts has become available and no substantial changes to the circumstances under which the Project is being undertaken have occurred since certification of the EIR. No substantial changes are required for the modifications compared to that analyzed in EIR. There are no new mitigation measures required and no new alternatives are available that would substantially reduce the environmental effects beyond those previously described in the EIR. However, one MM has been modified as shown in Table 4-1.

Table 4-1. Modified Mitigation Measure Applicable to the Project Modification

TERRESTRIAL BIOLOGICAL RESOURCES / MARINE BIOLOGICAL RESOURCES
MM BIO-4b. Soft Start. A "soft start" procedure shall be used during ~~vibratory~~ all pile driving activities to give marine mammals, sea turtles, birds and nearshore fish species an opportunity to move out of the area away from the sound source. Soft starts would be implemented at the start of each day's pile driving and at any time following the cessation of pile driving for a period of 30 minutes or longer. ~~For vibratory pile drivers~~ In addition, the sound shall be initiated for 15 seconds at reduced energy followed by a 30-second waiting period; this procedure shall then be repeated two additional times prior to full pile driving.

The Project is consistent with State CEQA Guidelines section 15164 in that only minor changes have been made to the Project, and none of the conditions described in State CEQA Guidelines section 15162 has occurred. Therefore, no subsequent or supplemental document is required.

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APPENDIX A

2017 Project Final EIR

Final Environmental Impact Report (EIR) for the Becker and Legacy Wells Abandonment and Remediation Project (SCH No. 2016101008)

Available at: https://www.slc.ca.gov/ceqa/becker/

California State Lands Commission
Prepared with the assistance of MRS

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APPENDIX B

Air Quality Emissions Spreadsheets

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Appendix B - Table 1
Summerland Legacy Wells Abandonment
Project Modification Equipment Description

10-day well abandoment plus 6-day contingency
All Counties

Equipment	Description	Device Specifications				Usage Data			Max Hours		Transit			10-day well abandonment			6-day abandonment contingency			Total Project Hours	ENGINE INFO	Engine Tier
		Fuel	%S	Size	Units	BSFC	Units	Load	Day	Yr	Hours/day	Total Days	Total hours	hrs/Full Day	hrs/part day	Total hours	hrs/Full Day	hrs/part day	Total hours			
Santa Barbara Transit and Operations																						
Derrick Barge														**5**	**4**		**3**	**3**				
DB Salta Verde	Crane (Engine 1)	Diesel	0.0015	318	bhp	0.055	gal/bhp-hr	0.29	6	69.0	0	0	**0**	30	12	**42**	18	9	**27**	**69**	Detroit Diesel 8V-71	Pre-Tier
	Crane (Engine 2)	Diesel	0.0015	318	bhp	0.055	gal/bhp-hr	0.29	6	69.0	0	0	**0**	30	12	**42**	18	9	**27**	**69**	Detroit Diesel 8V-71	Pre-Tier
	Generator (Engine 1)	Diesel	0.0015	201	bhp	0.055	gal/bhp-hr	0.25	24	336.0	24	2	**48**	120	60	**180**	72	36	**108**	**336**	John Deere 6068	Marine Tier 3
	Generator (Engine 2)	Diesel	0.0015	201	bhp	0.055	gal/bhp-hr	0.25	24	336.0	24	2	**48**	120	60	**180**	72	36	**108**	**336**	John Deere 6068	Marine Tier 3
	Winch	Diesel	0.0015	201	bhp	0.055	gal/bhp-hr	0.50	2	24.0	0	2	**0**	10	5	**15**	6	3	**9**	**24**	John Deere 6068	Marine Tier 3
Tug Boat																						
Bernadine	Main Engine 1	Diesel	0.0015	500	bhp	0.055	gal/bhp-hr	0.40	9	151.5	24	2	**48**	45	18	**63**	27	13.5	**40.5**	**152**	John Deere 6135	Marine Tier 3
	Main Engine 2	Diesel	0.0015	500	bhp	0.055	gal/bhp-hr	0.40	9	151.5	24	2	**48**	45	18	**63**	27	13.5	**40.5**	**152**	John Deere 6135	Marine Tier 3
	Generator	Diesel	0.0015	87	bhp	0.055	gal/bhp-hr	0.50	24	336.0	24	2	**48**	120	60	**180**	72	36	**108**	**336**	Marathon 65 kW	Marine Tier 3
Other Boats																						
Assist Retriever (Work)	Main Engine 1	Gasoline	0.0100	200	bhp	0.056	gal/bhp-hr	0.65	12	96.0	0	0	**0**	60		**60**	36		**36**	**96**		
	Main Engine 2	Gasoline	0.0100	200	bhp	0.056	gal/bhp-hr	0.65	12	96.0	0	0	**0**	60		**60**	36		**36**	**96**		
Patriot Oregon (Work)	Main Engine 1	Gasoline	0.0100	90	bhp	0.056	gal/bhp-hr	0.65	12	96.0	0	0	**0**	60		**60**	36		**36**	**96**		
	Main Engine 2	Gasoline	0.0100	90	bhp	0.056	gal/bhp-hr	0.65	12	96.0	0	0	**0**	60		**60**	36		**36**	**96**		
Patriot Ocean (Crew)	Main Engine 1	Gasoline	0.0100	225	bhp	0.056	gal/bhp-hr	0.65	4	40.0	0	0	**0**	20		**20**	20		**20**	**40**	Honda BF225	Ultra Low
	Main Engine 2	Gasoline	0.0100	225	bhp	0.056	gal/bhp-hr	0.65	4	40.0	0	0	**0**	20		**20**	20		**20**	**40**	Honda BF225	Ultra Low
Other Equipment																						
Hammer	Main Engine 1	Diesel	0.0015	460	bhp	0.055	gal/bhp-hr	0.65	1.5	3.0	0	0	**0**	1.5		**1.5**	1.5		**1.5**	**3**	IHC S-90	
Light Tower	Main Engine 1	Diesel	0.0015	12	bhp	0.055	gal/bhp-hr	0.65	12	96.0	0	0	**0**	60		**60**	36		**36**	**96**	Unknown	
Light Tower	Main Engine 1	Diesel	0.0015	12	bhp	0.055	gal/bhp-hr	0.65	12	96.0	0	0	**0**	60		**60**	36		**36**	**96**	Unknown	
Pile Driver	No Additional Engine																				Powered by Salta Verde Generators	
	Welding Rig	Diesel	0.0015	425	bhp	0.055	gal/bhp-hr	0.42	12	84.0	0	0	**0**		48	**48**		36	**36**	**84**	Unknown	
On-Road Equipment						**Number of Vehicles**	**Trips Per Day**	**Trip Length One-Way (Miles)**	**Round Trip Miles/day**	**Total Trip Miles**				Number of Days			Number of Days			Total Days		
Polaris UTV	All Terrain Vehicle	Gasoline	0.0100	50	bhp	2	4	2.0	8.0	120.0	0	0	**0**		9			6		15.0	Model: RANGER 4 seater (2012)	Need Number of Trips
	Trucks	Diesel	0.0015	440	bhp	2	4	12.3	49.2	738.0	0	0	**0**		9			6		15.0	Ford F550/F350	
	Worker Commute Vehicles	Gasoline	0.0100			25	50	12.3	615.0	9,225.0	0	0	**0**		9			6		15.0		
	Miscellaneous Trucks	Diesel	0.0015			4	8	12.3	98.4	492.0	0	0	**0**		3			2		5.0		
	Cement Bulk Truck	Diesel	0.0015																			
	Cement Pump Truck	Diesel	0.0015																			

Equipment	Description	Device Specifications				Usage Data			Max Hours		Transit			10-day well abandonment			6-day abandonment contingency			Total Project Hours	ENGINE INFO	Engine Tier
		Fuel	%S	Size	Units	BSFC	Units	Load	Day	Yr	Hours/day	Total Days	Total hours	hrs/Full Day	hrs/part day	Total hours	hrs/Full Day	hrs/part day	Total hours			
Ventura County + South Coast Transit																						
Derrick Barge																						
DB Salta Verde	Crane (Engine 1)	Diesel	0.0015	400	bhp	0.055	gal/bhp-hr	0.29	0	0.0	0	0	**0**	0	0	0	0	0	0	**0**	Detroit Diesel 8V-71	Pre-Tier
	Crane (Engine 2)	Diesel	0.0015	400	bhp	0.055	gal/bhp-hr	0.29	0	0.0	0	0	**0**	0	0	0	0	0	0	**0**	Detroit Diesel 8V-71	Pre-Tier
	Generator (Engine 1)	Diesel	0.0015	201	bhp	0.055	gal/bhp-hr	0.25	12	48.0	12	4	**48**	0	0	0	0	0	0	**48**	John Deere 6068	Marine Tier 3
	Generator (Engine 2)	Diesel	0.0015	201	bhp	0.055	gal/bhp-hr	0.25	12	48.0	12	4	**48**	0	0	0	0	0	0	**48**	John Deere 6068	Marine Tier 3
	Winch	Diesel	0.0015	201	bhp	0.055	gal/bhp-hr	0.50	0	0.0	0	0	**0**	0	0	0	0	0	0	**0**	John Deere 6068	Marine Tier 3
Tug Boat																						
Bernadine	Main Engine 1	Diesel	0.0015	500	bhp	0.055	gal/bhp-hr	0.40	12	48.0	12	4	**48**	0	0	0	0	0	0	**48**	John Deere 6135	Marine Tier 3
	Main Engine 2	Diesel	0.0015	500	bhp	0.055	gal/bhp-hr	0.40	12	48.0	12	4	**48**	0	0	0	0	0	0	**48**	John Deere 6135	Marine Tier 3
	Generator	Diesel	0.0015	87	bhp	0.055	gal/bhp-hr	0.50	12	48.0	12	4	**48**	0	0	0	0	0	0	**48**	Marathon 65 kW	Marine Tier 3

Notes:

1. Assume tugboat makes one round trip to pull the barge back to Long Beach (2 total days in SBC plus 4 total days through Ventura and South Coast, worst case scenario).
2. The Cement Bulk Truck and Cement Pump Truck were evaluated in the 2017 Project Final EIR as "off-highway trucks"; applying emissions factors defined by CalEEMod for off-highway trucks. This method estimates emissions based on horsepower and hours of use in lieu of anticipated miles/day.
3. For worst case scenario emission estimates, assume barge crane engines are Pre-Tier.
4. Work Boats – Engine emission data for the two work boats "Assist Retriever" and "Patriot Oregon" were calculated based on the engines' "Ultra Low" emission certification for gas-powered marine outboard engines.
5. Light Towers – Assume current EPA Tier 2 (based on horsepower) are used.
6. Polaris UTV – Personnel transport vehicles on the beach. Emissions are calculated by applying the emission factors defined for the gas powered (LDA) vehicles (Workers Commuting) identified in the EIR
7. Pile Driver – The 2017 Project Final EIR assumed the use of a separate engine to power the pile driver. Under the Project Modification generators on-board the Salta Verde to power the pile driver. No additional engine or motive power is required.
8. Welding Rig – the utilization of the welding rig was adjusted hours based on the revised Treadwell project description.
9. Trucks – Additional trucks identified by the vessel operator for use near the construction site. Emission are calculated by applying the emission factors defined for the diesel trucks (miscellaneous trucks) as identified in the EIR and discussed further below.
10. The following equipment that was specified in the 2017 Project Final EIR is included in emission calculations; no changes were made to the engine specifications or emissions factors as provided in the original EIR:
    a. Trucks – Miscellaneous tucks needed to support the project that transit to Santa Barbara Harbor.
    b. Workers Commuting – These are emissions from on-road vehicles that will be used by project personnel within Santa Barbara County.
    c. Cement Bulk Truck – These emissions result from the cement bulk truck that was evaluated as an off-road vehicle in the EIR.
    d. Cement Pump Truck – These emissions result from the cement pump truck that was evaluated as an off-road vehicle in the EIR.

Appendix B - Table 2
Summerland Legacy Well Abandonment
Project Modification Emission Factors

10-day well abandonment plus 6-day contingency
Emission Factors
All Counties

Equipment	Description	Emission Factors										Engine Rating
		NOx	ROC	CO	SOx	PM	PM10	CO2	CH4	N2O	Units	
Santa Barbara Transit and Operations												
Derrick Barge												
DB Salta Verde	Crane (Engine 1)	421.46	33.48	89.67	0.06	29.89	28.70	22,501.21	0.91	0.18	lb/1000gal	Pre-Tier
	Crane (Engine 2)	421.46	33.48	89.67	0.06	29.89	28.70	22,501.21	0.91	0.18	lb/1000gal	Pre-Tier
	Generator (Engine 1)	145.27	16.14	149.45	0.06	3.59	3.44	22,501.21	0.91	0.18	lb/1000gal	EPA Marine Tier 3
	Generator (Engine 2)	145.27	16.14	149.45	0.06	3.59	3.44	22,501.21	0.91	0.18	lb/1000gal	EPA Marine Tier 3
	Winch	145.27	16.14	149.45	0.06	3.59	3.44	22,501.21	0.91	0.18	lb/1000gal	EPA Marine Tier 3
Tug Boat												
Bernadine	Main Engine 1	150.65	16.74	149.45	0.06	3.29	3.16	22,501.21	0.91	0.18	lb/1000gal	EPA Marine Tier 3
	Main Engine 2	150.65	16.74	149.45	0.06	3.29	3.16	22,501.21	0.91	0.18	lb/1000gal	EPA Marine Tier 3
	Generator	145.27	16.14	149.45	0.06	3.59	3.44	22,501.21	0.91	0.18	lb/1000gal	EPA Marine Tier 3
Other Boats												
Assist Retriever (Work)	Main Engine 1	548.30	60.92	123.75	0.39	12.50	12.50	19,350.88	0.83	0.17	lb/1000gal	Spark Ignitied Ultra Low
	Main Engine 2	548.30	60.92	123.75	0.39	12.50	12.50	19,350.88	0.83	0.17	lb/1000gal	Spark Ignitied Ultra Low
Patriot Oregon (Work)	Main Engine 1	548.30	60.92	123.75	0.39	12.50	12.50	19,350.88	0.83	0.17	lb/1000gal	Spark Ignitied Ultra Low
	Main Engine 2	548.30	60.92	123.75	0.39	12.50	12.50	19,350.88	0.83	0.17	lb/1000gal	Spark Ignitied Ultra Low
Patriot Ocean (Crew)	Main Engine 1	548.30	60.92	123.75	0.39	12.50	12.50	19,350.88	0.83	0.17	lb/1000gal	Spark Ignitied Ultra Low
	Main Engine 2	548.30	60.92	123.75	0.39	12.50	12.50	19,350.88	0.83	0.17	lb/1000gal	Spark Ignitied Ultra Low
Other Equipment												
Hammer	Main Engine 1	2.70	0.30	2.60	0.06	0.15	0.14	558.75	0.023	0.005	g/bhp-hr	EPA Non-Road Tier 3
Light Tower	Main Engine 1	5.04	0.56	4.90	0.06	0.60	0.60	558.75	0.023	0.005	g/bhp-hr	EPA Non-Road Tier 2
Light Tower	Main Engine 1	5.04	0.56	4.90	0.06	0.60	0.60	558.75	0.023	0.005	g/bhp-hr	EPA Non-Road Tier 2
Pile Driver	No Engine										g/bhp-hr	
	Welding Rig	3.777	0.29	2.121	0.005	0.138	0.127	501.1	0.154	0.004	g/bhp-hr	Factors Per EIR - Appendix E

Appendix B - Table 2
Summerland Legacy Well Abandonment
Project Modification Emission Factors

On-Road Equipment												
Polaris UTV	All Terrain Vehicle	2.30E-04	4.60E-05	2.10E-03	6.90E-06	3.00E-06	2.80E-06	5.60E-01	3.40E-05	6.80E-08	lb/mile	Applied "Worker Commute Vehicle" Factors
	Trucks	1.60E-02	4.30E-04	1.70E-03	3.60E-05	1.90E-04	1.80E-04	3.60E+00	3.30E-05	6.50E-08	lb/mile	Applied "Miscellaneous Trucks" Factors
	Worker Commute Vehicles	2.30E-04	4.60E-05	2.10E-03	6.90E-06	3.00E-06	2.80E-06	5.60E-01	3.40E-05	6.80E-08	lb/mile	Factors Per EIR - Appendix E
	Miscellaneous Trucks	1.60E-02	4.30E-04	1.70E-03	3.60E-05	1.90E-04	1.80E-04	3.60E+00	3.30E-05	6.50E-08	lb/mile	Factors Per EIR - Appendix E
	Cement Bulk Truck	3.67	0.33	1.75	0.01	0.14	0.13	501.40	0.15	0.00	g/bhp-hr	Factors Per EIR - Appendix E
	Cement Pump Truck	3.67	0.33	1.75	0.01	0.14	0.13	501.40	0.15	0.00	g/bhp-hr	Factors Per EIR - Appendix E

Equipment	Description	Emission Factors										Engine Rating
		NOx	ROC	CO	SOx	PM	PM10	CO2	CH4	N2O	Units	
Ventura County + South Coast Transit												
Derrick Barge												
DB Salta Verde	Crane (Engine 1)	421.46	33.48	89.67	0.06	29.89	28.70	22,501.21	0.91	0.18	lb/1000gal	Pre-Tier
	Crane (Engine 2)	421.46	33.48	89.67	0.06	29.89	28.70	22,501.21	0.91	0.18	lb/1000gal	Pre-Tier
	Generator (Engine 1)	145.27	16.14	149.45	0.06	3.59	3.44	22,501.21	0.91	0.18	lb/1000gal	EPA Marine Tier 3
	Generator (Engine 2)	145.27	16.14	149.45	0.06	3.59	3.44	22,501.21	0.91	0.18	lb/1000gal	EPA Marine Tier 3
	Winch	145.27	16.14	149.45	0.06	3.59	3.44	22,501.21	0.91	0.18	lb/1000gal	EPA Marine Tier 3
Tug Boat												
Bernadine	Main Engine 1	150.65	16.74	149.45	0.06	3.29	3.16	22,501.21	0.91	0.18	lb/1000gal	EPA Marine Tier 3
	Main Engine 2	150.65	16.74	149.45	0.06	3.29	3.16	22,501.21	0.91	0.18	lb/1000gal	EPA Marine Tier 3
	Generator	145.27	16.14	149.45	0.06	3.59	3.44	22,501.21	0.91	0.18	lb/1000gal	EPA Marine Tier 3

Notes:

Note 1: Reference EPA documents for Non-Road and Marine Emission Standards for Tier engines;

Note 4: GHG Emission Factors per Subpart C, Tables C-1 and C-2

Greenhouse Gas Basis	mmBtu/ gallon	kg CO2/ mmBtu	kg CH4/ mmBtu	kg N2O/ mmBtu
Distillate Fuel Oil No. 2	0.138	73.96	0.003	0.0006
Gasoline	0.125	70.22	0.003	0.0006

(Per Table C-1 and C-2 of 40 CFR 98 Subpart C)

CO2e Conversion		1	21	310
U.S. Short Ton to Metric Ton Conversion	0.90718			

Appendix B - Table 3
Summerland Legacy Well Abandonment
Project Modification Short Term Emissions

10-day well abandonment plus 6-day contingency
Short Term Emissions
All Counties

Equipment	Description	NOx lb/day	ROG lb/day	CO lb/day	SO2 lb/day	PM10 lb/day	PM2.5 lb/day
Santa Barbara Transit and Operations							
Derrick Barge							
DB Salta Verde	Crane (Engine 1)	12.83	1.02	2.73	0.00	0.91	0.87
	Crane (Engine 2)	12.83	1.02	2.73	0.00	0.91	0.87
	Generator (Engine 1)	9.64	1.07	9.92	0.00	0.24	0.23
	Generator (Engine 2)	9.64	1.07	9.92	0.00	0.24	0.23
	Winch	1.61	0.18	1.65	0.00	0.04	0.04
Tug Boat							
Bernadine	Main Engine 1	14.91	1.66	14.80	0.01	0.33	0.31
	Main Engine 2	14.91	1.66	14.80	0.01	0.33	0.31
	Generator	8.36	0.93	8.60	0.00	0.21	0.20
Other Boats							
Assist Retriever	Main Engine 1	47.90	5.32	10.81	0.03	1.09	1.09
(Work)	Main Engine 2	47.90	5.32	10.81	0.03	1.09	1.09
		-	-	-	-	-	-
Patriot Oregon	Main Engine 1	21.55	2.39	4.86	0.02	0.49	0.49
(Work)	Main Engine 2	21.55	2.39	4.86	0.02	0.49	0.49
		-	-	-	-	-	-
Patriot Ocean	Main Engine 1	17.96	2.00	4.05	0.01	0.41	0.41
(Crew)	Main Engine 2	17.96	2.00	4.05	0.01	0.41	0.41
Other Equipment							
Hammer	Main Engine 1	2.67	0.30	2.57	0.06	0.15	0.14
Light Tower	Main Engine 1	1.04	0.12	1.01	0.01	0.12	0.12
Light Tower	Main Engine 1	1.04	0.12	1.01	0.01	0.12	0.12
Pile Driver	No Engine	-	-	-	-	-	-
	Welding Rig	17.84	1.37	10.02	0.02	0.65	0.60
On-Road Equipment							
Polaris UTV	All Terrain Vehicle	0.002	0.000	0.017	0.000	0.000	0.000
	Trucks	0.787	0.021	0.084	0.002	0.009	0.009
	Worker Commute Vehicles	0.141	0.028	1.292	0.004	0.002	0.002
	Miscellaneous Trucks	1.574	0.042	0.167	0.004	0.019	0.018
	Cement Bulk Truck	9.940	0.880	4.730	0.010	0.370	0.340
	Cement Pump Truck	7.410	0.660	3.530	0.010	0.280	0.250

Equipment	Description	NOx lb/day	ROG lb/day	CO lb/day	SO2 lb/day	PM10 lb/day	PM2.5 lb/day
Ventura County + South Coast Transit							
Derrick Barge							
DB Salta Verde	Crane (Engine 1)	-	-	-	-	-	-
	Crane (Engine 2)	-	-	-	-	-	-
	Generator (Engine 1)	4.82	0.54	4.96	0.00	0.12	0.11
	Generator (Engine 2)	4.82	0.54	4.96	0.00	0.12	0.11
	Winch	-	-	-	-	-	-
Tug Boat							
Bernadine	Main Engine 1	19.89	2.21	19.73	0.01	0.43	0.42
	Main Engine 2	19.89	2.21	19.73	0.01	0.43	0.42
	Generator	4.18	0.46	4.30	0.00	0.10	0.10

Appendix B - Table 4
Summerland Legacy Well Abandonment
Project Modification Estimated Total Emissions

10-day well abandonment plus 6-day contingency
Long Term Emissions
All Counties

Equipment	Description	NOx TPY	ROG TPY	CO TPY	SO2 TPY	PM10 TPY	PM2.5 TPY
		Santa Barbara Transit and Operations					
Derrick Barge							
DB Salta Verde	Crane (Engine 1)	0.074	0.01	0.02	0.00	0.01	0.01
	Crane (Engine 2)	0.074	0.01	0.02	0.00	0.01	0.01
	Generator (Engine 1)	0.068	0.01	0.07	0.00	0.00	0.00
	Generator (Engine 2)	0.068	0.01	0.07	0.00	0.00	0.00
	Winch	0.010	0.00	0.01	0.00	0.00	0.00
Tug Boats							
Bernadine	Main Engine 1	0.126	0.01	0.12	0.00	0.00	0.00
	Main Engine 2	0.126	0.01	0.12	0.00	0.00	0.00
	Generator	0.059	0.01	0.06	0.00	0.00	0.00
Other Boats							
Assist Retriever (Work)	Main Engine 1	0.192	0.02	0.04	0.00	0.00	0.00
	Main Engine 2	0.192	0.02	0.04	0.00	0.00	0.00
Patriot Oregon (Work)	Main Engine 1	0.086	0.01	0.02	0.00	0.00	0.00
	Main Engine 2	0.086	0.01	0.02	0.00	0.00	0.00
Patriot Ocean (Crew)	Main Engine 1	0.090	0.01	0.02	0.00	0.00	0.00
	Main Engine 2	0.090	0.01	0.02	0.00	0.00	0.00
Other Equipment							
Hammer	Main Engine 1	0.003	0.00	0.00	0.00	0.00	0.00
Light Tower	Main Engine 1	0.004	0.00	0.00	0.00	0.00	0.00
Light Tower	Main Engine 1	0.004	0.00	0.00	0.00	0.00	0.00
Pile Driver	No Engine	0.000	0.00	0.00	0.00	0.00	0.00
	Welding Rig	0.062	0.00	0.04	0.00	0.00	0.00
On-Road Equipment							
Polaris UTV	All Terrain Vehicle	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000
	Trucks	0.0059	0.0002	0.0006	0.0000	0.0001	0.0001
	Worker Commute Vehicles	0.0011	0.0002	0.0097	0.0000	0.0000	0.0000
	Miscellaneous Trucks	0.0039	0.0001	0.0004	0.0000	0.0000	0.0000
	Cement Bulk Truck	0.015	0.001	0.007	0.000	0.001	0.001
	Cement Pump Truck	0.011	0.001	0.005	0.000	0.000	0.000

Equipment	Description	NOx TPY	ROG TPY	CO TPY	SO2 TPY	PM10 TPY	PM2.5 TPY
		Ventura and South Coast Transit					
Derrick Barge							
DB Salta Verde	Crane (Engine 1)	0.00	0.00	0.00	0.00	0.00	0.00
	Crane (Engine 2)	0.00	0.00	0.00	0.00	0.00	0.00
	Generator (Engine 1)	0.01	0.00	0.01	0.00	0.00	0.00
	Generator (Engine 2)	0.01	0.00	0.01	0.00	0.00	0.00
	Winch	0.00	0.00	0.00	0.00	0.00	0.00
Tug Boats							
Bernadine	Main Engine 1	0.04	0.00	0.04	0.00	0.00	0.00
	Main Engine 2	0.04	0.00	0.04	0.00	0.00	0.00
	Generator	0.01	0.00	0.01	0.00	0.00	0.00
		Nox	**ROG**	**CO**	**SOx**	**PM10**	**PM2.5**
	Santa Barbara County	1.45	0.15	0.72	0.00	0.04	0.04
	Ventura + South Coast	0.11	0.01	0.11	0.00	0.00	0.00
	Project Total:	**1.55**	**0.16**	**0.83**	**0.00**	**0.04**	**0.04**
	EIR Total Project Threshold	**2.54**	**0.20**	**1.41**	**0.00**	**0.09**	**0.09**

Appendix B - Table 5

Project Modification Onshore
Annual Emission Estimate

4-day well abandonment

Emission Factors

Portable, Non-Road Engines

										Emissions (lb/Year)					
Description	**Equipment Category**	**HP**	**Fuel**	**Model Year**	**Tier Category**	**Load Factor**	**Hours/Day**	**Total Days**	**Hours Per Year**	**NOx**	**ROC**	**SOx**	**CO**	**PM_{10}**	**PM_{2_5}**
Aux Generator	Generator Sets	300	Diesel	2008	T3-302	0.74	12	4	48	63.06	7.01	0.12	61.31	3.50	3.50
65 Ton Crane	Cranes	275	Diesel	2008	T3-302	0.29	12	3	36	16.99	1.89	0.03	16.52	0.94	0.94
40 Ton Hydro Crane	Cranes	300	Diesel	2005	T2-302	0.29	12	3	36	30.58	3.40	0.04	18.02	1.03	1.03
Excavator	Excavators	153	Diesel	2008	T3-174	0.38	12	2	24	8.26	0.92	0.02	11.47	0.69	0.69
Light towers	Other General Industrial Equipment - Light Tower	12	Diesel	2008	T4-25	0.34	6	4	24	1.09	0.12	0.00	1.06	0.06	0.06
Light towers	Other General Industrial Equipment - Light Tower	12	Diesel	2008	T4-25	0.34	6	4	24	1.09	0.12	0.00	1.06	0.06	0.06
										121.07	**13.45**	**0.21**	**109.45**	**6.29**	**6.29**

Mobile Non-Road Engines

										Emissions (lb/Year)					
Description	**Equipment Category**	**HP**	**Fuel**	**Model Year**	**Tier Category**	**Load Factor**	**Hours/Day**	**Total Days**	**Hours Per Year**	**NOx**	**ROC**	**SOx**	**CO**	**PM_{10}**	**PM_{2_5}**
Bin Truck w/ Skid	Off-Highway Trucks	400	Diesel	2018	T4-603	0.38	12	3	36	3.60	1.71	0.06	31.49	0.18	0.18
Rubber Tire Loader	Rubber Tired Loaders	196	Diesel	2008	T3-302	0.36	12	3	36	15.03	1.67	0.03	14.62	0.84	0.84
Cement Pump Truck	Off-Highway Trucks	302	Diesel	2008	T3-603	0.38	12	1	12	8.15	0.91	0.02	7.92	0.45	0.45
										26.78	**4.29**	**0.11**	**54.02**	**1.47**	**1.47**

Mobile On-Road Vehicles

										Emissions (lb/Year)					
Description	**Representative Equipment Model**	**HP**	**Fuel**	**EF Source**	**Number of Vehicles**	**Trips per Day**	**Trip Length One Way**	**Total Days**	**Round Trip Total Miles**	**NOx**	**ROG**	**SO_x**	**CO**	**PM_{10}**	**PM_{2_5}**
Polaris UTV	Worker Commute Vehicles	50	Gasoline	EMFAC (EIR)	2	4	0.25	4	4	0.00	0.00	0.00	0.02	0.00	0.00
Truck	Miscellaneous Trucks	440	Diesel	EMFAC (EIR)	2	4	12.3	4	197	6.30	0.17	0.01	0.67	0.07	0.07
										6.30	**0.17**	**0.01**	**0.69**	**0.07**	**0.07**

NOx	ROC	SOx	CO	PM10	PM2.5
154.15	17.91	0.33	164.16	7.84	7.83

Notes:
1. Engine list as estimated for onshore work associated with the CSLC Legacy well abandonment project.
2. Emission Tier standard for each portable non-road diesel engine based on EPA family name provided by applicant. Where specific engine information was not available, assumed a minimum model year 2008, corresponding to at least Tier 3, consistent with EIR assumptions.
3. Mobile On-Road Vehicle emission factors as described in EIR Appendix E-1.
4. Hours of operation for each engine based on estimates for onshore project work.
5. Source for equipment Load Factors: Load factors are based on *California Emissions Estimator Model (CalEEMod) User's Guide,* Appendix D, October 2017, Table 3.3 (OFFROAD Default Horsepower and Load Factors).
6. Source for non-road engine emission factors: EPA Non-Road Emission Standards.