Safety and Oil Spill Prevention Audit

California Resources Corporation
Long Beach Unit
Island White

April 2026

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EXECUTIVE SUMMARY

Safety Audit of California Resources Corporation Long Beach Unit – Island White

A Safety and Oil Spill Prevention Audit of the California Resources Corporation (CRC) Long Beach Unit (LBU) Island White offshore production and processing facility began in October 2025. Fieldwork for both the Safety Audit Team and third-party Electrical contractor concluded in January 2026.

The objective of each Safety and Oil Spill Prevention Audit is to ensure that oil and gas facilities on State leases are operated in a safe and environmentally sound manner, comply with state and federal regulations, and meet the Best Achievable Protection (BAP) requirement of Public Resources Code (PRC) 8755. This audit followed the established procedures that have been used by the California State Lands Commission (Commission) for many years. The applicable regulations and standards commonly used are provided in Appendix C. Audit findings are based on and reference these criteria.

Company Background

CRC is an oil and natural gas exploration and production company with operating properties exclusively in the state of California. CRC explores for, produces, gathers, processes, and markets crude oil, natural gas, and natural gas liquids in each of California's four major oil and gas basins: San Joaquin, Los Angeles, Ventura, and Sacramento. CRC carries out the day-to-day operations of the LBU for the City of Long Beach and State of California.

Facility Description

CRC LBU is engaged in drilling and production operations of oil and gas from four artificial islands in Long Beach Harbor. The four islands are named after astronauts (Chaffee, Freeman, Grissom, White) who died in the line of duty in the early years of the United States space program. Production is shipped between islands and to shore at Pier J in the Port of Long Beach via subsea pipeline. Based on information provided by CRC, Island White produced about 1,870 barrels of oil per day (BOPD) and 1,120 thousand cubic feet of gas per day (MCFD) in the first quarter of 2026 from 100 active wells.

Safety Audit Results

The Safety and Oil Spill Prevention Audit found that the LBU – Island White production and processing facility substantially complies with applicable safety and regulatory requirements and that an adequate level of safety and environmental protection has been achieved for facility activities. The established safety culture also ensures the protection of workers, the public, and the environment.

The condition of the facility was found to be in an acceptable state of repair, clean, and well organized. CRC appears to have well-established safety policies, health, and environmental programs. A consistent safety and environmental protection culture has developed from these programs. Employees are thoroughly trained in their job, which ensures that they perform tasks effectively, efficiently, and safely. They are encouraged to participate and further enhance overall reliability, job performance, and promote teamwork to reach organizational safety goals and reduce workplace hazards. Personnel are knowledgeable and provided valuable assistance to the Commission Mineral Resources Management Division (MRMD) staff during the course of the Safety Audit.

Safety systems and equipment remain fit for service. Preventive maintenance practices, inspection protocols, and regular condition assessment help ensure that the equipment and systems meet risk reduction and environmental compliance goals. CRC has effectively implemented these measures on Island White.

Firefighting, life safety, and spill response equipment meet NFPA and regulatory requirements. Hose reels and fire extinguishers are located throughout the facility. Fire suppression equipment (pumps, hoses, extinguishers) are regularly serviced, maintained, and tested. Hose reels and fire extinguishers are located and identified so that employees can make use of them when needed. Protective covers for some hose reels and fire extinguishers showed extensive wear and need to be replaced.

Corporate safety programs are in place and fully implemented. The facility process control and safety shutdown systems are designed, installed, and maintained according to applicable codes and standards. Employees are appropriately trained in operating procedures, safe work practices, and the use, care, and limitations of all required Personal Protective Equipment (PPE).

Action items from the audit are categorized into three subject areas: equipment function and integrity (EFI), electrical (ELC), and safety management programs (SMP). Each action item is assigned a priority ranking from one to three: priority one action items pose a high or immediate risk to personnel, the facility, or the environment and must be resolved within 30 days of this report; priority two action items pose a moderate risk potential and must be resolved within 120 days; and priority three action items pose a low-risk potential and must be resolved within 180 days.

The MRMD Safety Audit Team identified two priority 1, 14 priority 2 and 59 priority 3 action items. The following chart displays the distribution of the action items by subject areas.

This distribution is similar to other facilities in California where the items identified are typically related to process equipment, maintenance practices, and electrical systems. Upon notification of the two priority 1 action items, CRC implemented corrective action immediately.

CRC Island White Safety Audit Action Items by Category and Priority

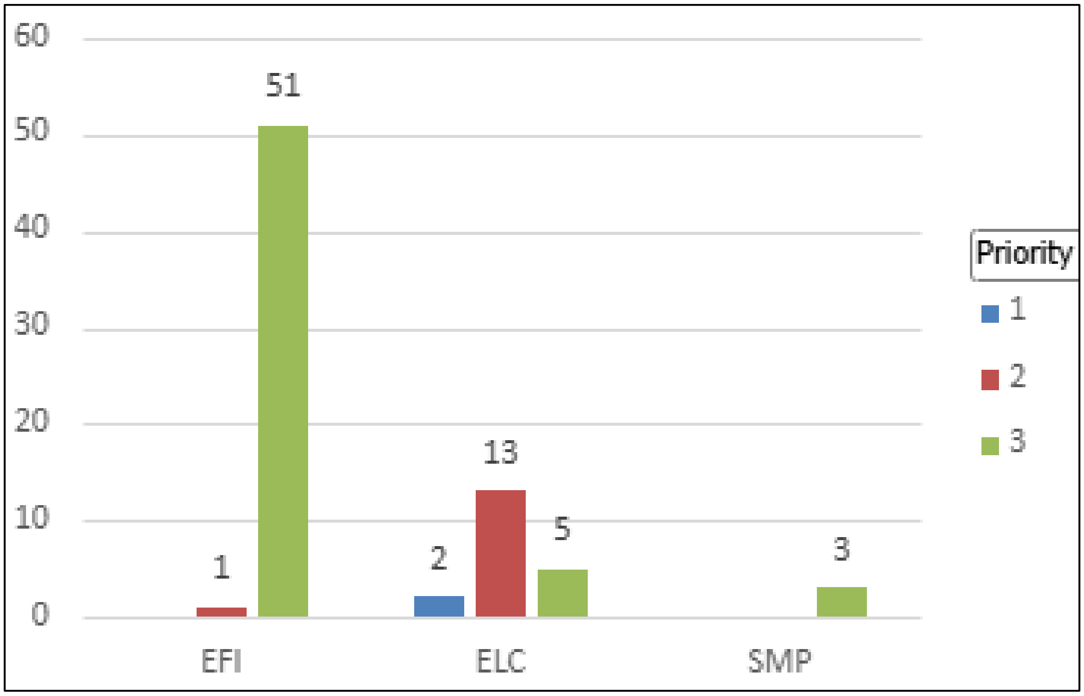

Figure 1

Introduction

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INTRODUCTION

1.1 Safety Audit Background

The California State Lands Commission (Commission) Mineral Resources Management Division (MRMD) conducts safety and oil spill prevention audits of operators and/or contractors for lands in which the State has an interest. Commission sponsored safety audits ensure oil and gas production facilities on State leases or granted lands are operated in a safe and environmentally sound manner and comply with Federal, State, and Local codes or permits, as well as industry standards and practices. Commission staff are tasked with oil spill prevention in California’s ocean and tidelands, prevention of waste, conservation of natural resources, and ensuring that safety and health standards are being met. Public Resources Code (PRC) 6103, 6108, 6216, 6301, 6873(d), 8755, and 8757 provide authority for Commission regulations and the existing inspection of the Safety Audit program.

In 1990, the California Legislature enacted the Lempert-Keene-Seastrand Oil Spill Prevention and Response Act (California Government Code 8670.1). The Act covers all aspects of marine facility oil spill prevention and response in California. Under the legislation, marine facilities must provide the Best Achievable Protection (BAP) of the coast and marine waters.

Frequent monitoring and inspections by MRMD staff of offshore and onshore oil and gas drilling and production facilities ensure that BAP is in place to safeguard the public and environment. The MRMD Safety Audit Program, in conjunction with the monthly inspection program, helps prevent oil spills and other accidents with on-site inspection and verification activities. The Safety Audit Program also aids prevention through design review and assessment of facility producing, processing, and safety systems, maintenance condition, operating procedures, emergency plans, training and certification programs, human factors, and other aspects of safety management.

During a safety and oil spill prevention audit, MRMD team members systematically review and inspect the operating organization’s facilities and safety management programs, identify action items to be addressed, and provide feedback for improvement in preparation of a formal written report. The areas of emphasis include:

- Equipment Functionality and Integrity (EFI)
- Electrical (ELC)
- Safety Management Programs (SMP)
- Human Factors (HF)

Appropriate company contacts and resources are identified prior to the start of the audit. Progress reports are communicated to MRMD management personnel and the company throughout the safety audit process and an “action item matrix” is developed to categorize and track audit findings. The matrix identifies deficiencies and contains recommended corrective actions and a priority ranking for the specified corrective actions. A graph and table are generated showing the breakdown of the facility’s identified action items by area of emphasis.

Draft copies of the report and the action item matrix are provided to the company during the safety audit. The final audit report is presented to company management formally, which affords the opportunity to discuss the findings, and the corrective actions proposed. Throughout the clearance phase of the audit, the MRMD team continues to communicate with the company in resolving the action items and tracks the progress of the proposed corrective actions.

This program could not be successfully undertaken without the cooperation and support of the operating company. The Safety Audit benefits both the company and the State by reducing workplace hazards, property damage, oil spills and other releases that are harmful to the environment. Previous experience shows safety assessments help increase operating effectiveness, efficiency, and lower operating costs.

1.2 Facility Background

The California Resources Corporation (CRC) Long Beach Unit (LBU) is located within the Wilmington Oil Field in California, the third largest field in the contiguous United States, with ultimate recovery estimated at three billion barrels of oil. It encompasses both tidelands (lands granted to the City of Long Beach by the State), uplands, and offshore areas leased by the State, and has produced over two and one-half billion barrels of oil through primary production and secondary water flooding.

Operations began in the mid-1960s from onshore areas within the Harbor District while the four artificial islands were being constructed. The oil-producing formations in the Wilmington Field are at or below hydrostatic pressure, and the wells require artificial lift to produce. The field has been produced under waterflood since the 1960s to enhance recovery and to control subsidence; this has resulted in high water cuts for the current production. Oil is mostly produced from intervals ranging in vertical depths from 2,000 feet to 8,500 feet.

Legislation enacted in 1964 allowed the City of Long Beach to contract out the operation of the eastern offshore portion of the field. Four artificial islands were built and named after astronauts that lost their lives during the early years of the U.S. space exploration (Grissom, White, Chaffee, and Freeman). The original consortium of operators: Texaco, Humble, Union, Mobil and Shell formed the THUMS Long Beach Company to serve as contractor for the City of Long Beach. THUMS constructed the islands and expanded Pier J adjacent to the Long

Beach Harbor, forming the LBU. Occidental Oil and Gas Holding Corporation acquired THUMS from ARCO in 2000 creating Oxy Long Beach, Inc. California Resources Corporation was separated in June 2014 from parent company Occidental Petroleum and continues to be the contractor operating the LBU on behalf of the State of California and the City of Long Beach.

1.3 Facility Description

CRC LBU is engaged in drilling and production operations of oil and gas from four artificial islands in Long Beach Harbor, as well as onshore well areas, production facilities, and support facilities. The onshore facilities that are part of the LBU located within Pier J area of the Port of Long Beach include well areas at sites J-1, J-3, J-4, and J-5, as well as the J-6 tank farm and J-2 processing facility. The LBU also includes the Broadway and Mitchell (B&M) processing and shipping facilities.

Wells at the LBU employ downhole electric submersible pumps (ESP) to produce crude oil. The wells are grouped in multi-well cellars at each island and other well sites. Produced oil, water, and associated natural gas are processed through Free Water Knockouts (FWKOs) at the island facilities, that provide initial separation of the produced fluid and gas. Produced water from the FWKOs is treated on site and is normally injected back into the formation. The oil emulsion and the gas streams are then sent through subsea pipelines and onshore gathering lines to the J-2 processing facility.

The J-2 processing facility further separates the produced emulsion into gas, water, and oil components, while removing entrained solids. The J-2 facility works in concert with the nearby J-6 tank farm which can hold some production volume during processing and stores the crude oil that is ready for sale and shipping.

The gas from the islands and onshore gas production is routed to the hydrogen sulfide (H_2S) absorption unit at the J-2 facility. The sweetened gas then travels to the B&M gas processing facility where it is further dehydrated and processed to meet sales specifications. A refrigeration process is used to dehydrate the gas, removing water vapor and hydrocarbon condensates from the gas stream. Recovered hydrocarbon condensates are injected into the oil shipping line. The B&M facility also measures the volumes of oil sold using Lease Automatic Custody Transfer (LACT) meters and certifies the custody transfers of the crude oil to the individual shipping companies via pipelines to buyers, typically pipeline companies or refineries. Natural gas is normally sent to the nearby power plant to generate power directly for the local electric utility grid.

Based on information provided by CRC, Island White produced about 1,870 barrels of oil per day (BOPD) and 1,120 thousand cubic feet of gas per day (MCFD) in the first quarter of 2026 from 100 active wells.

Facility Condition Audit

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2.0 FACILITY CONDITION AUDIT

2.1 Goals and Methodology

The goal of the facility condition portion of the audit was to evaluate the current equipment maintenance and integrity of the California Resources Corporation (CRC) Long Beach Unit (LBU) Island White production and processing facility. The on-site inspection involved a systematic evaluation of the different systems, equipment, and facilities using various checklists and methods that the team has developed over years of auditing. A variety of codes and standards apply. Initial tasks to accomplish this goal included field verifications of the key drawings/plans, overall condition inspection and evaluation, review of system and equipment maintenance histories, evaluation of key systems and equipment, technical review of safety systems design, and verification of compliance with applicable state regulations and industry codes, standards, and recommended practices. The layout of the audit report generally follows a “system by system” method that includes a description and assessment of the facility with any significant observations. The report addresses the safety of personnel as well as facility and process safety. The assessments of both areas of safety are important when identifying an organization’s current level of safety development. The power plant was not included in the scope of this audit.

2.2 General Facility Conditions

2.2 Facility Roads Condition: No items of interest were identified during this audit. Roads are maintained in an acceptable condition to enable ready access to maintenance, surveillance, and service vehicles and equipment.

2.2.1 General Cleanliness/Vegetation Control: Facility work areas were clean, orderly, and free of waste materials (e.g., refuse, oilfield wastes) and fire hazards. There was an adequate supply of clearly marked refuse containers throughout the facility, and all refuse appeared to be well controlled. Employee facilities consist of a plumbed restroom located within the Production Office, used predominantly by CRC personnel, as well as portable sanitation facilities for contractors and visitors. The portable toilets and hand-washing stations on location are clean, regularly serviced, and well maintained.

CRC’s good housekeeping policies provide an organized, uncluttered environment and reduce hazards. Good housekeeping practices require attention to details, such as the layout of the worksite or facility, identification and marking of physical hazards, ensuring the adequate number of storage facilities, and routine maintenance. The benefits of good housekeeping affect not only workers' safety but also their health and productivity. Improvements in worker health and productivity, in turn, lead to lower operating costs thereby providing benefits to both the workers and the employer. It is also the foundation for accident and fire prevention.

CRC's housekeeping strategy is more than a one-time initiative; it encourages constant monitoring and auditing. Regular walkthrough inspections are conducted, hazards are reported, and employees are trained to help sustain housekeeping. Goals and expectations are set and audited.

To help prevent slip, trip and fall incidents, CRC uses the following employee guidance and work practices:

- Report and clean up spills and leaks.
- Keep walkways and exits clear of items.
- Warning signs to identify hazards.
- Drip pans and guards.

2.2.2 Stairs, Walkways, Gratings, & Ladders: Stairs, walkways, gratings, and ladders throughout the facility appeared to be of a safe design and construction. Safeguards were in place where there was a need to transition between levels and for routine access to equipment. The aisles, passageways, stairs, and gratings had sufficient safe clearances and were clear with no obstructions across or in the aisles to create a hazard. Fixed metal ladders and appurtenances are painted to resist corrosion and necessary work equipment appeared to be in good working order. Three priority 3 action items were identified that address specific issues: grating corrosion in one limited area, one set of stairs in the Mud Plant that shows signs of corrosion, and two ladderway openings without swinging gates or equivalent protection. *(Action Items EFI 2.2.2.01 – 2.2.2.03)*

2.2.3 Exits, Emergency Egress, & Escape: Gathering points are clearly posted and easily accessible. Emergency procedures are explained during initial worker orientation and safety meetings, as well as being reviewed as part of the work permit system. Due to the design, size, and open arrangement of the facility's equipment, there were no areas of concern regarding access and egress.

2.2.4 Labeling, Color Coding, Placards, & Signs: The design, application, and use of signs and symbols within the facility define specific workplace hazards. CRC adheres to Occupational Safety and Health Administration (OSHA) and American National Standards Institute (ANSI) recommendations regarding signage. All employees receive instruction on what the signs mean and what, if any, special precautions are necessary to perform their task safely. Generally, warning, danger, and caution signs were posted properly to identify known safety hazards and were clearly visible. National Fire Protection Association (NFPA) 704 hazard identification labeling (hazard diamonds) were visible and legible on all tanks, vessels, buildings, and chemical storage totes. The posting of hazard diamonds is an indication of good facility hazard communication and conformance with good oilfield practice.

Tanks and pressure vessels within the facility were clearly identified with stenciled labels. Confined space warning placards are posted at open manways or skirt openings to warn personnel of potential hazards. Generally, field equipment was observed to be appropriately labeled and manufacturers data plates were present. Two pumps that were not clearly labeled were identified. *(Action Item EFI 2.2.4.01)*

2.2.5 Security: Physical and operational security measures are in place to prevent unauthorized entry into the Island White facility. The facility is manned twenty-four hours a day, seven days a week with at least one operator present at all times. Crew boat usage is controlled through security badging at the boat landing. The dock and barge ramp on the island provide limited points of access which can be easily monitored. No issues related to facility security were identified during the audit.

2.2.6 Hazardous Material Handling & Storage: Flammable and combustible liquids were found properly stored and documentation readily available, corresponding to Cal/OSHA and NFPA 30 regulations. The bulk chemical totes appeared structurally sound and had adequate containment in the event of a leak. There were some missing and/or faded chemical labels for various tanks which should be replaced (*Action Item EFI 2.2.6.01*). Safety Data Sheets (SDS) containing information on all chemicals used in the workplace are readily available and can be found inside the Production Office.

Compressed gas cylinders were secured and legibly marked identifying the gas content. Empty and unused cylinders had closed valves with protective caps in place. Cylinders were adequately secured and stored in places where they would not be knocked over or damaged because of contact.

2.3 Field Verification of Plans

2.3.1 Process Flow Diagrams (PFDs) & Plot Plans: The PFDs are part of the process safety design information for the facility and indicate the general flow of plant processes and equipment. Plot Plans illustrate the location of pieces of equipment, including safety equipment, and where they are relative to other pieces of equipment. Some minor changes to the Process Flow Diagrams and the Plot Plans are needed to reflect current equipment and placement (*Action Items EFI 2.3.1.01 – 2.3.1.04*).

2.3.2 Piping & Instrumentation Diagrams (P&IDs): Field Verification of the P&IDs showed that they were reasonably accurate; however, minor updating is required. The discrepancies in the P&IDs included piping identification errors, missing equipment, and out of service or removed equipment (*Action Items EFI 2.3.2.01 – 2.3.2.34*).

2.3.3 Fire Protection Plot Plan: The fire protection equipment is depicted on drawings captured in Section 2.3.1. Some mounted fire extinguishers were not shown on the drawing.

2.4 Condition and Integrity of Major Systems

2.4.1 Pumps and Piping: The mechanical integrity and maintenance of the pumps and piping were evaluated by external visual inspections in conjunction with P&ID verification. The visual inspection and evaluation work included the external condition of the pumps and piping, coating, signs of misalignment, support, temporary repairs, and leakage. The evaluation considered other key information such as material selection, piping design, and maintenance practices.

CRC uses a combination of ongoing routine and risk-based piping inspections to achieve a desired level of facility safety, environmental protection, and unscheduled downtime. Inspection frequencies are set up according to regulatory requirements and established guidelines (e.g., American Petroleum Institute (API) 570 and Department of Transportation (DOT) pipeline inspections). Results from wall thickness measurements, inspections, repairs, and other tests are readily available and recorded in a computer-based maintenance system (Maximo). This maintenance management system stores and generates maintenance activities as well as saving inspection data. The pumps and piping integrity throughout the facility were found to be in generally good condition with the exception of the following action items that were generated as a result. Temporary repairs were observed that had remained in place through an available maintenance opportunity *(Action Item EFI 2.4.1.01).* Various piping segments were either uncoated or showed signs of surface corrosion and oxidation *(Action Item EFI 2.4.1.02).* It was noted that some piping supports and brackets were missing or broken (*Action Item EFI 2.4.1.03*).

2.4.2 Tanks: The tanks at the facility appear to be in good condition and have been inspected within API Standard 653 guidelines. Facility tanks are subject to CRC's written inspection and maintenance plan which follows API Recommended Practices (RPs) and standards. The maintenance strategy also conforms to applicable State regulations and uses appropriate work practices and procedures. Routine external/internal maintenance inspections occur in cycles. Tank documentation includes inspections, repairs, alterations, and reconstruction records. In addition, tank shell ultrasonic thickness (UT) data showing locations and results are completed as part of the inspection process. This inspection method searches for flaws and service-induced damage as part of determining the suitability of the tank for intended service. Tank exterior coatings, piping, valves, walls, roofs, anchor bolts, and labeling appeared to be in good condition with no evidence of recent damage or active leaks. A comprehensive review of the tank inspection records was performed to assess the current condition.

2.4.3 Pressure Vessels: Island White has a variety of pressure vessels used for separation and processing. These pressure vessels are maintained following a program of external and internal examination for compliance with applicable regulations, standards (primarily API 510), and recommended practices. These pressure vessels are built according to American Society of Mechanical Engineers (ASME) Codes and have appropriate controls and safety devices. CRC has tailored inspection cycles to match the safety risks posed by particular classes of pressure vessels. CRC uses a maintenance management program called CREDO to determine vessel inspection frequencies. CREDO uses vessel wall thickness, corrosion allowance, and minimum thicknesses (t-mins), as well as operating temperature and pressures, to determine the inspection frequency. External vessel inspections are completed within 5-year intervals, while internal inspections and/or thickness measurements are completed within ten-year intervals using non-destructive examination techniques per API 510 Pressure Vessel Inspection Code.

A visual external inspection of the pressure vessels was performed to assess the general condition. Only one item of potential concern was identified: bolts securing the Vent Gas Scrubber to the concrete foundation showed signs of corrosion and oxidation. *(Action Item 2.4.3.01)*

<u>2.4.4 Pressure Safety Valves:</u> The primary purpose of the pressure relief system is to ensure protection of facility personnel and equipment from overpressure conditions that may happen during process upsets, equipment failure and external fires. The relief system serves the major process vessels and components while other relief devices may be located on smaller ancillary components. The relief system components were evaluated for installation, design, maintenance, functionality, compliance with applicable regulations and recommended standards, as well as recordkeeping.

A visual inspection of the system determined that all piping laterals and headers are arranged so that the outlet from each PSV does not form a liquid trap.

Isolation valves are installed on the inlet lines to some PSVs and on the outlet lines to isolate a relief valve for inspection, servicing, and repair while the facility is operating. Due to the critical nature of this safety system, these valves are locked or car sealed in the open position during normal operations. PSVs are tested and serviced by an outside contractor. The inspection frequency is normally at least once every five years, in line with API requirements. Service records were in order and no action items were identified.

<u>2.4.5 ESP, Pump Units, Cellars, Wellhead Equipment & Well Safety Systems:</u>

Production and injection wells are located within large volume multi-well cellars. They are secured by reinforced concrete walls and provide secondary containment against potential oil spills. A visual inspection of the cellar walls was performed, and they were found to have visible damage, generating concern regarding their condition. Damage varied from minor to severe cracking, rebar exposure, and loose top metal edges of the concrete walls. *(Action Item EFI 2.4.5.01)*

The production wells are incapable of flow once artificial lift is stopped. Therefore, subsurface safety valves (SSSVs) or other automated shut down valves are not required on production flow lines. Since gas can flow from the casings, block and bleed systems have been provided at the wellheads. The electrical submersible pumps (ESPs) can be shutdown remotely via the tank farm lease emergency shutdown (ESD).

2.4.6 Firefighting Detection Systems: The facility is equipped with photoelectric smoke detectors. There is adequate coverage with no action items identified.

2.4.7 Fire Protection Equipment: Island White is equipped with an electric fire pump, hydrants, hose reels, and portable fire extinguishers are distributed throughout Island White. Equipment inspections occur monthly and annually by a contractor and equipment appears in good condition. In a marine environment, fire protection equipment should be covered and protected from exposure to the environment. Some fire extinguisher and hose reel covers were damaged or missing. *(Action Items EFI 2.4.7.01 – 2.4.7.02)*

2.4.8 Emergency Shutdown Device (ESD): There is a manual ESD in the Production Office. Its testing is witnessed by MRMD Inspections personnel during quarterly Major Safety Systems inspections.

2.4.9 Safety & Personal Protective Equipment (PPE): CRC has a written workplace safety program for identifying, evaluating, analyzing, and controlling workplace safety and health hazards. This program has systematic policies, procedures, and practices that are fundamental to creating and maintaining a safe and healthy working environment. CRC prioritizes the importance of preventing occupational injury and illness over production.

CRC regularly assesses the workplace to determine if hazards are present that require the use of PPE when engineering and administrative controls are not feasible or effective in reducing these exposures to acceptable levels. Hazards are communicated to the employees, appropriate PPE is selected, and workers are trained in its use. Employees were observed to be using appropriate PPE as required by company policy or where hazards are known to exist. PPE commonly used include hard hats, steel-toed boots, fire resistant clothing (FRC), hearing protection, safety glasses, and other specialty items like face shields, rubber gloves, aprons, and fall protection as needed.

2.4.10 Instrumentation, Alarm, & Paging: Major equipment, process controls, and process control alarms are graphically displayed on a Human Machine Interface (HMI) on multiple terminals in the Production Office and Control Room. Electronic gas sensors are located throughout the well cellars to detect combustible gas at 10% of the lower explosive limit (LEL). Testing of the gas detection equipment is witnessed monthly by MRMD Inspections personnel. The process control and safety systems HMI software includes event logging (errors, alarms, and system messages) and can be printed on demand.

The facility instrumentation is tested, maintained, and calibrated on a regular schedule. Records are readily available, and the device history can be tracked through the maintenance database program. All local instrumentation (e.g., pressure gauges, temperature gauges, and recorders) appeared to be properly maintained and in good operating condition.

2.4.11 Auxiliary Generator / Prime Mover: The emergency generator on Island White is installed to supply electrical power to the fire pump, barge ramp, and some area lighting at or near the barge ramp/boat landing. CRC has established a schedule of maintenance and service based on recognized and generally accepted good engineering practices. The frequency of inspection and tests of the emergency generator are consistent with applicable manufacturers' recommendations and NFPA standards. The most recent annual inspection record for the generator was provided as part of the audit.

2.4.12 Spill Containment: Spill containment equipment appeared to be adequate. Initial spill response supplies including containment boom, sorbent pads, sorbent blankets, anchors, and drogues are stored on Island White. These supplies are inventoried (included in the quarterly Major Safety Systems inspection) and readily accessible by operating personnel in the event of a spill.

2.4.13 Spill Response: Oil spill response for Island White is outlined in CRC LBU's Oil Spill Contingency Plan (OSCP) dated July 2024. The plan satisfies both federal and state regulations. The response equipment that is located in the facility is checked monthly for condition and to satisfy the quantities specified by the response plan. All equipment and its storage appeared to be in good order during the safety audit.

2.5 Mechanical Integrity / Preventive Maintenance Program

This section provides a general overview of CRC's corporate philosophy and approach to implementing a successful reliability program. The evaluation of CRC LBU's maintenance activities also ensures mechanical equipment is operating within design parameters and maintained in a manner appropriate for its intended application.

Maintenance activities are initiated, managed, and tracked utilizing Maximo. Operating personnel have the capability to access Maximo to generate a work order. These work orders can range from a simple filter change to major equipment repair. Maximo gives the CRC maintenance planner flexibility to schedule and record these activities based upon manufacturer's recommendations, operating history, and recognized and generally accepted good engineering practices. Operating personnel conduct routine preventive maintenance on all critical processes and operational equipment. Major pieces of process equipment (i.e. vessels, tanks, piping, and machinery) can be scheduled within the preventive maintenance program based on manufacturer's recommendations and operating history.

In addition, a computer-based risk management software package called CREDO is used to allow facility engineers to view risk levels established for the various sections of piping and pressure vessels based on service and consequence of failure. When the risk for a particular section of piping or shell thickness of a pressure vessel reaches an unacceptable level, engineers can implement a corrective or mitigating action on the asset to lower the risk to an acceptable level.

2.6 Production Safety Systems

The audit team reviewed the automated safety systems on Island White. All process components, their installed safety alarms and shutdown features, detection and monitoring systems, other emergency support features, equipment, and their functions were reviewed. Study of these systems and devices through review of CRC's Cause & Effect Chart, P&IDs, and operating procedures provided an overall view of the design. Island White's safety systems and devices (as presented in these documents) were compared with the recommendations from API RP 14C – *Analysis, Design, Installation, and Testing of Safety Systems for Offshore Production Facilities*. An action item was identified to generate a more comprehensive hazards analysis, such as a Safety Analysis Function Evaluation (SAFE) Chart or Hazard and Operability (HazOp) Process Hazard Analysis (PHA), to show that all failure modes have been considered and are adequately addressed by Island White's safety systems. *(Action Item EFI 2.6.01)* The Cause & Effect Chart was also found to have some inaccuracies related to process safety information. While expanding the chart to produce a more comprehensive hazards analysis, the information contained within should be verified and corrected. *(Action Item EFI 2.6.02)*

Island White has an integrated safety control system. The automated control and safety systems feature an HMI that displays status information for the operator, process controls, and includes a set of safety sensors and controls for the facility. These layers achieve appropriate safeguarding for the risks and hazards addressed, while providing opportunities for corrective action to minimize the consequences from operational upsets and other undesirable events. The automated control system provides for reliable and coordinated operation of the major processing equipment. An initial set of process control alarms and the capability for operator originated corrective actions act as the first level of safeguard within this automated control system. For critical deviations in pressure or level, a safety or emergency shutdown action typically provides the next level of protection. Relief valves and/or other mechanical devices also provide automatic physical protection to prevent rupture from overpressure or overflow.

The safety systems installed on pressure vessels and tanks focus on preventing releases, stopping the flow of hazardous chemicals to a leak if one occurs, and minimizing the effects of such releases. The majority of safety devices on the pressure vessels consist of alarms and pressure safety valves (PSVs). Process tanks and their control systems are designed with sufficient safety devices and redundancies to prevent and/or isolate any accidental release of flammable gas or liquid. An integrated detection and protection system senses and activates appropriate high and low-level alarms. Mechanical devices such as level indicators and valves are incorporated into the design to provide an additional level of protection.

The basic process control system and safety instrumented systems on Island White function independently in line with International Society of Automation (ISA) and International Electrotechnical Commission (IEC) recommendations. This separation prevents common-mode failures between process control and safety systems and increases reliability of the safety systems functioning properly during hazardous events. Facility HMI systems are designed to allow operators to easily visualize and control operating parameters to optimize the overall function and production of the processes. Access to safety system program control code and parameters is limited to the automation team to prevent inadvertent changes and ensure desired function. Bypass switches for functional testing provide “no interruption” to the normal process operation. System safety integrity is maintained when a device is placed in bypass by procedures and the use of an alarm to indicate an active bypass.

An emergency shutdown switch for Island White is clearly indicated and easily accessible in the control room. The switch provides a means for personnel to initiate a facility shutdown when an abnormal condition is observed.

Electrical System Audit

California Resources Corporation
Long Beach Unit
Island White

April 2026

3.0 ELECTRICAL SYSTEM AUDIT

3.1 Goals and Methodology

The primary goal of the Electrical Team (ELC) was to evaluate the electrical systems and operations of the California Resources Corporation (CRC) Long Beach Unit (LBU) Island White production and processing facility to determine if it conforms to recognized and appropriate electrical Codes and industry standards.

References used in review of facilities include documents published by the American Petroleum Institute (API), National Fire Protection Association (NFPA), the State of California Electric Code (CEC) and state regulations. The ELC Team review comments are based on those publications, which primarily include API RP 500, API RP 540, CEC documents and industry standards. The drawings used in support of the audit were Electrical Single-lines, Area Classification Drawings, as-builts, and maintenance/testing data provided by CRC for the facility.

Specific tasks to accomplish this goal included a systematic process of field verification of electrical single-line diagrams, plan drawings, area classification drawings, and operation and maintenance practices. A comprehensive use of inspection checklists, code and standard compliance checklists, and review of electrical system design for conformance to codes and standards was utilized to complete the audit. This report includes a summary of the electrical systems included in the audit.

The ELC Matrix, Section 3.0, provides a detailed listing of the locations and items identified for correction. The matrix is organized in sections and each segment is discussed below along with examples of typical items encountered.

3.2 Hazardous Area Electrical Classification Drawings (HAECD)

The API recommended practices and CEC requirements provide specific guidelines for the electrical classification of hazardous areas and installation practices for electrical equipment and materials within classified areas. The basis for observations and review comments for all hazardous areas are API RP 500, CEC Articles 500, 501, and 504, and NFPA 70E. The hazardous area electrical classification drawings are generally representative of the existing conditions and area class elements.

The purpose of a Hazardous Area Electrical Classification Drawing is to define the locations of boundaries and areas where specific electrical materials and installation practices are required to manage risks associated with the explosive properties of flammable liquids, vapors, and other volatile materials. Installation and maintenance of electrical systems requires attention to the type of hazard and the level of the hazard in order to ensure compliance with

CEC requirements. Hazardous Area Electrical Classification Drawings are required to include the information necessary for designers, electricians, and other personnel to perform work in and around classified areas. There have been no apparent equipment changes made at the production facilities at Island White that necessitate an update of the Hazardous Area Electrical Classification Drawings.

Electrical equipment that is not suitable for installation in a classified area will need to be relocated, replaced with equipment that is suitable, purged, or non-permeable barriers will need to be installed. Enclosed and gasketed fittings are suitable for Division 2, but not Division 1. NEMA 3R enclosures are suitable for unclassified areas, but not Division 1 or Division 2. When non-explosionproof enclosures with arc producing devices are located in Class I areas, they are required to be purged and pressurized per NFPA 496.

3.3 Electrical Power Distribution System, Normal Power

Electrical System Configuration: Island White's electric utility service is supplied by Southern California Edison (SCE). Island White receives power at 66kV from two SCE oil-filled submarine cables. Island White utilizes power at 4160V or 480V through a radial distribution system to supply plant loads

3.3.1 Electrical Single-Line: The electrical single-line drawings provided by CRC were used for review of the LBU facilities electrical system. During the audit, sizes and rating of the equipment were recorded for comparison to existing drawings. The audit focused on 12.47kV, 480V, and 240V power distribution systems. CRC will need to add missing information and incorporate the corrected information into updated single-line drawings.

3.3.2 Electrical Service Capacity: The normal power system capacity appears to be adequate for present usage and loads based on observation of equipment connected for each site. Electrical system utility short circuit duty data was provided within the 2023 arc-flash report created by Mangan Inc. The data is suggested to be included on the single-line diagram. Utility short circuit duty should be verified every five years when the facility arc flash hazard assessment is updated as required by NFPA 70E.

A physical inspection of motor starters and circuit breakers revealed that, in general, overcurrent protection was appropriate. The application of overcurrent devices with respect to equipment rating is generally satisfactory.

3.3.3 Electrical System Design: Island White receives power from SCE at 4.16kV. CRC-owned step-down transformers supply three-phase power at 4.16kV to the facility loads. Facility loads requiring a 208/120V supply are served by CRC owned transformers located near the loads.

Island White receives SCE power at 4.16kV at Distribution and Metering F.P.E. Switchgears 1 and 2. Two main step down transformers – "Transformer #3 (West)" and "Transformer #4 (East)" – supply power to the 4.16kV switchgears 1 & 2. The step down transformer windings are delta connected and grounded.

Reliability of the electric system is determined primarily by the availability of SCE to supply loads and the condition and operational readiness of the facility distribution system. A sound maintenance and inspection program, properly implemented, is key to assuring the highest level of reliability. Electrical preventative maintenance and repair has been integrated into the MAXIMO computer database where it is tracked.

Electrical systems shall be designed to minimize the risk of hazards to operating personnel. CEC Article 110.16 requires that arc flash hazard warnings be provided on electrical equipment to warn personnel of the potential electric arc flash hazards. NFPA 70E-2024, Standard for Electrical Safety in the Workplace, provides guidance for labeling and selecting personal protective equipment (PPE). Arc flash hazard warnings and labeling is, in general, provided on all energized equipment at the LBU. It was confirmed with CRC that the studies for arc flash hazard are being updated every five years.

Temporary electrical equipment, including temporary variable frequency drives (VFD) and transformers, appears to be in service for an extended duration. Per NEC 110.3(B) and 110.12(A), all equipment shall be installed and used in accordance with any instructions included in the listing or labeling. Temporary equipment should be verified for suitability for continued use and either permanently installed or replaced as required.

All Lockout/Tagout (LOTO) equipment and temporary equipment should be identified and labeled as such in the field. NEC 110.22(A) requires that each disconnect be legibly marked to indicate its purpose. Temporary equipment lacking proper identification should have nameplates added or updated as necessary. Refer to the electrical matrix for specific locations that require updating.

3.4 Electrical Power Equipment Condition and Functionality

<u>*3.4.1 Equipment Condition:*</u> Given the harsh environmental marine conditions, the overall condition of the electrical equipment can be rated as fair. The rating condition of fair can be attributed to age, result of exposure to the elements, collateral damage during site activities, and the ongoing need for maintenance in this type of aged facility. Broken and missing enclosure covers, broken supports, rusted enclosures, deteriorated weatherproof gaskets, and missing bolts all indicate the need for continual attention to basic maintenance housekeeping activities.

CEC Article 110.13, *Mounting Electrical Equipment*, requires all electrical equipment to be firmly secured to the surface on which it is supported. CEC Article 300.11, *Securing and*

Supporting, requires all electrical raceways, cable assemblies, boxes, cabinets and fittings to be secured or fastened in place. Additional mounting, support, and securing requirements are also provided in the CEC for individual types of installations and conditions. Securing and supporting of electrical equipment, cables, and materials needs to be consistently addressed and managed throughout the island.

Refer to the Electrical Matrix for a list of physical condition issues such as broken/missing covers and supports, corrosion and deteriorated gaskets, open or partially assembled fittings, and degraded labels. These conditions undermine environmental and classified-area integrity (ingress paths) and complicate operations. Corrective actions include: replace/secure damaged supports and covers, renew gaskets, close/replace compromised fittings and conduits, and re-label with durable, legible nameplates and current arc-flash stickers.

3.4.2 Safety Procedures: Safety Standards in the Operations Manual are provided to cover the electrical equipment lockout/tagout/blockout program and reflect NFPA 70E requirements. CRC has implemented a hazards identification program that requires personnel to complete a Job safety Analysis (JSA) prior to performing any work on equipment or facilities. The JSA includes hazards identification, PPE, and other measures to mitigate hazards. All JSAs must be closed out at the completion of the tasks.

3.4.3 Equipment Maintenance Practices: Equipment maintenance practices are clearly defined within CRC's Electrical Integrity and Quality Assurance Program and implement requirements based on the NFPA 70B code and API standards. The Electrical Integrity program clearly communicates inspection and testing parameters and frequency for electrical systems. The program appears to be adhered to and kept up to date.

Maintenance and testing documentation was provided by CRC as a part of the Audit. Regular inspections and work orders are scheduled, completed, and documented appropriately and proactively. Routine maintenance and testing shutdown took place for Island White during the week of 9/8/25.

3.5 Grounding & Bonding

CEC Articles 250 and 501 provide the requirements for power system grounding and bonding in oil production facilities. Significant portions of the requirements for grounding are established to prevent or reduce the possibility of injury to personnel from shock. The grounding system also contributes to a reduction of equipment damage either from induced voltages or during fault conditions. The three types of grounding required at the facility are power system circuit grounding, equipment equipotential grounding, and static control grounding.

CEC Article 501.16, *Bonding in Class I Areas*, states that all non-current carrying metal parts and enclosures associated with electrical components shall be connected, bonded, and be continuous between the Class I area equipment and the supply system ground. That is, ground circuit bonding shall be continuous from the load all the way back to the power transformer grounding electrode system. The best way to achieve ground circuit continuity is to include properly sized (CEC Article 250) equipment grounding conductors with each set of power conductors from the source of power to the load. Equipment bonding conductors to major equipment, such as transformers, switchgear, and the like, were installed and appeared adequate.

CEC Article 501.16(b) requires that all liquid-tight conduit used in hazardous areas be supplemented with either an internal or external ground bonding jumper. A spot check of the facility found external grounds on the liquid-tight conduits where needed with minor maintenance required.

The electrical matrix items identify specific grounding deficiencies including a severed equipment grounding conductor and a damaged grounding point protective cover. These conditions represent discontinuities in the bonding path between equipment and the source grounding electrode system. Restore bonding and grounding continuity by repairing or replacing damaged grounding conductors and protective covers as described in the matrix.

3.6 Emergency Electrical Power

<u>3.6.1 System Configuration:</u> Island White has a standby generator to power a Fire Pump and Fire Pump Controller. The Fire Pump is normally powered by LC-11 through a transfer switch. If LC-11 is unavailable, the transfer switch operates to connect the Fire Pump to AMCC-1A as an alternate source. AMCC-1A, labeled the Fire Pump & Ramp Control Center, is itself powered by LC-1. In the case of emergency, when neither LC-11 nor AMCC-1A can supply power, the Fire Pump is supported by the 175 KW Diesel Generator.

<u>3.6.2 Equipment and Component Ratings:</u> Individual battery backup power is provided within the Control Building telecom room. The capacity of the UPS system is adequate based on the load.

3.7 Electric Fire Pumps

Island White has a fire pump and emergency generator. The purpose of the Electric Fire Pump is to provide backup to the water injection booster pumps. If the water injection booster pumps fail to operate during an emergency the Electric Fire Pump can be used. The Electric Fire Pump has a normal source of power and an emergency generator supply. Manual switching is necessary to run the Electric Fire Pump. The emergency generator can provide power to the fire pump or the barge area but not to both simultaneously. The pumps utilize sea water to supply the deluge system.

3.8 Process Instrumentation

Process control is managed on a daily basis by operating personnel. Communications regarding process operating parameters is managed through direct communications and cellular phone. The microwave data link is supervised by the IT department and maintenance is performed by CRC electricians.

The process control system uses a combination of pneumatic, hydraulic, and electrical instruments and controls. It includes the use of computers, programmable logic controllers (PLC), and relay logic to control and interface with valves, solenoids, and pump controllers. Alarms are produced from the level, temperature, pressure, and flow sensors advising operators of process conditions.

Process monitoring is accomplished through the use of control terminal screen displays located in the Main Control Room at Island White. Additionally, operators will tour the facility to conduct daily monitoring and verification of local instrument readings and record them on a regular basis.

Process alarms are either discrete or result in a single point alarm. Annunciation at the Main Control Room or with a local alarm and beacon or a combination of local and Control Room alarms will result from a process alarm. Single point alarms annunciated in the Control Room require an operator to go to the source of the alarm to determine the actual cause. Local annunciators or displays are then used to troubleshoot the cause of a general alarm or shutdown.

3.9 Lighting Systems

Facility area and work lights require normal utility power. Area and work lights are installed throughout Island White. Light sources are being converted from High Pressure Sodium and Metal Halide to LED. Illumination levels should comply with API RP 540. Lighting fixtures were spot checked and appear to be maintained and in good working condition. Emergency lighting was tested along with other emergency systems by Vallen Safety services in February 2025 and no concerns were identified.

3.10 Special Systems

The ELC Team review comments for special systems are based on API RP 14F, API RP 540, and CEC documents.

<u>*3.10.1 Safety Control Systems:*</u> Safety control systems are required to be a combination of devices arranged to safely affect facility shutdown. Electrical safety control systems are normally operated energized and fail-safe. Failure of external power to a safety control circuit

requires an audible or visual alarm to be initiated or operation of equipment in a fail-safe condition.

An emergency shutdown (ESD) station is located within the Production Office/Control Room on Island White. The ESD station's location is unclear on the equipment plan. The ESD is periodically tested during normal maintenance procedures. As-built documents of the ESD system have not been provided.

3.10.2 Gas Detection Systems: Combustible gas detection systems, Lower Explosive Limit (LEL) and Hydrogen Sulfide (H_2S) type, are employed to detect combustible gas leaks in equipment and piping, and to warn personnel of explosive and toxic concentrations in order to initiate remedial action. Island White requires all personnel to wear a personal H_2S detector and to carry a 4-way detector while working on site for specific tasks. General Monitor gas detectors have been implemented throughout the well cellars, are tested regularly, and appear to be in good working condition. The system uses general strobe lights and sirens to announce an alarm when activated.

3.10.3 Fire Detection Systems: Fire detection and smoke detection is employed to detect and warn personnel of fire and smoke conditions and to initiate remedial action. General Monitors flame detectors have been implemented throughout the facility, are tested regularly, and appear to be in good working condition. The system uses general strobe lights and sirens to announce an alarm when activated.

3.10.4 Aids to Navigation: The U.S. Coast Guard requires Aids to Navigation in offshore facilities close to the shore to include obstruction lights. The navigation beacons are equipped with an automatic lamp feature which stays lit even if a bulb burns out. The transfer feature automatically detects when the currently active lamp has ceased to function and moves the next lamp into place. The beacons require periodic maintenance to confirm proper operation and should be included in MAXIMO.

3.10.5 Communication: Communications systems are established to provide reliable communication during normal and emergency operations. Systems used for emergency communication have battery-operated supplies good for at least four-hours continuous operation as required by API RP 14F. UPS systems are installed on the Islands that provide power for communications during a power outage. Landlines, microwave, wireless radio, and cellular phones are available and are used for communication between facilities.

3.10.6 General Alarms: General alarms shall be audible in all parts of the facility to notify personnel to abandon the facility or respond to an emergency. Red lights can be used in conjunction with the audible alarms. All general alarm sounding devices shall be identified by a sign at each device in red letters at least 1-inch high describing the required personnel response. It is recommended the central paging system be used to supplement instruction of a general alarm.

3.10.7 Cathodic Protection: Cathodic protection systems are installed at the Island White facility. All cathodic protection system equipment required to protect vessels, tanks, and pipelines should be evaluated for proper operation and repaired as necessary.

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Safety Management Programs

California Resources Corporation
Long Beach Unit
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4.0 SAFETY MANAGEMENT PROGRAMS

4.1 Goals and Methodology

The goal of this section of the audit was to verify that CRC has required programs, plans, and manuals in place and that the company uses a safety management approach to manage hazards and thereby reduce the frequency and severity of undesirable events. CRC's safety management programs are composed of organizational and operational procedures, design management, audit programs, and other methods defined by OSHA and the EPA. Operating Manuals, emergency and spill response plans, training and qualification programs, and other key elements were reviewed for accuracy and content. Additionally, Staff reviewed programs specific to CRC addressed in their Health, Safety, and Environmental Manual.

4.2 Operations Manual

CRC has a system in place for determining what procedures or processes need to be documented. Individuals knowledgeable with the process and its hazards write the Standard Operating Procedures (SOPs). These individuals are also familiar with the subject matter and typically have performed the work and operated the process. The SOPs are written in a concise, systematic, easy-to-read format with sufficient detail so that trainees with limited experience or knowledge of the procedure can successfully carry out the task with minimal supervision.

The SOPs are maintained and available via the company intranet system to all CRC personnel with hard copy versions located in the operating facility control room. A comprehensive review of the SOPs is performed to determine that pertinent operating information is readily available within the different manuals. The SOPs are reviewed annually, with hard copies and/or electronic files being updated by authorized CRC personnel to ensure that the policies and procedures remain current. Operating procedures for processes that are no longer followed are removed from the intranet and manual. The review of operating procedures uncovered limited references to missing, inaccurate, inconsistent, and out-of-date information. *(Action Items SMP 4.2.01 – 4.2.03)*

4.3 Spill Response Plans

CRC's Oil Spill Contingency Plan (OSCP) was developed under the Federal and State Facility Response Plan requirements. The document defines procedures and plans for responding to discharges of oil into navigable waters and seeks to lessen damage to the environment, natural resources, and facility installations. The following elements are addressed within the plan:

- Incident Command Organization

- Facility description
- Hazards Evaluation Study and potential worst-case spill scenario evaluation
- On-water containment and recovery procedures
- Shoreline protection and clean-up
- Wildlife Care and Rehabilitation procedures
- Response procedures

The OSCP (Revision 3, July 2024) which covers all THUMS operating areas (Islands, B&M, Pier J) was provided by CRC. A cursory review of the plan for basic compliance verified inclusion of:

- Certificates of Financial Responsibility
- Pipeline and Hazardous Materials Safety Administration Approval Letter
- California Department of Fish and Wildlife Acknowledgement of Revision

The OSCP and any other required spill response plans will be more thoroughly evaluated during the upcoming audits of the other manmade islands (Chaffee, Freeman, Grissom).

4.4 Training and Drills

CRC has a policy requiring all employees, contractors, and visitors to receive safety orientation training, be issued a security badge, and to sign-in upon entering an operating location. This policy provides a record that is used to account for personnel during an evacuation and enhances safety awareness and accountability.

CRC has an ongoing regulatory required training program for facility personnel and contractors. This training includes confined space entry, oil spill drills, hazard communication, HAZWOPER, hot/safe work permitting, H_2S, lockout / tagout, and personal protective equipment. The program appears to include all mandatory training as required by Cal/OSHA and the Office of Spill Prevention and Response. The training matrix appears to be well defined and effective for each job description. A refresher course on fire extinguishers is completed annually. Firefighting is encouraged only if the fire is small and can be safely done until the fire department arrives and takes command of the event.

4.5 Safety Management Programs

CRC has developed and implemented an array of Process Safety and Risk Management programs that were reviewed for this audit. These programs demonstrated substantial compliance with California Code of Regulations, Title 8, Section 5189 – the Cal/OSHA Process Safety Management standard. The programs reviewed include:

- HSE Risk Management Standard

- Facility Technical Information
- Management of Change
- Operating and Maintenance Procedures
- Pre-Startup Safety Review
- Process Hazard Review
- Mechanical Integrity Standard

The ongoing application of these process safety management elements has been shown to reduce the risk of loss of containment, employee exposure, and environmental damage in oil and gas processing facilities.

Most of the general workplace safety programs are collected in the CRC Safety Manual. These programs include Control of Hazardous Energy, Hazard Communication, Respiratory Protection, Confined Space Entry, Fall Protection, and Personal Protective Equipment.

CRC has a number of additional plans required by various regulatory agencies available on electronic file and hard copy, including the Business Emergency Plan (BEP). The Long Beach Fire Department approves CRC's BEP. This document is current and meets the Hazardous Materials Disclosure Program requirements of the city by providing the chemical inventory and other hazards on the lease to fire personnel. The Los Angeles County Environment Health Division retains chemical inventory data and other hazards on the lease. The BEP is available at each facility.

Human Factors Audit

California Resources Corporation
Long Beach Unit
Island White

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5.0 HUMAN FACTORS AUDIT

5.1 Goals of the Human Factors Audit

The primary goal of the Human Factors (HF) Audit is to evaluate the operating company's human and organizational factors by using the Safety Assessment of Management Systems (SAMS) interview process. The SAMS is planned to be conducted following audits of the Long Beach Unit (LBU) lease facilities. Interview results are considered confidential between the Commission and LBU and will be contained in a separate report.

SAMS was developed under the sponsorship of government agencies and oil companies from the United States, Canada, and the United Kingdom to assess organizational factors, enabling companies to reduce organizational errors, reduce the risk of environmental accidents, and increase safety. The assessment was divided into nine major categories to examine the following areas (The number of sub-categories or areas of assessment for each category are included in parentheses.):

- Management and Organizational Issues (9),
- Hazards Analysis (HA) (9),
- Management of Change (8),
- Operating Procedures (7),
- Safe Work Practices (5),
- Training and Selection (14),
- Mechanical Integrity (12),
- Emergency Response (8), and
- Investigation and Audit (9)

Assessment of each of the sub-categories is derived from one main question with a number of associated and detailed questions to help better define the issues.

The SAMS process is not intended to generate a list of action items. Its purpose is to provide the company with a confidential assessment of where it stands in developing and implementing its safety culture and to serve as a benchmark for future assessments.

5.2 Human Factors Audit Methodology

The Commission's MRMD staff will schedule the SAMS interviews with a cross-section of CRC staff and sub-contractors after completion of the Safety Audit. The assessors will evaluate the responses based on SAMS guidelines and develop a separate confidential report. The MRMD staff will provide the confidential report accompanied by a formal presentation that summarizes the report to CRC's management.

Action Item Matrix

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Appendices

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Appendix A
Acronyms

ANSI	American National Standards Institute
API	American Petroleum Institute
ASME	American Society of Mechanical Engineers
BAP	Best Achievable Protection
BEP	Business Emergency Plan
Cal/OSHA	California Occupational Safety and Health Administration
CEC	California Electrical Code
CRC	California Resources Corporation
Commission	California State Lands Commission
DOT	Department of Transportation
EFI	Equipment Functionality and Integrity
ELC	Electrical
EPA	Environmental Protection Agency
ESD	Emergency Shutdown
ESP	Electrical Submersible Pump
FWKO	Free Water Knock Out
GOV	California Government Code
HA	Hazards Analysis
HAECD	Hazardous Area Electrical Classification Drawings
HAZMAT	Hazardous Materials
HF	Human Factors
HMI	Human Machine Interface
H_2S	Hydrogen Sulfide
IEC	International Electrotechnical Commission
IT	Information Technology
ISA	International Society of Automation
JSA	Job Safety Analysis
kV	Kilovolt
kVA	Kilovolt Amperes
LBU	Long Beach Unit
LED	Light Emitting Diode
LEL	Lower Explosive Limit
LO/TO	Lockout/Tagout
MCC	Motor Control Center
MRMD	Mineral Resources Management Division
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association

OSCP	Oil Spill Contingency Plan
OSHA	Occupational Safety & Health Administration
OSPR	Office of Spill Prevention and Response
P&ID	Piping and Instrumentation Diagram
PFD	Process Flow Diagram
PHA	Process Hazard Analysis
PLC	Programmable Logic Controller
PM	Preventive Maintenance
PPE	Personal Protective Equipment
PRC	Public Resources Code
PSV	Pressure Safety Valve
RP	Recommended Practice
SAMS	Safety Assessment of Management Systems
SCE	Southern California Edison
SDS	Safety Data Sheet
SMP	Safety Management Programs
SOP	Standard Operating Procedures
UPS	Uninterruptible Power Supply
UT	Ultrasonic Thickness
V	Volt
VFD	Variable Frequency Drive

Appendix B
Best Practices & Regulations

Regulatory References

MRMD – California Code of Regulations (CCR) Title 2
CalGEM – CCR Title 14
Cal/OSHA - CCR Title 8
OSHA – CFR Title 29
EPA – Code of Federal Regulations (CFR) Title 40

1.0 INTRODUCTION

1.1 Best Achievable Protection/ Best Achievable Technology	PRC 8750
Commission Oil & Gas Regulations	MRMD Articles 3 - 3.6

2.0 FACILITY CONDITION AUDIT

2.1 Goals and Methodology	
2.2 General Facility Conditions and Road Conditions	
2.2.1 General Cleanliness / Vegetation Control	MRMD 2129; API RP 51R; Cal/OSHA 6539; OSHA 5(a)1
2.2.2 Stairs, Walkways, Gratings, & Ladders	MRMD 2129; Cal/OSHA 3212, 3272, 3273, 6546; Nace Guidelines; OSHA 5(a)1, 1910.22(d)(1)
2.2.3 Exits, Emergency Egress, & Escape	MRMD 2129 2132; API RP 49; Cal/OSHA 3215, 6577
2.2.4 Labeling, Color Coding, Placards, & Signs	MRMD 2129; Cal/OSHA 3340, 5157, 5189; OSHA 5(a)1, 1910.146; NFPA 704, API RP 55, 74, 2003, API 610; ANSI/ASME A13.1
2.2.5 Security	MRMD 2129; API RP 51R, 74
2.2.6 HAZMAT Handling and Storage	MRMD 2129; CalOSHA 4650, 5194, 5164(c); OSHA 1910.106, 1910.1200; NFPA 30, 400
2.3 Field Verification of Plans	
2.3.1 Process Flow Diagrams (PFDs) & Plot Plans	MRMD 2129, 2132; OSHA 5(a)1, 1910.151, 1910.266; Cal/OSHA 5189; NFPA 10, 30, 72; API RP 51R
2.3.2 Piping & Instrumentation Diagrams (P&IDs)	MRMD 2129, 2132;

	OSHA 5(a)1, API RP 51R, Cal/OSHA 5189
2.3.3 Fire Protection Plot Plan	MRMD 2129, 2132; OSHA 5(a)1,1910.144; Cal/OSHA 6183; API RP 51R; NFPA 14, 72, 101
2.4 Condition and Integrity of Major Systems	
2.4.1 Pumps and Piping	MRMD 2129; Cal/OSHA 3328, 5610, 6533; OSHA 5(a)1, 1910.106; ASME B31.3; API 570 API RP 51R, 574;
2.4.2 Tanks	MRMD 2129; API 650, 653; OSHA 5(a)1
2.4.3 Pressure Vessels	MRMD 2129; API 510 ASME B&PV Code Sect. VIII Cal/OSHA 460, 3328, 5157, 6551, 6552
2.4.4 Pressure Safety Valves	MRMD 2129, 2132; Cal/OSHA 6552 API 510, 520, 521, RP 576
2.4.5 ESP, Pump Units, Wellhead Equipment & Well Safety Systems	MRMD 2129, 2132; API RP 11ER, 51R Cal/OSHA 6631, 6634; CalGEM 1722.1.1
2.4.6 Firefighting Detection Systems	MRMD 2132; NFPA 25, 72
2.4.7 Fire Protection Equipment	MRMD 2129, 2132; OSHA 1910.144, 1910.160; NFPA 10, 20, 25, 80
2.4.8 Emergency Shutdown Device (ESD)	MRMD 2132
2.4.9 Safety & PPE	MRMD 2129, 2132; Cal/OSHA 1602, 2340.12, 3212, 3380, 4002, 5162, 6549; API RP 51R; ANSI Z358.1; OSHA 1910.151, 1910.134; CalGEM 1770
2.4.10 Instrumentation, Alarm, & Paging	MRMD 2129, 2132; OSHA 5(a)1
2.4.11 Auxiliary Generator/Prime Mover	MRMD 2129, 2132; Cal/OSHA 2940.13; OSHA 5(a)1
2.4.12 Spill Containment	MRMD 2139, 2140;

		EPA 112.7(c); NFPA 30; California Government Code 8670
	2.4.13 Spill Response	MRMD 2139, 2140 California Government Code 8670
	2.4.14 Cranes/Slings	ASME B30 Series Cal/OSHA 4880 to 5049
2.5	Mechanical Integrity/Preventative Maintenance	MRMD 2129; API 510, 570, RP 572, 574
2.6	Production Safety Systems	API RP 14C; ISA 84 / IEC 61511 AIChE CCPS publications MRMD 2129
3.0	**ELECTRICAL AUDIT**	
3.1	Goals and Methodology	
3.2	Hazardous Area Electrical Classification Dwgs	MRMD 2132; API RP 500; NFPA 70; CEC 110.22, 408, 500.4, 501.15
3.3	Electrical Power Dist. System, Normal Power	MRMD 2132; CEC 90, 110, 240; API RP 540, NFPA 70E
	3.3.1 Electrical Single Line	
	3.3.2 Electrical Service Capacity	
	3.3.3 Electrical System Design	
3.4	Elec. Power Equip Condition and Functionality	MRMD 2129, 2132; API RP 540; CEC 110, 300, 314, 320, 344, 408, 430, 500, 501; NFPA 70B; Cal/OSHA 2340
	3.4.1 Equipment Condition	
	3.4.2 Safety Procedures	
	3.4.3 Equipment Maintenance Practices	
3.5	Grounding & Bonding	MRMD 2129, 2132; CEC 501; API RP 540; NFPA 70
3.6	Emergency Electrical Power	MRMD 2132; CEC 110, 700; NFPA 70, 110
	3.6.1 System Configuration	
	3.6.2 Equipment and Component Ratings	
3.7	Electric Fire Pumps	NFPA 20, NEC 696
3.8	Process Instrumentation	API RP 540, NFPA 70
3.9	Lighting Systems	Commission 2129 et seq. CALGEM 1743 (a)-(c)
3.10	Special Systems	Commission 2129 et seq. CALGEM 1743 &1747; OSPR GOV CODE 8670

	ISA RP7.1, RP 12.1, 12.2 ISA S7.4, S12.4
3.10.1 Safety Control Systems	Commission 2129 et seq.
3.10.2 Gas Detection Systems	Commission 2129 et seq. CALGEM 1747.6
3.10.3 Fire Detection Systems	Commission 2129 et seq. CALGEM 1743 & 1747 API 2001 & RP 75
3.10.4 Aids to Navigation	USCG 33 CFR Subcp. C, Part 67
3.10.5 Communication	USCG 33 CFR Subcp. C, Part 67
3.10.6 General Alarms	USCG 33 CFR Subcp. C, Part 67
3.10.7 Cathodic Protection	API RP 651, NACE RP 01-76 & 0675

4.0 SAFETY MANAGEMENT AUDIT

4.1 Goals and Methodology	
4.2 Operations Manual	PRC 8758; MRMD 2129, 2175
4.3 Spill Response Plan	MRMD 2129; Cal/OSHA 3220; CCR Title 14 Sections 815-818; BSEE 254; DOT 194; EPA 112
4.4 Training and Drills	MRMD 2132; Cal/OSHA 6507
4.5 Safety Management Programs	MRMD 2129; 2132; CAL OSHA 6507 Cal Government Code 8670; EPA 112.7;

5.0 SAFETY MANAGEMENT PROGRAMS

5.1 Goals of the Human Factors Audit	
5.2 Human Factors Audit Methodology	MRMD 2129(b) & (c); Commission SAMS; BSEE Subpart S

Appendix C
References

GOVERNMENT CODES, RULES, AND REGULATIONS

CCR — CALIFORNIA CODE OF REGULATIONS

Title 2, Division 3, Chapter 1. State Lands Commission

2129 *General Provisions, including referencing to "all applicable laws, rules, and regulations of the United States and the State of California" and "good oilfield practice".*
2174 *Manual Review*

Title 8, Division 1, Chapter 4. Division of Industrial Safety [Ca/OSHA]

3212 *Floor Openings, Floor Holes, Skylights and Roofs*
3272 *Aisles, Walkways, and Crawlways*
3329 *Pipe Lines*
5194 *Hazard Communication*
5610 *Protection Against Corrosion*
6533 *Pipe Lines, Fittings, and Valves*
6546 *Reservoirs and Stationary Tanks*
6551 *Vessels, Boilers and Pressure Relief Devices*
6576 *[Cellars and Shafts] Construction and Maintenance*
6634 *Pumps and Pump Pressure Relief Devices*

INDUSTRY CODES, STANDARDS, AND RECOMMENDED PRACTICES

API — AMERICAN PETROLEUM INSTITUTE

RP 14C *Analysis, Design, Installation, and Testing of Safety Systems for Offshore Production Facilities*
RP 14E *Recommended Practice for Design and Installation of Offshore Production Platform Piping Systems*
RP 14F *Recommended Practice for Design, Installation, and Maintenance of Electrical Systems for Fixed and Floating Offshore Petroleum Facilities for Unclassified and Class I, Division 1, and Division 2 Locations*
RP 14J *Recommended Practice for Design and Hazards Analysis for Offshore Production Facilities*
RP 51R *Environmental Protection for Onshore Oil and Gas Production Operations and Leases*

RP 75	*Occupational Safety for Onshore Oil and Gas Production Operations*
API 510	*Pressure Vessel Inspection Code: Maintenance Inspection, Rating, Repair, and Alteration*
API 570	*Piping Inspection Code*

ASME AMERICAN SOCIETY OF MECHANICAL ENGINEERS

BPVC VIII, Div 1	*Rules for Construction of Pressure Vessels, Division 1*

NFPA NATIONAL FIRE PROTECTION AGENCY

10	*Standard for Portable Fire Extinguishers*
70	*National Electric Code*
70B	*Standard for Electrical Equipment Maintenance*
70E	*Standard for Electrical Safety in the Workplace*
704	*Standard System for the Identification of the Hazards of Materials for Emergency Response*
1962	*Standard for the Care, Use, Inspection, Service Testing and Replacement of Fire Hose, Couplings, Nozzles, and Fire Hose Appliances*

CEC CALIFORNIA ELECTRIC CODE

110.3	*Examination, Identification, Installation, Use, and Listing of Equipment*
110.12	*Mechanical Execution of Work*
110.22	*Identification of Disconnecting Means*
250.4	*General Requirements for Grounding and Bonding*
250.112	*Specific Equipment Fastened in Place or Connected by Permanent Wiring Methods*
300.6	*Protection Against Corrosion and Deterioration*
300.15	*Boxes, Conduit Bodies, or Fittings – Where Required*
312.2	*Damp and Wet Locations*
314.25	*Covers and Canopies*
344.30	*Securing and Supporting Rigid Metal Conduit*
406.9	*Receptacles in Damp or Wet Locations*
501.15	*Class I Locations – Sealing and Drainage*
501.30	*Grounding and Bonding, Class I, Divisions 1 & 2*

Appendix D
TEAM MEMBERS

FACILITY CONDITION TEAM

Commission – MRMD	David Calderon Ryan Horton Crystal Garcia
CRC – LBU	Johnathon Hill Robby Deford

ELECTRICAL TEAM

Commission – MRMD	David Calderon Ryan Horton Crystal Garcia
P2S	Alex Sassoon Amir Jones
CRC – LBU	Chris Cayanan Alan McGrew

TECHNICAL TEAM

Commission – MRMD	David Calderon Ryan Horton Crystal Garcia
CRC – LBU	Johnathon Hill Robby Deford

SAFETY MANAGEMENT TEAM

Commission – MRMD	David Calderon Ryan Horton Crystal Garcia
CRC – LBU	Johnathon Hill Robby Deford