Safety and Oil Spill Prevention Audit

SoCal Holding, LLC
Platform Emmy

California State Lands Commission

March, 2016

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Executive Summary

Safety Audit of Platform Emmy

A Safety and Oil Spill Prevention Audit of SoCal Holding, LLC's, Huntington Beach (HB) Platform Emmy started in June 2014. Fieldwork was finished in September 2014 with completion of the Electrical portion of the audit in November. The objective of the Safety and Oil Spill Prevention Audit is to ensure that oil and gas production facilities on State leases are operated in a safe and environmentally sound manner, comply with CSLC and other applicable state and federal regulations, and meet the Best Achievable Protection requirement of Public Resources Code (PRC) 8755. The audit followed the established procedures used by CSLC for many years. The applicable regulations and standards commonly used are provided in Appendix C. Audit findings are based on and reference these standards.

Company Background

SoCal Holding, LLC is the current owner of Platform Emmy and holds interest in the state oil and gas leases at that location. By December 2014, Oxy USA had been granted approval for the transfer of their interest in the Huntington Beach leases to SoCal Holding, LLC, a Delaware Corporation that is a subsidiary of Occidental Oil and Gas Holding Corporation (Oxy) USA, and of California Resources Corporation. Oxy purchased Platform Emmy and the HB operation from AERA Energy, LLC in November 2011.

Description of the Facility

Platform Emmy is situated in state waters approximately 1.3 miles off the HB shoreline, west of the HB onshore facilities, in 45 feet of water. Produced crude oil is transported to the onshore Huntington Beach facility through a subsea pipeline for treating. Casing gas is sent to shore through the low-pressure gas pipeline. Emmy's casing gas is blended with gas produced onshore before Hydrogen Sulfide (H_2S) removal at the Gas Processing facility. Gas produced from Emmy's two gas wells is transported to shore through the high pressure gas pipeline. No oil and gas separation is performed on the platform.

Thirty-one active wells produce from state leases PRC's 392, 425 and 426. There are no water injectors on the platform since the injection line was converted to gross oil service. Currently, Platform Emmy produces 2,100 Barrels of Oil per Day (BOPD), 45,000 Barrels of Water per Day (BWPD), and 400 Thousand Cubic Feet of Gas per Day (MCFD) of natural gas.

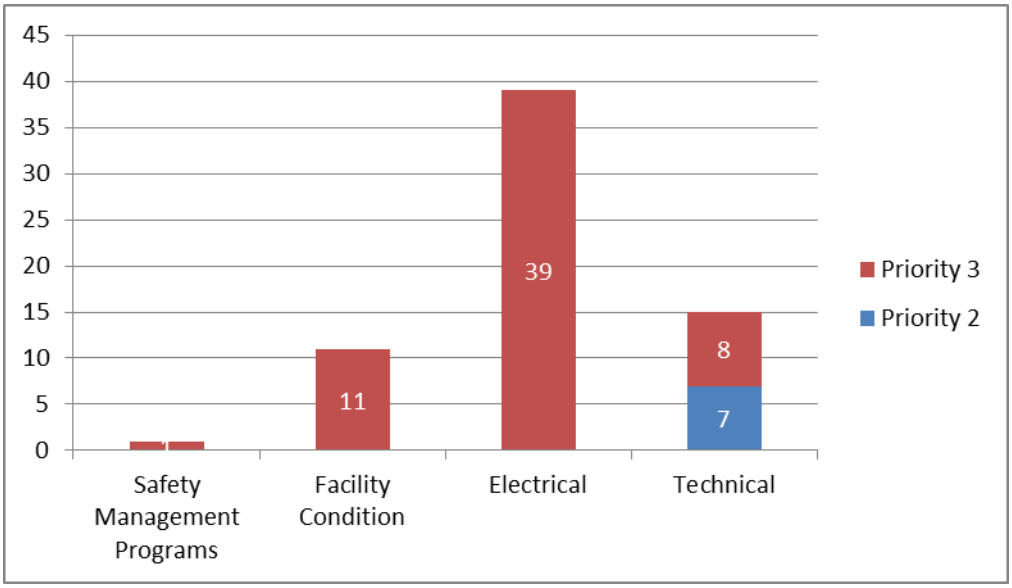
The oil producing formations are typically below hydrostatic pressure, and need artificial (mechanical) lift to produce. Thus, the potential for a well blowout is small. The offshore wells are produced using rod pumping units and electric submersible pumps.

Safety Audit Results

The Safety and Oil Spill Prevention Audit found that Platform Emmy complies with applicable safety and regulatory requirements. Appropriate Safety Management Systems ensure protection of workers, the public and the environment. The platform is properly maintained and safety systems and equipment remain fit for service. However, during the ownership transition from Aera to Oxy in 2011 not all safety device and equipment data records were transferred from Aera's asset management software (SAP), to Oxy's asset management software program (Maximo). The inadequate transfer of maintenance records resulted in inspection lapses. Mechanical integrity of process equipment and safety devices depend on routine inspection, testing, and preventive maintenance protocols. Gaps in the mechanical integrity program may increase risk and jeopardize compliance.

SoCal Holding, LLC, a subsidiary of Oxy and California Resources Corporation, has well established safety policies, health and environmental programs that they have brought to this location. A consistent and positive safety and environmental culture is obvious in the SoCal Holding, LLC employees. This progressive safety culture improves mechanical reliability, performance, and teamwork. Personnel are knowledgeable, and provided valuable support to the state lands team with this safety audit.

The safety audit identified 66 action items and no priority one items. The number of priority two action items was also quite low at seven, with the majority (59) being minor priority three action items. This is a favorable result and on par with other comparable facilities. Priority three items pose the lowest risk. Resolution of the priority two action items is required within 120 days, and resolution of the priority three actions items is required within 180 days from issuance of this report. Currently, five priority two and 13 priority three items are complete. The following chart displays the action items identified by the subject teams that total 66. This distribution is similar to the other facilities in California where the items identified are typically related to piping, equipment, electrical, and system condition and maintenance.



Introduction

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1.0 INTRODUCTION

1.1 Safety Audit Background

The California State Lands Commission (CSLC) Mineral Resources Management Division (MRMD) conducts safety audits of lessees and operators for lands in which the State has an interest. CSLC sponsored safety audits ensure oil and gas production facilities on State leases or granted lands are operated in a safe and environmentally sound manner, comply with Federal, State, and local codes/permits, and follow industry standards and practices. CSLC staff is tasked with oil spill prevention in California's ocean and tidelands, prevention of waste, conservation of natural resources, and ensuring public safety. Public Resources Code (PRC) 6103, 6108, 6216, 6301 and 6873(d) provide authority for these endeavors.

In 1990, the California legislature enacted the Lempert, Keene, Seastrand Oil Spill Prevention Act and directed SLC to inspect these facilities to ensure that Best Achievable Technology (BAT) standards for prevention of oil spills are met. SLC conducts frequent inspections of onshore and offshore oil and gas drilling and production facilities to ensure that these standards are enforced to safeguard the public and environment. The Safety Audit Program, together with the monthly inspection program aids in preventing oil spills and other accidents. Added prevention efforts occur through a review of drilling, pipeline inspection, facility design, maintenance, human factors, and other aspects of safety management.

Audit team members systematically assess the operator's facility and safety management programs and provide feedback for improvement. The areas of emphasis include:

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

Appropriate company contacts and resources are identified at the start of the audit. Progress and deficiency reports are communicated periodically throughout the audit process. An "action item matrix" is used to classify and track action items. The matrix identifies items needing corrective action and priority ranking. A report highlighting the strengths and weakness of the facility is created from the matrix items.

Draft copies of this report and the action item matrix are provided to the company during the audit. The final audit report is prepared for company management, affording them the opportunity to address the findings and recommendations. Throughout the clearance phase of the audit, the MRMD team continues to coordinate with the operator in evaluating the adequacy of corrective actions and tracking progress of the proposed corrective actions.

This program could not be successfully accomplished without the cooperation and support of the operating company. The safety audit benefits both the company and the State by reducing workplace hazards, environmental incidents, property damage, and in particular,

oil spills. Previous experience shows safety assessments help increase operating effectiveness, efficiency and lower operating cost. History has also shown that improving safety and reducing incidents makes good business sense.

1.2 Facility Background

1.2.1 Description of the Oil Field: SoCal Holding, LLC, currently operates the Huntington Beach state leases that include Platform Emmy as well as the Huntington Beach onshore facility. Platform Emmy is located 1.3 miles offshore from Huntington Beach. The state leases are part of the Huntington Beach Field originally discovered by Standard Oil Company on May 4, 1929 when oil was struck at 2,199 feet in Huntington Beach. This field has produced more than one billion barrels of oil in its history and is listed as the sixth largest oil field in California.

Platform Emmy produces roughly 2,100 BOPD, 45,000 BWPD and 400 MCFD of natural gas daily without water injection. The previous operator shut down the water injection system when the injection line was converted to gross oil service. Onshore injectors now support waterflooding of the reservoir.

1.2.2 Company History: In December 2014, Oxy USA was granted approval for the transfer of their interest in the Huntington Beach leases to SoCal Holding, LLC, a Delaware Corporation, a subsidiary of Occidental Oil Corporation (Oxy) USA. SoCal Holding, LLC owns and operates oil and gas properties and provides exploration and production of oil and gas. The company was founded in 2014 and is based in Long Beach, California. SoCal Holding, LLC operates as a subsidiary of California Resources Corporation. Oxy had previously bought the Huntington Beach and Platform Emmy operation from AERA Energy, LLC in November 2011.

California Resources Corp. operates and oversees the day-to-day operations of Platform Emmy and the Huntington Beach facility. California Resources is currently California's largest natural gas producer and the state's largest oil producer based on gross-operated barrels of oil equivalent (BOE). The company employs more than 8,000 employees and contractors statewide. Assets under the umbrella of California Resources include operations in Long Beach, Elk Hills in Kern County, and Vintage Production California LLC with operations in San Joaquin, Ventura, Montalvo, and Sacramento basins.

1.3 Facility History and Description

Signal Oil & Gas Company originally announced plans in February 1961 to construct a $2,000,000 offshore platform to be named "Emmy". The platform was installed to complete offshore development of heavy oil reserves. The proposed structure was to be located in 45 feet of water offshore from the Huntington Beach, California coastline, on State Lease PRC 425. Permits were approved and construction of Platform Emmy was completed with drilling operations beginning in March 1963.

Platform Emmy has eight steel-jacketed support legs. The platform consists of a lower deck, a production deck (53 ½-feet above the waterline), a small mezzanine deck found above the north end of the production deck, and a drill deck that is 83 feet above the waterline. Platform Emmy was originally designed to accommodate 42 wells using up to 26 rod pumping

units. After it became obvious that this number of rod pumping units would not be used, approval was given in 1967 to change the design to allow a maximum of 52 wells. In 1980, Aminoil installed a satellite platform immediately adjacent to the original platform for a steam stimulation project. Shell bought both platforms in 1986 from Phillips Petroleum, the owner at the time. After the steam drive project was terminated, Shell received approval in 1988 for the addition of two decks to the satellite platform. A major structural upgrade was completed in 1991, which added a new quarters building, motor control center, and heliport to the satellite platform. Shell also received approval to drill and cement 13 3/8-inch surface casing to a depth of 720 feet in twelve well conductors located in the corner legs of the platform. The twelve casings were cemented back to the platform's production deck level to provide structural integrity for seismic events, as well as the addition of a second electric-driven hydraulic crane to provide lifting capacity for the drill deck.

Platform Emmy currently has 31 production wells, 28 electric submersible pumps (ESPs) and three rod pumping units. These wells produce from state leases PRC 392, 425 and 426. Production fluids from these wells flow directly into a 12-inch pipeline to shore relying only on the wellhead pressure to push the fluid through the pipeline, thus eliminating the need for a shipping pump. Low-pressure casing gas from these wells flows to shore through a 4-inch polyethylene pipeline encased in a 6-inch steel line. In addition, there are two active gas wells whose production flows to shore through a pipeline consisting of 3 ½-inch steel coiled tubing encased in an 8-inch steel line.

1.3.1 Oil Processing: No oil processing is performed on the platform. All separation and processing occurs at the onshore facility.

1.3.2 Water Processing: No water separation is performed on the platform. All separation, dehydration, and water treatment occurs at the onshore facility.

1.3.3 Gas Processing: No gas processing is performed on the platform. All gas processing occurs at the onshore facility.

Facility Condition Audit

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2.0 FACILITY CONDITION AUDIT

2.1 Goals and Methodology

The primary goal of the Safety and Oil Spill Prevention Audit Team was to evaluate the topside equipment and mechanical integrity of SoCal Holding, LLC's Platform Emmy offshore facilities. The audit team inspected the platform thoroughly including the safety, production, and electrical systems and identified the regulatory requirements applicable to each. Field tasks included confirmation of accuracy of facility drawings/plans, review of testing, inspection, and equipment maintenance histories, and completing a variety of facility condition checklists. All of these tasks enable technical design review of the platform's safety systems. The audit report reflects this "system by system" process and includes a description and assessment of each system and any significant action items or observations. Specific sections of the report may address personnel safety concerns, while others are more applicable to facility process safety. The facility condition audit is also an essential preliminary element that is later used while assessing the organization's safety management program development and implementation.

2.2 General Facility Conditions

2.2.1 Workplace Housekeeping: The Platform Emmy Audit occurred while both drilling operations and a deck expansion project were in progress on the platform. Since space was at a premium, tubular goods and mud system equipment were located on the Drilling Deck with associated auxiliary equipment placed on the Production Deck. Acceptable refuse containers were provided. No noticeable waste was on the platform.

Drip pans and splash guards are used throughout the facility to prevent spills and pollution. If a substance accidentally drips onto the deck, personnel clean it up immediately. Absorbent materials are stored in quickly accessible bins and are available for wiping up greasy, oily or other liquid spills. Tools are available and stored in suitable fixtures for easy access. They are quickly returned after each use and regularly inspected, cleaned and taken out of service if visibly worn or damaged. Management policies require workers to pay attention to good housekeeping practices as a basic part of accident and fire prevention.

2.2.2 Stairs, Walkways, Gratings and Ladders: All stairs, walkways, and gratings found on Platform Emmy appear to be safely designed and built. Permanent steps and elevated platforms are available where needed. Portable ladders were observed to be in good usable condition and free from oil and grease. The use and care of ladder equipment are defined in safe work practices.

2.2.3 Escape / Emergency Egress / Exits: Escape routes and emergency egress are covered as part of the Platform Emmy orientation. The primary safe briefing area for H_2S is the heliport on the satellite platform and the secondary safe briefing area is located on the northwest corner of the drill deck. The wind direction determines which area will be used in an H_2S emergency. The primary safe briefing area for fire and abandon platform is the satellite platform with the secondary safe briefing area located at the northwest corner of the bottom deck. The audible difference in the alarm tones as well as announcements over the public-address system (PA) directs personnel to the proper safe briefing area.

During the previous safety audit on Platform Emmy, helicopter transport was the primary means of transport for both operating and contract personnel working on the platform. Crew boat transport occurred only during fogged-in conditions. Thus, the design of Platform Emmy's primary and secondary or emergency boat landings were considered adequate for their infrequent use. Since SoCal Holding, LLC stopped regular helicopter service to Platform Emmy, the maximum number of personnel allowed on the platform has been increased from thirty to fifty-two and the small size of the landing may be an area of concern that should be addressed. Because the primary boat landing uses fixed ladders between the different levels of the landing, the ladders take more time to negotiate. Life vests and workbags appear to get caught on these ladders. Most other landings on platforms are made with steps and handrails that connect the different levels. This allows personnel to quickly move off the landing, which can be critical for personnel safety during rough sea conditions. In addition, the United States Coast Guard (USCG) primary means of escape requirements conflict with the current state of the boat landings. To reach the emergency boat landing, personnel must traverse temporary scaffolding and descend through a fixed caged ladder. Since the secondary safe briefing area for fire or abandon platform would use the emergency boat landing, it appears problems could result if a large number of personnel were trying to leave the platform using this landing during an emergency. Staff issued a priority two action item for SoCal Holding, LLC to evaluate the design of the platform's primary boat landing and address the need for added egress. (TEC - 2.2.3.01) A priority two action item was also issued for SoCal Holding, LLC to complete Management of Change procedures for the personnel increase from thirty to fifty-two and to examine the possible hazards with this change. (TEC - 2.2.3.02)

2.2.4 Labeling, Color Coding and Signs: The design, application, and use of signs and symbols on the platform define the specific hazards to workers. Physical hazards in the workplace, such as tripping, are identified with yellow signs and fire safety equipment with red signs. The design and application of the signs adheres to Occupational Safety and Health Administration (OSHA) and American National Standards Institute (ANSI) recommendations. Warning signs were posted properly to identify known safety hazards. Signs are also posted at each wellhead to identify the well number. Fire diamonds were visible on all tanks, vessels and chemical storage totes. Posting of fire diamonds complies with the National Fire Protection Association (NFPA) 704 and Uniform Fire Code (UFC).

2.2.5 Security: Physical and operational security measures are in place on Platform Emmy to prevent unauthorized entry. The platform is staffed twenty-four hours a day, seven days a week with at least two operators. There is a limited route of access from the boat landing and restricted access signs are posted which are visible from all sides. Approved personnel traveling to the platform must be prelisted on an approved boat log before boarding. Ship Services deckhands check that each person's name appears on the boat log, as well as checking for proper identification and swing rope certification. Security gates at the boat deck access to the upper areas of the platform further limit unauthorized access.

2.2.6 Hazardous Material Handling and Storage: Flammable and combustible liquid storage and documentation on Platform Emmy corresponds to Cal-OSHA and NFPA 30 standards. Material Safety Data Sheets (MSDSs) are online and accessible within the employee work area. SoCal Holding, LLC subscribes to 3E online, a service that allows operating personnel to access MSDS information. This information can either be printed out or operating personnel can contact the service by phone to speak to a technical representative if they have questions. This service provider data retrieval has been determined to meet the

requirements of OSHA's Hazard Communication Standard. Employees felt that this was better than keeping hard copies.

Chemical and diesel storage areas on the platform are properly protected against external damage and leaks. Bulk chemical totes have proper labeling and satisfactory containment in the event of a spill.

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

2.3 Field Verification of Plans

2.3.1 Process Flow Diagrams (PFDs): The Process Flow Diagrams are considered to be a part of the necessary design documentation. The PFDs were up-to-date and showed the flow of all production streams through the plant and equipment.

2.3.2 Piping and Instrumentation Diagrams (P&IDs): Field confirmation of the P&IDs was performed to the extent possible for Platform Emmy considering the drilling program in place. These drawings are reasonably accurate, but need some minor updating. Differences in the P&IDs are considered minor and include sizing errors in valves and piping connections, missing equipment and out of service or removed equipment.

2.3.3 Fire Protection Drawings: Firewater / Foam Utility Flow Diagram and the Platform Station Bill were available and reviewed for accuracy. No concerns were found and the Firewater / Foam drawing is current.

2.4 Condition and Integrity of Major Systems

2.4.1 Piping: An external visual inspection of the piping systems at all locations in this facility was performed with P&ID confirmations. This visual inspection and evaluation work noted the outside condition of the piping, painting and coating, signs of misalignment, vibration, and leakage. The evaluation also included the condition of pipe hangers and supports as well as any field changes or temporary repairs not recorded on the piping drawings. Other key information such as material selection, piping design and maintenance practices was also considered during the inspection. The piping throughout the platform was found to be in good condition with no action items. The selection of piping materials and components, for example, valves, flanges, bolts, and welds are compatible with the operating parameters and environment.

SoCal Holding, LLC uses a combination of continuing 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, for example, American Petroleum Institute (API) Recommended Practice (RP) 570 and Department of Transportation (DOT) pipeline inspections. Results from thickness measurements, inspections, repairs and other tests are readily available and recorded within a computer-based maintenance system called Maximo. The maintenance management system is used to generate and store maintenance activities.

2.4.2 Tanks: There are only three active tanks on Platform Emmy: the atmospheric drain tank, pressure drain tank, and satellite drip tank. Externally, the three tanks are in good condition. SoCal Holding, LLC's maintenance plan follows API 653 recommended practices, industry standards and state regulations. Routine external/internal maintenance inspections occur on a five-year cycle and more often if conditions indicate. Tank documentation includes inspections, repairs, and changes. Tank shell ultrasonic thickness data is maintained showing locations and readings, and is part of the regular inspection process. Records also show that recommended repairs are being completed.

2.4.3 Pressure Vessels: Pressure vessels are also maintained following a program of external and internal examination. The external and internal inspection intervals for all pressure vessels were reviewed for compliance with applicable regulations, recommended practices, (e.g. API RP 510 and CSLC 2132(g)(3)), and record keeping. SoCal Holding, LLC uses risk management software (Credo) to track wall thickness, corrosion rates; inspection due dates, and predicted retirement dates for individual pressure vessels based on total metal loss and risk. Contractors perform vessel inspections (external and internal) within 5-year intervals using nondestructive examination techniques. However, a review of inspection records found that several pressure vessels had passed their due dates for inspections. This finding was communicated to SoCal Holding, LLC personnel and they are reviewing each of the vessels to determine what action is needed. External inspections found no evidence of leakage, distortion or cracks at welds, foundation damage, corrosion, or defects of piping connections. Internal inspection records show corrosion to be low and at a predictable rate with no major concerns, but the visual inspection did identify some minor concerns about anchoring and foundations. Pressure vessel records are well maintained and are easily accessible onshore.

2.4.4 Relief System: The piping for both of the relief vent systems on Platform Emmy was evaluated for condition, maintenance, and functionality. These relief vent systems are used to release process vapor to the atmosphere when needed. The system is designed to remove any liquid within the gas before venting to the atmosphere. Activated charcoal canisters impregnated with potassium hydroxide have been added upstream of the southeast vent stack for H_2S control. These canisters were added instead of installing a flare and are designed to lower the H_2S content of vented gas to 0 ppm. In addition, flame arrestors are installed in locations where gas can be vented to the atmosphere. Each device allows gas to pass through it but stops a flame to prevent a larger fire, back flash or explosion from occurring. Flame arrestors are inspected for clogging yearly as part of the preventive maintenance program. A priority two action item was issued to anchor the canisters to the deck of the platform. (TEC - 2.4.4.02)

The maintenance and servicing intervals for all pressure safety valves (PSVs) were examined for compliance with CSLC 2132(g)(3) regulations, recommended standards and record keeping. An outside contractor does the PSV inspections and testing biannually. Inventory records contained pressure relief valve data, location, size, set pressure, manufacturer, capacity and date installed. SoCal Holding LLC maintains these records, with no major action items identified. One minor item was noted because the labeling on the drawings did not match the inventory records. (EFI - 2.4.4.01)

2.4.5 Electric Submersible Pumps (ESPs), Pump Units, Wellhead Equip. & Well Safety Systems: Safety devices were verified to be installed on producing wells and flow lines. Surface safety valves (SSVs) and surface controlled subsurface safety valves (SCSSVs), flow

safety valves (FSVs) and shutdown valves are commonly used to shutdown and isolate a line if a leak were to occur. Two wells, 392-CJ202A and 425-J329B are capable of flowing oil on their own to or above the mudline, however, only one of the wells (392-CJ202A) is still active. To block the flow of produced fluid from the wellbore individual SCSSVs are installed in the tubing strings of each well. SCSSVs, SSVs and FSVs are checked monthly as required by CSLC regulations to ensure they operate correctly and can hold pressure without leaking. No problems were noted.

2.4.6 Fire Detection Systems: Fire sensors are positioned to detect fires in their earliest stages and alert personnel to the existence of a fire on the platform. Early detection of fires is essential for personnel safety and to activate shut downs and fire protection systems to reduce fire damage. The fire alarm to warn personnel may be activated manually or automatically by the detection sensors. The fire detection system sensors may include the following types:

- Smoke Detectors
- Heat Detectors
- UV/IR Detectors
- Gas Detectors
- Fusible Plugs

Smoke detectors are found in the Control Room and Living Quarters, the Main MCC Room, PLC Room, Mezzanine Electrical Room and in the drill rig quarters on the main platform. Any detection of smoke or products of combustion will sound the fire alarm. In addition, smoke detectors in the MCC and PLC rooms not only sound a fire alarm but will also shutdown the platform. Heat detectors in the quarters building and change room will alarm if the temperature exceeds 135 degrees Fahrenheit. The UV/IR detectors found in the Well Bay and production area of the platform will activate the fire alarm, ESD system and the deluge system.

Heat sensing fusible loop systems are located in the Well Bay, Automatic Well Tester, Prover and Pressure Drain Tanks. These fusible loop systems consist of pressured air-filled lines with strategically located fusible elements used to protect process equipment. In the event of a fire, the heat created by the fire will melt one or more of the fusible plugs located in or near the fire. Melting of the plug releases air from the fusible loop through the plug, which then activates the fire alarm and ESD. Loss of instrument air to the fusible plug system will have the same effect as detection of a fire.

Platform fire detection systems meet CSLC 2132(g)(1), 2132(g)(5) and 2132(g)(6)(A) regulations. These systems appeared to be well maintained and in an operable condition. Fire detection systems are tested monthly for reliability and proper operation. No action items were identified.

2.4.7 Fire Fighting Equipment: The main firefighting system is a pressurized fire main system with two pumps, fixed monitor stations, hose reel stations, and a wellbay deluge system. Platform Emmy's primary firewater pump is a 2000 GPM Sulzer vertical shaft turbine-type pump with a 200 HP electric motor. The secondary firewater pump is a 1500 GPM Worthington vertical shaft turbine-type with a 120 HP Detroit diesel engine. Other firefighting equipment includes a 50-gallon foam tank for the fixed monitor stations and portable fire extinguishers located throughout the platform. The firefighting systems are installed and

maintained under NFPA 20 and 25 standards per CSLC regulation 2132(g)(4). Delta Fire Protection conducted annual flow tests on both firewater pumps in May 2014. Both pumps were determined to have performance problems that were suspected to be caused by marine growth in the suction piping. Two priority two action items were issued to clean suction screens as necessary and retest. (TEC - 2.4.7.02 & 03) SoCal Holding, LLC started repair work when they became aware of the problem with the firewater pumps.

Fire main piping appears to be properly supported and adequately maintained. The firewater hose stations are strategically located throughout the platform and arranged to provide coverage of the target area from two different directions. Firewater monitors are positioned in the well bay of the Production Deck to provide maximum wellhead coverage while a deluge system is used on the Lower Deck. Additionally, the firewater system can apply foam directly to the Atmospheric Drain Tank. A priority three action item was issued after the foam tank was found to be improperly anchored to the deck. (TEC - 2.4.7.01)

Portable fire extinguishers are the dry chemical type and appear to comply with CSLC 2132(g)(4)(F), NFPA and OSHA regulations. Portable fire extinguishers are maintained in a fully charged and operable condition and kept in their designated places. A third-party contractor does maintenance and testing of all the portable fire extinguishers. Portable fire extinguishers are visually inspected monthly per CSLC 2132(g)(4)(F) and subject to an annual maintenance check. The company provides required annual online training to familiarize employees with the general principles of fire extinguisher use and the hazards involved.

2.4.8 Combustible Gas and H_2S Detection Systems: There are 20 gas detectors, 13 on the main platform, 4 in the MCC/PLC building, 2 in the quarters building, and 1 in the safe welding area (mezzanine). Any detection of 20% or greater LEL (Lower Explosive Limit) of combustible gas will sound an alarm. At 40% LEL, the platform ESD system is activated and all processes are shut down. The tone produced by LEL alarms is distinct from the other alarm tones. Gas detectors are located at key locations on the platform.

CSLC regulations require H_2S detectors on offshore production facilities where production is known to contain H_2S per CSLC 2132(g)(6). Platform Emmy is equipped with 21 H_2S sensors. When H_2S concentrations reach 10 parts per million (ppm), an audible alarm with a distinct wailing tone activates, as well as warning beacons. During an H_2S emergency, all nonessential personnel are required to report immediately to the upwind safe briefing area. If the H_2S cannot be contained and levels cannot be maintained at or below 15 ppm in the safe briefing area, all employees, with the exception of key personnel will be evacuated. When H_2S concentrations reach 20 ppm, the audible alarm becomes a solid tone and personnel follow procedures to move to safe briefing areas. When H_2S levels exceed 20 ppm, the USCG and CSLC are notified and the platform should be abandoned before breathing air has been exhausted. Sensors are located nearest to the point of H_2S release, properly spaced, installed at the correct height, and protected against water, mud, chemical splashes, and mechanical damage.

Whenever the drilling rig is operating on the platform, a local H_2S monitoring system is located on the rig floor with sensors and alarms at the bell nipple, mud-return line, pipe-trip tank, shale shaker, pit area and drillers station. These sensors are not tied into the platform system but alarm locally on the rig floor. The portable H_2S detection and alarm system used on the drilling rig complies with CSLC 2132(g)(6)(A) and API RP 49(6.4.1) in design and

scope. Additional safeguards are in place to limit employee exposure include training, H_2S contingency plan, PPE, safe work practices and unit work permits.

The review of well test records found the concentration of H_2S in the platform casing gas to have increased since 2007. The main increase is limited to two wells (State PRC 425-375 RD1 and 425-J337) over the most recent six years. Well 425-375 RD1 sample results showed an increase from 85ppm to 100ppm, while well 425-J337 showed an increase from 700ppm to 2000ppm, which is an 18% and 257% increase in the H_2S concentrations. Mature oil fields often experience an increase in H_2S levels that create challenges related to personnel safety, corrosion, and possible material failure due to stress cracking. SoCal Holding should evaluate H_2S concentrations and determine if the value of periodic gas sampling at all wells to monitor H_2S concentrations and determine if the H_2S gas may reach an atmospheric concentration of 50 ppm or greater to which personnel could be exposed. If atmospheric concentrations reach 50 ppm, automatic corrective actions should be initiated to control the source of H_2S per API RP 14C, appendix F. This automatic corrective action can be accomplished by the H_2S detection system shutting in the source of the H_2S. As H_2S concentrations change, H_2S detection systems and equipment should be reassessed for compliance with CSLC regulations, API RP 14C sensor locations and spacing, and Appendix F.1.2.d sensor functionality. Addition of sensors to detect H_2S leaks from any vessels, piping, or process equipment containing H_2S concentrations in gas that exceed 100 ppm should also be evaluated. An action item was developed to evaluate the H_2S levels and how the H_2S detection system meets the regulatory requirements. (TEC – 2.6.06)

Both the LEL and platform H_2S detection sensors are tested as part of the CSLC required monthly testing. Test gas is used with the system in bypass to verify proper function of the detection sensors. The monthly testing is witnessed and results are recorded by a CSLC inspector.

2.4.9 Emergency Shutdown System (ESD): The platform is equipped with 14 manual ESD stations that comply with CSLC 2132(g)(1)(A). Activation of an ESD will cause shut-in of all wells and pipelines as well as the complete shutdown of the production facility in the event of fire, pipeline failure or other catastrophe. This is in addition to other safety sensors that have platform shutdown capability. The 14 manual ESD stations on Platform Emmy are tested monthly in bypass mode to ensure automatic shutdown systems are functioning properly. CSLC inspectors witness and record the results of the tests. During semi-annual testing, one of the manual ESD stations or process shutdowns is fully tested with an actual live test to ensure the platform will shutdown as designed.

2.4.10 Safety and Personal Protective Equipment (PPE): SoCal Holding, LLC has a written policy to provide a safe and healthy workplace and to comply with all applicable federal and state regulations about occupational safety and health. All personnel entering a SoCal Holding, LLC facility must at a minimum wear hard hats, safety glasses, hard toe boots, fire resistant clothing (FRC) and personal H_2S monitors. Additional PPE, such as hearing protection, face shields, rubber gloves, aprons, and fall protection that may be needed are found in the SoCal Holding, LLC Safety Manual, safe work permit or Job Safety Analysis (JSA). No issues about the use of PPE were noted while on the platform.

2.4.11 Lighting: Platform Emmy lighting is provided by ceiling and pole mounted fixtures with high-pressure sodium vapor bulbs or similar type lighting. The lighting appears to

meet the levels for safety found in API RP 14F. Extra information about lighting levels can be found in the electrical portion of the safety audit.

2.4.12 Instrumentation, Alarm and Paging: The process instrumentation and control has changed from pneumatic to digital through past facility upgrades. Production controls and instrumentation are now part of a Digital Control System (DCS) that is connected to the platform by digital networks. Within the DCS, Programmable Logic Computers (PLCs) are used to control and oversee all the production or process equipment and instruments on the platform. Operations management software (Wonderware) provides the operator interface displaying plant wide activities. The software also has the ability to detect instrument errors and equipment failure. This ability, in combination with optimizing features, makes both startup activity and operational routines much easier and more efficient for operators. Wonderware also supports information management that shows historical information which can be used to improve process efficiency and plant performance.

The platform's DCS system is effective in helping the operator in handling an emergency. All process alarms appear in three different colors and frequencies to display various priorities. Platform Emmy's safety shutdown system originating functions are annunciated so operators can find out the cause of the event. A different audible alarm is used to distinguish the shutdown system alarm from an ordinary process alarm. First-out alarm displays on the Human Machine Interface (HMI) use time tags to identify pre-shutdown process alarms and shutdown events allowing the operator to take corrective action before the protective system activation occurs. The alarm management and control using this arrangement avoids alarm floods and continuous alarm rates that could cause a critical alarm to go undetected. Facility alarms are tested yearly and safety shutdowns are tested monthly. Maximo facility test results and maintenance records are easily tracked and recovered when needed.

2.4.13 Auxiliary Generator / Prime Mover: The diesel generator is exceptionally clean and appears well maintained. The generator provides 12 hours of power, without refueling, for the office/quarters, emergency lighting system, HVAC system for the Switch Gear Building, air compressors, utility/rescue/boom deployment boat launching system, navigation lights, shutdown valves, and several critical pumps. The generator is tested monthly as part of the CSLC safety inspection and to verify the operational reliability of the system. Historical data shows that routine maintenance is being performed on generating system components and that load tests are acceptable.

2.4.14 Spill Containment: Spill containment on Platform Emmy appears satisfactory. Rainwater spills and leaks are handled by deck drains found throughout both the main and satellite platforms. The lower deck and satellite open deck drains flow to the Satellite Drip Tank T-207 before being pumped to Atmospheric Drain Tank T-203. Deck drains from the drill deck, production deck and the helicopter deck all flow directly to T-203. Pumps operating on level control transfer the fluid from T-203 into the production header where the fluid commingles with the production emulsion flowing through the 12-inch oil production pipeline to shore.

Seven drums of assorted sorbent pads are available for use on the platform, as well as, two 750-feet sections of Series 4300 Expandi-Boom to help contain any spill that might get into the ocean. SoCal Holding, LLC operating personnel inventory and maintain spill response

materials monthly as part of the platform safety inspection. Platform Emmy's containment system meets the requirements of the Spill Prevention, Control, and Countermeasure (SPCC) Rule.

2.4.15 Spill Response: SoCal Holding, LLC keeps an 18-foot boat with outboard motor for immediate launch to allow rapid boom deployment should the crew or workboat not be on-site. Other equipment kept on the platform specifically for spill response include marine radios, company radios, phone lines, tracking flags and electronic tracking buoys. The equipment appears to be well kept and is part of the CSLC monthly safety inspection.

An example of SoCal Holding, LLC's spill response readiness was recently tested when the Bureau of Safety and Environmental Enforcement (BSEE) conducted an unannounced multiagency tabletop exercise on May 24, 2014. The exercise simulated a release of 50 barrels of crude oil from the subsea oil pipeline to shore. The exercise did not deploy response equipment or require additional resources. The drill proceeded without incident, and showed the effectiveness of the company's spill plan. The exercise was conducted under 30 CFR Section 254.42(g) as approved by the Oil Pollution Act of 1990.

SoCal Holding, LLC is a member of a cooperative of oil producers, refiners, transporters and shippers that provide funding to Marine Spill Response Corporation (MSRC). MSRC is a national nonprofit USCG classified Oil Spill Response Organization (OSRO) with a large inventory of vessels, equipment, and trained personnel. Locally MSRC operates three oil spill response vessels (OSRV), two boom boats, two deployment boats, and a shallow water barge from Berth 57 at the Port of Long Beach. Boom deployment drills occur semi-annually with MSRC. The last Office of Spill Prevention and Response (OSPR) spill drill and boom deployment occurred on June 10, 2014 and was witnessed by a CSLC representative.

2.4.16 Cranes: Platform Emmy is equipped with two cranes. The crane on the west side of the platform is an electric driven Weatherford Model G-20F crane with a 100-ft. boom. The crane on the east side of the platform is a diesel driven Mariner Model 480 H crane with an 80-ft. boom. Cal OSHA regulations require that cranes over three-ton capacity be load tested every four years and after major repairs. Koncranes performed quadrennial load tests on both cranes on August 1, 2012 as well as an annual inspection on the Weatherford crane on August 1, 2013. After replacing a section of the boom on the Mariner crane, Crane Certification Services, Inc. performed both an annual inspection as well as a load test on that crane on December 8, 2013 before returning it to service.

Crane inspection records (monthly, quarterly, yearly) comply with Cal OSHA 5031 requirements and API RP 2D Operation of Offshore Cranes. Inspection recommendations were completed satisfactorily. No action items were noted.

2.5 Mechanical Integrity

This section gives a general evaluation of SoCal Holding, LLC's maintenance strategy and approach to mechanical integrity. This section also provides comments on specific areas of concern. The company uses three different strategies to reduce spills and overcome the problems related to equipment breakdown. These strategies are:

- Preventive Maintenance

- Predictive Maintenance
- Proactive Maintenance

Preventive maintenance and job scheduling is done by a “maintenance planner”. The maintenance planner reviews new work orders daily and assigns an in-house craft or outsources the task to a contractor/vendor depending on workload and specific job needs. The planner also stages commonly used parts and supplies while critical spare parts are found in the warehouse. This approach provides SoCal Holding, LLC with maintenance task optimization and decreases the chance of equipment failure. However, during the change of ownership between SoCal Holding, LLC and AERA, the equipment maintenance transition was incomplete. Gaps were found in the movement of equipment records from SAP to Maximo. These gaps caused certain equipment to be excluded from routine maintenance and testing. SoCal Holding, LLC is aware of the problem and is repopulating the missing maintenance data files.

The computerized maintenance management program (Maximo) is used for preventive maintenance scheduling, equipment repair, and tracking of work orders. Operating personnel are able to use Maximo to create work orders that can range from a simple filter change to major equipment repair. Maximo gives the SoCal Holding, LLC’s maintenance planner flexibility to schedule and record these activities based on manufacturer’s recommendations, operating history, and good engineering practices. Tank and pressure vessel reliability is maintained through regularly scheduled internal, external and ultrasonic inspections and repairs. Reliability inspections are also standard for all rotating equipment.

Facility engineers use an Inspection Management software system called Credo for the management of maintenance tasks on piping, vessels and related equipment on Platform Emmy and onshore facility process sites. Credo is used for inventory management, corrosion data collection, trending, criticality, risk analysis, reporting, planning and scheduling. The system thereby provides a predictive maintenance approach and bases maintenance needs on the actual condition of the equipment rather than solely by preset schedules. The goal of the software package is to extend the useful age of the equipment to reach its end of life stage. The program uses stored data, analysis and predictive trending, to prioritize inspection activities and keep maintenance resources focused on key areas. Credo also establishes a risk level for the various sections of piping and equipment based on service and by analyzing sets of test points. The analysis also provides corrosion rates and expected end of life for facility pressure vessels. Likewise, the data can be used to examine the root causes for equipment failures. When the risk level for a particular piece of equipment or piping reaches an unacceptable level Credo flags the item and alarms. This feature helps engineers carry out corrective action before failure of equipment or piping can cause a leak or spill.

All processes within the maintenance system are well documented and integrated throughout the organization. Operational groups (management, engineering, operations and maintenance) work together to achieve organizational maintenance objectives. Key Performance Indicators (KPIs) associated with the maintenance strategy are reviewed to achieve facility maintenance goals. These organizational practices help ensure stable and reliable operation of the platform.

2.6 Production Safety Systems

SoCal Holding's production platform process equipment and pipelines are designed, installed, and maintained in a manner which provides for safety of operation and protection of the environment. Platform Emmy's production facility is protected with basic and secondary surface safety systems designed, tested, and maintained in accordance with MRMD Regulations and API RP 14C.

Safety Analysis Function Evaluation (SAFE) Charts described in API RP 14C are utilized as an analysis technique to document the effects of and determine the requirements for components in the safety system. All safety devices and their functions were analyzed by comparing the SAFE Chart and facility P&IDs. The comparison matched all safety and shutdown devices and emergency support systems (ESSs), with their functions and verified that the required level of protection is being maintained. There were a few instances where minor corrections to the SAFE Chart were needed to properly document all of the installed safety equipment. (EFI - 2.6.01 thru 05)

All platform wellheads have SSVs that are inspected, installed, and tested in accordance with CSLC 2132(a)(9)(A) & (D) and API RP 14C. Surface safety valves on all the wells will automatically close to isolate the well and prevent oil and gas from escaping into the environment. Any SSV that does not operate properly, or fails the fluid flow leakage test, is either repaired or replaced.

Extensive fire and safety systems are installed throughout the platform. Included in these systems are safety devices that automatically shut down oil and gas production if an emergency occurs. Every operator/contractor on the platform is authorized to shut down the platform should they detect an unsafe condition. As part of the surface production safety system, automatic shutdown valves are installed per MRMD Regulations and API RP 14C to isolate the various process systems and lessen the environmental impact should a system problem be identified. Should evacuation be necessary, platform personnel can leave the platform by helicopter, crew, utility, or other boat, and also by using the available life rafts.

SoCal Holding's process hazard analysis (PHA) and hazard and operability study (HAZOP) assessments are used to identify potential hazardous scenarios and recommend corrective actions. Platform personnel are authorized to conduct mini HAZOPs on different platform processes and equipment to help prevent possible hazards from becoming serious problems. PHAs are performed as part of the management of change (MOC) process and before any construction can begin on a new project. This systematic approach for identifying, evaluating, and controlling the hazards of the process helps build-in additional safety and can help evaluate the contribution of each safety device or system protection. When hazards cannot be removed or controlled through design, SoCal Holding, LLC uses a hierarchy of health and safety controls (e.g., Administrative and Engineering Controls) to eliminate hazards or reduce exposure to hazards.

The Human Machine Interface (HMI) computer helps the operator understand the status of the process control and the safety systems and better manage operation of the platform. The HMI provides a graphics-based visualization of the platform control and monitoring system. The user interface resides in a Microsoft Office-based Windows computer that communicates with a Programmable Logic Controller (PLC) for specific functions, along with

the Digital Control System (DCS) on the platform. This equipment allows operators to control the process within authorized parameters. Uniformity in process settings among the different operating crews is carried out through a strict safety systems procedure that restricts operator access to the program control code. Separation of safety-related functions from process control reduces the risk of common cause failures and assures the safety system will function properly. 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 signal an active bypass. Additionally, facility controls and safety features are designed to be fail-safe and have redundant capacities. While the HMI display design provides an effective amount of information related to equipment and process, there appears to be a flaw in the placement of the control and monitoring software at an onshore server. During a loss of communication between the platform and the onshore server, “real time” process information is unavailable. The loss of HMI “real time” control display did not cause any sudden operational upsets but did require additional operator surveillance to monitor process variables manually. It should be pointed out that safety systems are independent of the DCS alarm system and were unaffected by the loss of the communications link. To avoid future loss of the supervisory HMI capability, the CSLC issued an action item that recommends process control software be installed on the platform PLC and that a backup can be available on the onshore server. (TEC - 2.4.12.02)

Electrical System Audit

SoCal Holding, LLC
Platform Emmy
Huntington Beach

3.0 ELECTRICAL AUDIT

3.1 Goals and Methodology

The primary goal of the Electrical Team Audit was to evaluate the electrical power distribution systems and operations of SoCal Holding, LLC's Platform Emmy to verify its conformance with applicable Codes and industry standards.

References used include documents published by the American Petroleum Institute (API), National Fire Protection Association (NFPA), the State of California Electric Code (CEC) and State Lands Commission Regulations. The ELC Team review findings refer to API RP 14F, API RP 500, API RP 540, CEC documents and industry standards. The drawings used in support of the audit were Electrical Single-lines and Area Classification Drawings provided by SoCal Holding, LLC for the platform.

Specific tasks to perform this verification included a proven process of field confirmation of electrical single-line diagrams, plan drawings, area classification drawings, and operation and maintenance practices. Comprehensive use of inspection checklists, code and standard compliance checklists, and review of electrical system design for conformance to codes and standards was used 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 and report is organized in sections and each section is discussed below with examples of typical items encountered.

3.2 Hazardous Area Electric Classification Drawings

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. Areas that contain, or may contain, flammable gases and vapors in normal operations can form an explosive environment that is ignitable by hot surfaces, electrical arcs, and sparks. To prevent this from happening, facilities are classified according to the hazard present in the different areas. This is done so all electrical equipment and systems are properly selected and installed. The basis for observations and review comments for all hazardous areas are API RP 500, CEC 500, 501, and 504 as well as API RP 14F. The hazardous area electrical classification diagrams are generally representative of the existing conditions and area class elements. The drawings need to be updated on a regular basis as process and equipment additions and deletions are made.

The purpose of an Electrical Area Classification Drawing is to define the locations of boundaries and areas where specific electrical materials and installation practices are required to manage 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 to insure compliance with CEC requirements. Electrical Area Classification Drawings are required to include the information necessary for a Qualified Electrician to perform work in and around classified areas.

Areas that contain walls, depressions and barriers to natural ventilation where flammable liquids or vapors may be present require evaluation and identification of the appropriate Electrical Area Classification. All areas known to contain flammable liquids or vapors are required to be identified on an Electrical Area Classification drawing. The area classification plans require the adding of details to more clearly define and show area class boundaries. (ELC - 3.2.06, 08, 09 & 11)

Oil and gas production operations require the use of various chemical additives that sometimes are flammable. The storage and dispensing of these chemicals is carried out by using portable totes. The area classification plans include identification of the locations of totes, but because of the changing needs of production, the use of totes requires periodic verification.

Portable chemical injection totes for oil and water production and treatment were found throughout the platform. The totes are portable, but the locations of the tote installations by definition, are permanent. The lines, pumps, and fittings associated with the tanks are a source of hazard and require hazardous area classification. (ELC - 3.2.01 & 10)

All equipment enclosures, raceways, conduit sleeves, metal totes and well casings in classified areas are required to be electrically bonded for static energy control. Refer to part 3.5 for more details.

The design of general-purpose electrical enclosures (Load Centers, MCC's, control panels, etc.) must be suitable for use in classified areas. In general, electrical equipment in classified areas was found to be explosion proof or National Electrical Manufacturers Association (NEMA) 4 purged or otherwise suitable for use in classified areas. Purged enclosures must have purge systems monitored and alarm when purge pressures drop below a minimum level. (ELC - 3.2.03)

Some junction box and conduit fitting covers are missing or not properly seated against box flanges to provide an acceptable seal in classified areas. Covers must be flange-face to flange-face or box if bolt-on type or five full threads engaged if screw-cover type. (ELC - 3.2.12)

Conduit seals are required at classification boundaries. Locations where conduits originate outside of classified areas and travel through classified areas without the use of a box, fitting, or coupling may cross boundaries of areas where the hazardous material has a low probability of producing an explosive or ignitable mixture and is present only during abnormal conditions for a short period of time without a seal (Division 2). Some equipment has been added, relocated and/or repurposed on the platform. (ELC - 3.2.02, 04, 05 & 07) Drawings need to reflect latest equipment locations and any process system changes that might affect the area classification. The extensive use of metal-clad (MC) and jacketed cables in cable tray has resulted in a drop in the quantity of conduit seals. However, MC cable must be built to be inherently blocked, and not capable of sending hazardous and explosive gas, vapor, and liquid from a hazardous source to ignition source.

3.3 Electrical Power Distribution System, Normal Power

3.3.1 Electrical Single-Line: Southern California Edison (SCE) provides electric utility service at 66kV onshore and SoCal Holding, LLC distributes power from there for all of the

onshore and offshore facilities. SCE provides a single 66kV overhead line to their substation located on SoCal Holding, LLC's lease property. The SCE 16.8/22MVA main transformer steps the voltage down to 12.47kV for service to the SoCal Holding, LLC's Huntington Beach 12.47kV Main Service Substation. From there 12.47kV is distributed to SoCal Holding, LLC's facilities in Huntington Beach. Platform Emmy receives its power at 12.47kV from a single submarine cable fed from the SoCal Holding, LLC's Main Service Substation. On the platform, the voltage is stepped down for local utilization to 2400V, 600V, 480V, and 208V as required. SCE available fault current is noted on the power system drawing for use in short circuit, arc flash, harmonic and other power system studies.

Emergency power is limited to one 175kW, 480V auxiliary electrical generator at Platform Emmy, which does not support production or process equipment. Various small battery and UPS systems are provided to handle emergency lighting, alarms and controls. Emergency power systems are discussed in Section 3.6.

The electrical single-line drawings used for audit review generally match the installed facilities. The audit focused on the normal power system 480V and above and the emergency power system 480V and below. SoCal Holding, LLC is completing the addition of a new 2400V MCC to the power systems. The new addition will increase power capacity for new wells. The single-line diagrams were compared to the existing installation. The drawings were found, in general, to be accurate, however some discrepancies were identified and are listed in the matrix. (ELC - 3.3.1.01 thru 06) The single-line drawings of the existing system were available on the platform for use by personnel.

3.3.2 Electrical Service Capacity: The power system capacity, in general, appears to be satisfactory for the existing platform loads. Overcurrent protection and wire sizes were found to be appropriate. The application of overcurrent devices with respect to equipment ratings is generally satisfactory. A new 2400V MCC has been installed that will allow the transfer of certain producing wells now supplied from twelve-pulse VFD and step-up transformers to single voltage 2400V across the line starters. This new design approach is being carried out as a space saving and equipment weight decrease measure. Transformer TR-3 has been replaced with a new 3000KVA / 3750 KVA, 12470Y-2400/1385V, solidly grounded oil-filled transformer. (ELC - 3.3.2.01) It is recommended that SoCal Holding, LLC complete a power system load flow study to identify power system deficiencies that may develop as new wells are brought on-line, and to prepare plans to address those deficiencies. (ELC - 3.3.2.02)

3.3.3 Electrical System Design Power: Feeder and control circuit wiring and installation design practices in Class 1, Division 2 have changed over the last several years. There has been a move away from the use of rigid conduit, wire, and conduit seals in favor of the use of type TC tray cable, type MC metal-clad cable and cable tray, and listed fittings and seals. Installation of cable tray with type TC and type MC metal-clad cable generally conforms to CEC section 330, 336, 392, 501 requirements. Cable trays must be installed as a complete system with enough access to maintain and install cables. (ELC - 3.3.3.02) Cables operating at over 600V, under 600V, and for control and communication are required to be separated by a solid fixed barrier by CEC 392.20(B). (ELC - 3.3.3.03) Some trays were viewed to have excess fill. CEC 392.22, Table 392.22(A), lists the allowable fill area for ladder and solid bottom type cable tray. Tray fill needs to be reviewed for Code compliance. (ELC - 3.3.3.04) The tray system design includes a gap or "slip joint" to allow for differential movement between the Main Platform and Satellite Platform. It was noted that recent tray additions at the Satellite

Platform MCC roof area have been made with “rigid” connections. The “rigid” connections need to be removed and remade to allow movement. (ELC - 3.3.3.06)

Arc-flash hazard (AFH) labels are required for electrical equipment per CEC 110-16. Arc-flash labels were found installed on switchboards, panel boards and other electrical equipment likely to require examination, adjustment, servicing or maintenance while energized. The installed labels require replacement to include added information now required by the Code. (ELC - 3.3.3.01) The SoCal Holding, LLC’s electrical safety program describes the training, qualification and personal protective equipment necessary to perform live electrical work. The standard AFH label will determine the actual boundaries (i.e. prohibited, limited, restricted etc.) and will inform the employee of what PPE must be worn.

The full arc-flash hazard study should be updated, to include all electrical system additions and deletions made since the last study was completed. It is also recommended that Code Compliant labels including flash hazard category boundary, incident energy, short circuit duty, and PPE requirements be provided on new labels to provide the required AFH information. (ELC - 3.3.3.01)

Panel schedules have been entered into a software spreadsheet and are changed, printed, and replaced by Platform Emmy electricians when loads are modified. Platform Emmy electricians have made a concerted effort to update the panel schedules. This is a continuing effort. It is also recommended that equipment identification labels be made consistent with process diagrams and electrical single-line diagrams, as well as the fixed naming convention for ease of reference and to avoid confusion. (ELC - 3.3.3.05)

The new 2400V MCC is a NEMA 3R outdoor assembly that includes a weather door to protect the internal parts. However, access to the motor starters requires the weather door be opened. During periods of inclement weather and heavy fog, the internal parts will be subject to water intrusion that may cause damage or create a shock hazard. It is recommended that SoCal Holding, LLC design and install a remote operator panel, or HMI, similar to what has been installed for the Drilling MCC. This would allow remote control of motor starters without the need to open the weather doors, and to reduce arc flash hazard exposure. (ELC - 3.3.3.07) The 2400V MCC will need to be conditioned to control moisture within the assembly. Two air-conditioning units are provided for cooling. Rules for heating, including controls, are also needed to keep an internal temperature above dew point.

3.4 Electrical Power Equipment Condition and Functionality

3.4.1 Materials and Installation: CEC 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. More 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 platform.

The Production Deck includes several well junction boxes, where type MC metallic sheathed type CLX flexible cables between the well J-box and the wellhead connection were not adequately supported. (ELC - 3.4.1.01) A project is in progress to move the well junction boxes from the Production Deck down one level to the Lower Deck. Many of the Production

Deck junction boxes will be removed. This project will change the cable installations so the cable passes through a steel sleeve that is next to the wall head and is sealed after cable installation. The cable will terminate directly to the wellhead connector and will no longer be a trip hazard or require multiple support locations. (ELC - 3.2.13)

Abandoned electrical equipment and parts should be removed or marked as out-of-service. Given the limited available space and platform weight limits, it is recommended the out-of-service panels, junction boxes, switches, light fixtures, and cabinets be removed. (ELC - 3.4.1.02)

Several unused openings in well junction boxes on the production deck were found to be open to the atmosphere in the classified area. SoCal Holding, LLC should confirm that all unused openings on production deck well junction boxes with active circuits are plugged and all hardware is installed. (ELC - 3.4.1.03)

3.4.2 Safety Procedures: The electricians follow a compulsory set of procedures designed to improve personnel safety and reduce the potential for shock and injury. Electricians are responsible to complete a task checklist before beginning any work. The checklist includes identification of hazards that might be associated with the task and the measures to be employed to lessen the hazard, risks. A lock-out tag-out program is well documented and implemented. The procedures require the use of a H_2S three-way (H_2S, O2 & %LEL) or four-way (H_2S, CO, O2 & %LEL) gas detector for entry into confined spaces and for hot work in classified areas.

CEC article 590.6(B)(2) requires a written assured grounding program for extension cords that is continuously enforced at the site by one or more named personnel. SoCal Holding, LLC has such a program that is being enforced. SoCal Holding, LLC also requires third parties to carry out their own programs. It is recommended that SoCal Holding, LLC require all third parties to comply with the color code sequence being applied by SoCal Holding, LLC. This would lessen confusion and the unintentional use of an extension cord set that has not been tested quarterly, as required. (ELC - 3.4.2.1)

3.4.3 Equipment Maintenance Practices: The Huntington Beach facilities, including Platform Emmy, used SAP software to track and create maintenance work orders up until the end of 2011. The SAP program was previously used by AERA to track and schedule maintenance. A transition to Maximo occurred in 2012 with the SAP database being mapped over to the Maximo database. Electrical maintenance is being integrated into the new Maximo computer database. The server for the Maximo database is located in Long Beach, CA.

Reliability of the Platform Emmy electric system is mainly dependent on the availability of the SCE power supply in addition to the condition and operational readiness of the onshore facility distribution system and the submarine cable. A sound maintenance and inspection program and documentation of the work performed is key to assuring reliability of this equipment. It is recommended the electrical system maintenance scope of work for each platform shutdown be entered into Maximo so that the planned maintenance can also be documented in the system as completed work orders.

Access to the Maximo database is restricted based on user credentials. Fully authorized-users have unlimited access. Production foreman and operators have limited-access to create work orders and update work order status. New equipment records are

documented and assembled in an Asset Addition Form, which is reviewed by engineering lead personnel. These records are transferred to the Facility Operating Supervisor (FOS) for review and approval before delivery to the Maintenance Planner. The Maintenance Planner assigns an asset number and completes the asset record in Maximo including preventive maintenance procedures and their frequencies. All new equipment requires a Pre-Startup Safety Review (PSSR) that identifies action items for documentation including maintenance procedures. At the time of this assessment, there were 344 preventive maintenance procedures in the system. Once the asset is created and entered in the system, Maximo produces work orders automatically. The orders are produced 30 days or less before the work is required. Work orders are scheduled and tracked for each asset and include maintenance activity needed weekly, quarterly, semi-annually, yearly, five-years, etc. Material required to complete the task is identified in the work order. A warehouse onshore stores commonly used consumables and certain renewable parts. The planner scheduler or FOS can issue purchase orders for items not in stock.

Besides Maximo produced work orders, corrective work orders are created by personnel. Corrective work orders document field observations and are sent to the FOS for review and implementation. Personnel also give recommendations to the FOS for any changes to a work order. Completed work orders are given to the FOS for review and then input into Maximo by one of the fully approved -users. Final documentation includes notes, test reports, photographs, third-party paperwork, procedures, and any other information considered critical or useful about the asset.

The Platform Emmy main switchgear protective relays were last tested and calibrated in 2010. NFPA 70B, Recommended Practice for Electrical Equipment Maintenance, and the Standard for Maintenance Testing Specifications for Electrical Power Equipment and Systems (ANSI/NETA MTS) recommend visual inspection of switchgear every twelve months and electrical testing and calibration at twenty-four month intervals. Switchgear inspection, cleaning, and testing were performed December 2, 2014 during a planned SCE 66kV shutdown.

3.5 Grounding

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 rules of grounding also contribute to 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.

Separately derived systems for 480Y/277V and 208Y/120V transformer secondary windings are solidly grounded and impedance grounded on Platform Emmy, and noted to satisfy Code requirements for power system grounding.

Article 501-16, Bonding in Class I Areas, states that all noncurrent carrying metal parts and enclosures associated with electrical components shall be connected together, 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 250) equipment grounding conductors with each set of power conductors from the source of power to the load.

Power circuits supplying submersible electric driven pumps are connected to the power system using type MC (Okonite CLX) armored cable. Metal-clad cable includes a metallic corrugated sheath that can be used as an equipment grounding conductor under CEC 250.118(10). Without a dedicated ground conductor or metallic sheath, the ground return path depends on the metallic raceway system to provide acceptable circuit continuity. The raceway system alone is generally not the most reliable equipment grounding conductor. Raceways typically have multiple locations where ground circuit continuity can be interrupted by loose fittings, transitions from different raceway types, and may be missing or inadequate bonding jumpers. A good example of missing or inadequate bonding jumpers is the cable tray system. Metallic cable tray systems shall be listed and bonded under CEC 250.92(B)(4). (ELC - 3.5.01)

The chemical totes found on the Lower Deck at the southeast corner require installing a ground bonding conductor for control of static discharge. (ELC - 3.5.02)

3.6 Emergency Electrical Power

3.6.1 System Configuration: Safety systems are required to perform under normal conditions and in emergencies, including power failures. The gas, fire, emergency lighting, general alarms, PA, PLC and emergency shutdown systems are powered by a combination of 24VDC battery, a 1.8kVA uninterruptible power supply (UPS) and a 175kW/225kVA, 480Y/277V, emergency power auxiliary diesel generator to provide continuous power in the event of a main supply power failure.

The Essential Loads MCC receives power either from the normal supply or from the generator through an automatic transfer switch (ATS). Both the normal source and emergency source are impedance grounded. Single-Line Diagram Drawing 078-87-514 of the Essential MCC shows a connected load consisting of 235hp of motor load, plus 161kW of various other loads for a total load of 336kW. Most of the loads are not expected to operate simultaneously. Generator loading should be checked and recorded to prevent accidental overload. Generator testing records show that routine operational tests are performed and the Essential MCC is switched to the generator during testing.

API RP 14F recommends that AC electrical safety control systems are supplied through a battery charger-inverter system and that DC controls have a reliable DC supply. This is achieved on Platform Emmy with a combination of UPS and 24VDC battery backup systems.

The Computer Room UPS, found in the main electrical room, is rated 120VAC, 15A, 1.8kW output. Drawing 078-87-323 identifies the UPS load as a control system computer believed to be PLC1 and PLC2. PLC1 and PLC2 provide the alarm and control logic for all process and emergency shutdown functions. The existing UPS is over 10 years old, nearing the end of its useful life, and should be scheduled for replacement. (ELC - 3.6.1.01)

Power for the PLC emergency shutdown relays and solenoid valves, as well as, PA system, gas, fire, and general alarms on Platform Emmy is provided by the 24VDC battery system through Panel DCP-1. The 24VDC battery is charged by one of two float and equalize battery chargers that are powered from Panel EDP-1 and the 175kVA generator, if utility power

is lost. The battery bank is composed of C&D 2305776, KCR7 Poly cells rated for a 126 ampere-hour capacity at a 3-hour discharge rate. The battery bank serves Panel DCP-1. The batteries were last replaced in 2011. Battery testing should be conducted periodically under IEEE Standard 450 to monitor the remaining useful life.

Platform Emmy 12kV switchgear protective relays and MCC-3 shunt trips are powered by the dedicated 48VDC switchgear battery system. The 48VDC battery is charged by one of two float and equalize battery chargers that are powered from the Essential Power MCC. 48VDC Battery Chargers 1 and 2 charge the battery through Panel DCP-2 bus. The battery bank is composed of C&D 2305776, KCR7 Poly cells rated 126 ampere-hour capacity at 3-hour discharge rate. The battery serves Panel DCP-2. The battery cells were made and installed in 2011.

3.6.2 Equipment and Component Ratings: The rating of emergency power system equipment and components was found to be satisfactory based on the measured operating loads. Load recordings should be taken before adding any new loads. The existing generator has limited capacity and is only capable of supplying motor loads of 25hp or less.

3.7 Electric Fire Pump System

An electric firewater pump and a backup diesel driven firewater pump are both provided to pressurize the firewater system on Platform Emmy. The electric driven firewater pump is the primary and the diesel engine driven firewater pump is the secondary. The electric firewater pump P-200 motor is fed from normal power and is without an emergency electrical power backup source since a diesel driven pump is provided.

The power supply to the electric driven firewater pump P-200 has been redesigned to comply with NFPA 20 and CEC 695 requirements. Power to the electric driven firewater pump is taken ahead of the 12.47kV electric service power main. Supply conductors are directly connected to the UL listed fire pump controller located next to the firewater pump on the lower platform through a primary fused switch and dedicated 300kVA pad-mount type transformer located on the electrical building roof. A medium voltage disconnect switch for the 300kVA pad-mount transformer located on the electrical building roof serves as the primary disconnect, but the switch was not labelled. (ELC - 3.7.01)

3.8 Process Instrumentation

The process control system uses a combination of pneumatic, hydraulic and electrical instruments and controls. Process control includes the use of computers, PLC's and relay logic to control and interface with valves, solenoids and pump controllers. Alarms are produced from level, temperature, pressure and flow sensors advising operators of process conditions. Local annunciators or displays are then used to troubleshoot the cause of a general alarm or shutdown. The shutdown systems are failsafe upon power loss.

All electrical instrumentation and wiring materials are installed in either Class I, Division 2 or unclassified locations. Class I, Division 1 locations such as pits and production deck vent locations are void of electrical instrumentation and wiring materials. The PLC and Control Type MC is the prevalent wiring method for instrumentation. It is used between individual instruments and local marshalling boxes where circuits are terminated and grouped into multipair cables. Multipair MC cables run between marshalling boxes and the PLC or local

control panel. Conduit is used to a lesser extent for instrumentation wiring. Class I, Division 2 area instrumentation includes the use of factory-sealed devices in suitable enclosures and intrinsically safe wiring.

3.9 Lighting Systems

In general, lighting fixtures are installed in conformance with the CEC and appear to be located to provide adequate lighting levels. Fixtures are appropriate types and designs for the environmental and hazardous area conditions. A mix of incandescent, fluorescent, high-pressure sodium, low-pressure sodium, metal halide lighting, and Light Emitting Diode (LED) are used on Platform Emmy.

Emergency lighting is supplied power from the Essential Power MCC, which in turn receives power from the emergency generator during a main power failure. Review of the layout of emergency light fixtures suggests satisfactory coverage of areas for safe egress. SoCal Holding, LLC should perform an illumination survey for the entire platform. New equipment (2400V MCC) has been installed on the lower deck of the Satellite Platform, as well as on catwalks on the lower deck of the Main Platform, drill rig operators offices on the Production Deck, and drill rig equipment on the Drill Deck. Two studies are required; one for normal nighttime task illumination levels and one for loss of shore power and emergency egress illumination levels. (ELC - 3.9.01 & 02) Illumination levels should be verified to comply with Illumination Engineering Society (IES) and API recommendations.

Many of the high bay lights (+25'-0") above the Production Deck are inoperable and are abandoned as they are difficult to access for maintenance and lamp replacement. SoCal Holding, LLC has replaced this lighting with more lights mounted on the columns approximately 10'-0" above the working surface/floor. The high bay light fixtures and conduit should be removed. (ELC - 3.9.03)

3.10 Special Systems (Offshore)

Special system requirements for offshore production facilities are described in API RP 14F. The ELC Team review comments for special systems are based on API RP 14F, API RP 540 and CEC documents.

3.10.1 Safety Control Systems: Safety control systems consist of multiple devices arranged to detect an abnormal condition and effect plant shutdown. Electrical safety control systems are normally operated energized and thereby fail-safe. Failure of external power to a safety control circuit also requires an audible or visual alarm to be initiated. All safety control systems were found operational and tested regularly. Besides the platform ESD stations, there is a shore activated shut-in control. In the event of an onshore shut-in or process control shutdown, an analog signal control can be initiated from on-shore that will shut-in Platform Emmy production. The shore-activated shut-in is configured with a fail-safe design.

3.10.2 Gas Detection Systems: Combustible gas detection systems, lower explosive limit (LEL) and Hydrogen Sulfide (H_2S) are employed to detect combustible gas leaks in equipment and piping, to warn personnel of possible toxic concentrations and to initiate remedial action. General Monitors LEL detectors and H_2S detectors are installed in a spaced pattern to provide coverage on the Platform Emmy Drilling Deck, Production Deck, Lower Deck, and on the Quarters Deck Main Switchgear Rm.

The General Monitors 4800 and 4801 combustible gas detection system and H_2S type DT-210 equipment has been installed and working properly for many years yet the future maintainability and availability of spare parts was a possible concern of the electrical team. General Monitors does not support older equipment models and lists their Zero Two Series Gas and Flame Detection System as the replacement. There are other companies that provide parts and service for these systems and they continue to be tested monthly proving proper operation as witnessed by CSLC inspectors. There are no action items regarding the operation of the H_2S or combustible gas detection systems.

3.10.3 Fire Detection Systems: Fire detection and smoke detection is usually employed to detect and warn personnel of possible fire and to initiate remedial action. Smoke and heat detectors are installed in the Control Room and Living Quarters, the Main MCC Room, PLC Room, Mezzanine Electrical Room and in the drill rig quarters on the main platform. There were no issues with this equipment from an electrical perspective.

3.10.4 Aids to Navigation: The US Coast Guard has considered platform illumination as sufficient for platform identification and no longer requires aids to navigation (obstruction lights) in offshore facilities close to the shore. However, Platform Emmy has retained four obstruction lights that are placed at the extreme corners (perimeter) of the platform. Each navigation beacon is equipped with an automatic lamp transfer feature and the equipment has been in-service. In addition, Platform Emmy has a foghorn on the northeast corner of the platform, which is operational. The obstruction lights and foghorn are supplied from emergency power and are functional.

3.10.5 Communication: Communications systems are established to provide for normal and emergency operations. Systems used for emergency communication should have battery-operated supplies good for at least four hours continuous operation as required by API RP 14F. Landlines, microwave, wireless radio and cellular phones are available for communication between Platform Emmy and shore satisfying this requirement.

3.10.6 General Alarms: General Alarms are audible in all parts of the facility to notify personnel to abandon the facility or respond to an emergency. Beacons and warning lights are used with the audible alarms. All General Alarm sounding devices are identified by a sign at each device and have red letters at least one inch high describing required personnel response. The central paging system is used to supplement instructions of a general alarm. Visual and audible alarms are tested regularly and were found to show satisfactory performance.

The platform also includes H_2S warning beacons and signs that are initiated in the event of an H_2S leak. The beacons and signs are to warn personnel on approaching vessels to stay clear of the platform.

3.10.7 Cathodic Protection: Platform Emmy cathodic protection system rectifiers are producing positive current flows to the platform structure. Sacrificial zinc anodes are also attached to cables that are hanging from the platform and submerged in seawater. There were no issues identified with the condition or operation of this equipment.

Safety Management Programs Audit

SoCal Holding, LLC
Platform Emmy
Huntington Beach

4.0 SAFETY MANAGEMENT PROGRAMS AUDIT

4.1 Goals and Methodology

The goal of the safety management programs audit was to verify that SoCal Holding, LLC uses a set of related approaches to manage hazards and reduce the frequency and severity of undesirable events. SoCal Holding, LLC's safety management programs are composed of organizational and operational procedures, design management, audit programs, and other methods defined by OSHA and the EPA. The audit started with the review of the Operating Manuals, emergency and spill response plans, training programs, and other key elements. These areas were reviewed before evaluating other programs addressed in the Safety and Environmental Management Program for Platform Emmy.

4.2 Operations Manual

SoCal Holding, LLC has a system in place for controlling what procedures or processes need to be documented. Individuals knowledgeable with the facility's production stream process and hazards are tasked with writing or updating the Standard Operating Procedures (SOPs). These individuals are chosen who are familiar with the company, facility, operations and maintenance procedures to accomplish this task. The SOPs are written in a concise, systematic, easy-to-read format with enough detail so trainees with limited experience or knowledge of the procedure can successfully carry out the task with minimum supervision. The information presented in the operations manual was found to be clearly written and exhibiting the right level of detail for operating personnel.

The SOPs are kept by means of the company intranet system with hard copy versions found in the control room at each operating facility. A comprehensive review of the SOPs determined that relevant operating information was available within the different manuals. However, some of the operating information does not appear up-to-date, for example company and personnel references. The SOPs should be systematically reviewed yearly, with hard copies being updated every 1-2 years, to ensure the policies and procedures remain current. It does not appear as though this is occurring consistently. (SMP - 4.2.01)

4.3 Spill Response Plans

The SoCal Holding, LLC Oil Spill Contingency Plan (OSCP) was developed under 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 plan covers the onshore facilities, Platform Emmy, and associated pipelines. 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

Within the OSCP are operating procedures the facility uses to prevent oil spills. Included are control measures to prevent oil from entering navigable waters or adjoining shorelines and countermeasures to contain, cleanup, and mitigate the effects of an oil spill. The OSCP was reviewed and meets Federal (40 CFR Section 112) and State Office of Spill Prevention and Response requirements. SoCal staff is familiar with the OSCP and holds annual spill drills to test the effectiveness of their spill response. No action items were identified for this plan.

4.3.1 EPA Spill Prevention Control and Countermeasure (SPCC): The SPCC Plan is an Environmental Protection Agency (EPA) requirement. An electronic version of the SPCC Plan was reviewed for EPA Rule compliance. The plan is prepared following good engineering practices and provides operation, maintenance, and management strategies to lessen the potential of a spill or release of oil products. A licensed professional engineer and company management has approved the SPCC Plan. No action items were identified for this plan.

4.4 Training and Drills

SoCal Holding, LLC has a comprehensive primary training program for new employees and continuing training that includes optional and compulsory training for all personnel. Yearly training in hazard communication, incipient firefighting, personal protective equipment (PPE), Control of Hazardous Energy (Lockout/Tagout), confined spaces, hot work, respiratory protection, hydrogen sulfide, and first aid and CPR is conducted to satisfy Cal OSHA safety and health training requirements.

Facility operations training consists of on-site facility instruction. Operators are trained on the operation of the facility and safe work practices for the process. The on-the-job training process is a strict testing and evaluation method. Both the lead operator and operation's supervisor must sign off on the training and qualification. Next level promotion is based on progression through these operating requirement elements. Successful completion of the elements and a field competency demonstration is required before advancement to the next level can occur. Situational awareness training helps employees recognize abnormal operating conditions as well as what to do if an abnormal event occurs. A computer based training matrix known as Training Mine alerts management and individual personnel of training requirements and keeps a history of all training activities. Some of the basic training provided includes: Confined Space Entry, DOT Pipeline Operations, Oil Spill Drills, First Aid/CPR Medic Inclusive, incipient firefighting, Hazardous Communications, Hazardous Waste Operations and Emergency Response (HAZWOPER), Hot Work Permitting, H_2S, Control of Hazardous Energy (Lockout/Tagout), and Process Safety Management. Compulsory OSHA and spill response training is also provided.

Spill response team members receive training to perform the tasks required of them based on their position and assigned responsibilities. This training consists of classroom instruction, field briefings, tabletop and equipment deployment drills. Exercises, safety meetings, evacuation and environmental training are held throughout the year. Oil spill drills enable response personnel to improve knowledge and skill in the plans and expose any weaknesses in procedures. If SoCal Holding, LLC finds significant deficiencies in the spill plan as a result of a drill or exercise evaluation, the company will record the deficiencies and require changes to the plan. Plan revisions may require additional inspections, drills, and training.

The Health, Safety and Environmental (HSE) Coordinator uses Training Mine to track employee training requirements according to position or job description. Training and drill records are kept and available to regulatory agencies on request. SoCal Holding, LLC's training program meets all requirements for safety management systems and spill response. No action items were identified.

4.5 Safety Management Programs

A SoCal Holding, LLC corporate program that parallels the OSHA Process Safety Management (PSM) standard controls workplace hazards. While OSHA does not consider the Platform Emmy bound by PSM, SoCal Holding, LLC has voluntarily integrated their corporate program into the facility. This practice has reduced incidents involving the release of hazardous materials beyond the facility boundaries.

SoCal Holding LLC's safety policy sets a clear direction for the organization to follow and is part of established business performance goals and commitment to continuous improvement. The objective of their safety policy is to set down in clear-cut terms management's approach and commitment to health and safety at their facilities. Audit team observations and interviews with employees and contractors confirmed that senior management has defined, documented and approved its safety policy. Safety management roles within the organization are coupled with the safety of their personnel. This association is shown in the planning, and carrying out of SoCal Holding LLC's safety policy. SoCal Holding LLC's management audits and reviews the performance of Safety Management Programs (SMPs).

Added assessment and feedback about SoCal Holding, LLC's safety management programs will be provided by the CSLC's Safety Assessment of Management Systems (SAMS), which was conducted following this safety audit. The SAMS also provides significant insights into human factors observations and assessments, which are described in the next section of this report. The SAMS is a separate effort from this safety audit and results are kept confidential between CSLC and the operating company.

Human Factors Audit

SoCal Holding, LLC
Platform Emmy
Huntington Beach

5.0 HUMAN FACTORS AUDIT

5.1 Goals of the Human Factors Audit

The primary goal of the Human Factors 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 follows the safety and spill prevention audit of an operating company's lease facilities. Interview results are considered confidential between CSLC and SoCal Holding, LLC and are provided 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, lessen the risk of environmental accidents, and increase safety. The assessment was divided into nine major categories to examine the following areas (The number of subcategories or areas of assessment for each category are included in parentheses.):

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

Assessment of each of the subcategories is traced from one main question with several of associated and detailed questions to help better define the issues.

The SAMS process is not intended to produce 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 a benchmark for future assessments.

5.2 Human Factors Audit Methodology

The CSLC Mineral Resources Management Division completed the SAMS interviews with SoCal Holding, LLC staff and subcontractors after the safety audit. Interview responses were evaluated according to SAMS guidelines and a separate confidential report summarizing the results was created. The CSLC staff provided the confidential report and offered to make a formal presentation to SoCal Holding, LLC management.

Action Item Matrix

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Platform Emmy
Huntington Beach

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Appendices

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Appendix A
Acronyms

AFH	Arc-Flash Hazard
ANSI	American National Standards Institute
API	American Petroleum Institute
ATS	Automatic Transfer Switch
BAT	Best Achievable Technology
BOE	Barrels of Oil Equivalent
BOPD	Barrels of Oil per Day
BOWD	Barrels of Water per Day
BSEE	Bureau of Safety and Environmental Enforcement
CEC	California Electrical Code
CFC	California Fire Code
CSLC	California State Lands Commission
DCS	Digital Control System
DOT	Department of Transportation
EFI	Equipment Functionality and Integrity
ELC	Electrical
EPA	Environmental Protection Agency
ESD	Emergency Shutdown
ESP	Electric Submersible Pump
ESS	Emergency Support Systems
FOS	Facility Operations Supervisor
FRC	Fire Resistant Clothing
FSL	Flow Safety Low
FSV	Flow Safety Valve
GC	Chromatography
HAZOP	Hazard and Operability Study
HAZWOPR	Hazard Waste Operations and Emergency Response
HB	Huntington Beach
HF	Human Factor
HMI	Human Machine Interface
HSE	Health, Safety and Environmental
H_2S	Hydrogen Sulfide
IES	Illumination Engineering Study
JSA	Job Safety Analysis
KPI	Key Performance Indicator
kVA	KiloVolt Amperes
kW	Kilowatts
LACT	Lease Automatic Custody Transfer
LED	Light Emitting Diode
LEL	Lower Explosive Limit
MC	Metal-Clad
MCFD	Manufactured Standard Cubic Feet per Day (Gas)
MOC	Management of Change
MRMD	Mineral Resources Management Division
MRSC	Marine Spill Response Corporation
MSDS	Material Safety Data Sheets
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
OSCP	Oil Spill Contingency Plan

OSHA	California Occupational Safety & Health Administration
OSPR	Office of Spill Prevention and Response
OSRO	Oil Spill Response Organization
OSRV	Oil Spill Response Vessel
OXY	Occidental Oil and Gas Holding Corporation
PA	Public Address System
PFD	Process Flow Diagram
PHA	Process Hazard Analysis
P&ID	Piping and Instrumentation Diagrams
PLC	Programmable Logic Controller
PM	Preventative Maintenance
PPE	Personal Protective Equipment
PPM	Parts Per Million
PRC	Public Resources Code
PSH	Pressure Safety High
PSHL	Pressure Safety High-Low
PSI	Pounds per Square Inch
PSL	Pressure Safety Low
PSM	Process Safety Management
PSSR	Pre Start-Up Safety Review
PSV	Pressure Safety Valve
RP	Recommended Practice
SAC	Safety Analysis Checklist
SAFE	Safety Analysis Function Evaluation
SAMS	Safety Assessment of Management Systems
SCADA	Supervisory Control and Data Acquisition
SCBA	Self Contained Breathing Apparatus
SCE	Southern California Edison
SMP	Safety Management Programs
SoCal	SoCal Holding, LLC
SOP	Standard Operating Procedure
SPCC	Spill Prevention Control and Countermeasure
SSV	Surface Safety Valve
SSSV	Subsurface Safety Valve
SCSSV	Surface Controlled Subsurface Safety Valve
TEC	Technical
UBC	Uniform Building Code
UFC	Uniform Fire Code
USCG	United States Coast Guard
UPS	Uninterruptable Power Supply
VSD	Variable Speed Drive

Appendix B
Best Practices

1.0	**BEST PRACTICES**	
1.1	Best Achievable Protection/ Best Achievable Technology	PRC 8750
	Inspection of Marine Facilities	PRC 8757
	CSLC Oil & Gas Operations	CSLC 2 CCR Art. 3 - 3.6
2.0	**FACILITY CONDITION AUDIT**	
2.1	Methodology for Audit	
2.2	General Facility Conditions	
	2.2.1 Housekeeping	CSLC 2123 & 6539
	2.2.2 Stairs, Walkways, Gratings, & Ladders	CAL OSHA Title 8 CCR
	2.2.3 Escape/ Emergency Egress/ Exits	CAL OSHA 3215, 22, 25 & 6577
	2.2.4 Labels, Placards, & Signs	CAL OSHA & API RP 14J
	2.2.5 Security	CSLC 2123
	2.2.6 HAZMAT Storage	OSHA 29 CFR 1910.1200
2.3	Field Verification of Plans	
	2.3.1 PFDs	API RP 14J
	2.3.2 P&ID	API RP 14J
	2.3.3 Fire Protection Drawings	API RP 14J (6.4.3)
2.4	Condition and Integrity of Major Systems	
	2.4.1 Piping	ANSI 31.3
	2.4.2 Tanks	CSLC 2132(g)(2), API Spec 12 R1 & API RP 653
	2.4.3 Pressure Vessels	CSLC 2132(g)(2), ASME Boiler & PV Code Sect. VIII & API RP 510 PV Insp Code
	2.4.4 Pressure Relief, PSVs and Flare Sys	CSLC 2132(g)(3), API RP 14J, 520, 521 & 576
	2.4.5 ESP, Pump Units & Wellhead Equip	CSLC 2132(a)(4)
	2.4.6 Fire Detection	CSLC 2132(g)(1)(C) & NFPA
	2.4.7 Fire Fighting Equipment and Systems	CSLC 2132(g)(4) & NFPA
	2.4.8 Combustible Gas & H_2S Detection	CSLC 2132(g)(5) & (6)
	2.4.9 Emergency Shutdown Device	CSLC 2132(g)(1) & API RP14J
	2.4.10 Safety & Personnel Protective Equip	CAL OSHA
	2.4.11 Lighting	CAL OSHA
	2.4.12 Instrumentation, Alarm, & Paging	CSLC 2132(g)(1)&(2), API RP 14J & 8 CCR 5189
	2.4.13 Auxiliary Generator/Prime Mover	CSLC 2132(g)(7)
	2.4.14 Spill Containment	CSLC 2139 & 2140, 40 CFR 112.7(c) & GOV CODE 8670
	2.4.15 Spill Response	CSLC 2139 & 2140 & GOV CODE 8670
	2.4.16 Cranes	CAL OSHA & API RP 2D
2.5	Mechanical Integrity	CSLC 2129(c) & CAL OSHA 8 CCR 5189 (j)
2.6	Offshore Production Safety Systems	CSLC 2132 (g)(1), API RP 14C, 14J, 75 & 29 CFR 1910

	Onshore Production Safety System	CSLC 2132 (g)(1), CAL OSHA 8 CCR 5189, 29 CFR 1910 & API RP 51R
3.0	**ELECTRICAL AUDIT**	
3.1	Goals and Methodology	
3.2	Hazardous Area Electrical Classification Dwgs	RP 500, NFPA 70, 496 & CEC 500 & 501
3.3	Electrical Power Dist. System, Normal Power	
	3.3.1 Electrical Single Line	API RP 540, NFPA 70 & CEC 110 & 500.5
	3.3.2 Electrical Service Capacity	API RP 540, NFPA 70 & CEC 408.4
	3.3.3 Electrical System Design	API RP 540, NFPA 70 & CEC 110, 240 & 408.4
3.4	Elec. Power Equip Condition and Functionality	
	3.4.1 Materials & Installation	API RP 540, NFPA 70 & CEC 110, 314, 490 & 501
	3.4.2 Safety Procedures	API RP 540, NFPA 70 & CEC 110, 314, 490 & 501
	3.4.3 Equipment Maintenance Practices	API RP 540, NFPA 70 & CEC 110, 314, 490 & 501
3.5	Grounding	API RP 540, NFPA 70 & CEC 250, 408.40 & 501.30
3.6	Emergency Electrical Power	API NFPA 70 & 110 & CEC 110 & 700
	3.6.1 System Configuration	API NFPA 70 & 110 & CEC 110 & 700
	3.6.2 Equipment & Component Ratings	API NFPA 70 & 110 & CEC 110 & 700
3.7	Electric Fire Pumps	API RP 14F, NFPA 20, NEC 696 & CEC 110 & 700
3.8	Process Instrumentation	API RP 14F& 540 & NFPA 70
3.9	Standby Lighting	API RP 14F
3.10	Special Systems	
	3.10.1 Safety Control Systems	API RP 14C & CEC 110
	3.10.2 Gas Detection System	API RP 14C
	3.10.3 Fire Detection System	API RP 14F & 14G & API 2001
	3.10.4 Aids to Navigation	Coast Guard & CEC 110
	3.10.5 Communication	API RP 14F & CEC 110
	3.10.6 General Alarm	API RP 14F & CEC 760
	3.10.7 Cathodic Protection	API RP 651, NACE RP 01-76 & 0675 & CEC 110 & 250
4.0	**SAFETY MANAGEMENT PROGRAMS AUDIT**	
4.1	Goals and Methodology	API RP 75 SEMP, OSHA 29 CFR 1910.119 & CAL OSHA 8 CCR 5189
4.2	Operations Manual	OSPR PRC 8758
4.3	Facility Oil Spill Response Plan	OSPR GOV CODE 8670
	4.3.1 EPA – SPCC	40 CFR 112
4.4	Training and Drills	CSLC 2175 (b)(6)(C, D) & (b)(7)(A,B,C,D) & OSPR GOV CODE 8670

4.5	Safety Management Programs	API RP 75 SEMP, OSHA 29 CFR 1910.119 & CAL OSHA 8 CCR 5189

5.0 HUMAN FACTORS AUDIT

5.1	Goals of the Human Factor Audit	
5.2	Human Factors Audit Methodology	CAL OSHA 8 CCR 5189, API RP 75 & CSLC Safety Audit of Mgmt Systems (SAMS)

Appendix C
References

GOVERNMENT CODES, RULES, AND REGULATIONS

CSLC — California State Lands Commission

2123	*Lease Operations on Uplands*
2129	*Article 3.3 -Oil and Gas Production Regulations*
2132	*Production Regulations*
2139	*Oil Spill Contingency Plan*
2140	*Pollution Control and Removal Equipment*
2173	*General Requirements – Operations Manual*
2174	*Manual Review*
2175	*Manual Content*

Cal OSHA — California Occupational Health and Safety

3215	*Means of Egress*
3222	*Arrangement and Distance to Exits*
3225	*Maintenance and Access to Exits*
3308	*Hot Pipes and Hot Surfaces*
3340	*Accident Prevention Signs*
5189	*Process Safety Management of Acutely Hazardous Materials*
6533	*Pipe Lines, Fittings, and Valves*
6551	*Vessels, Boilers and Pressure Relief Devices*
6556	*Identification of Wells and Equipment*

CCR — California Code of Regulations

1722.1.1	*Well and Operator Identification*
1774	*Oil Field Facilities and Equipment Maintenance*
1900-2954	*California State Lands Commission, Mineral Resources Management Division Regulations*

CFR — Code of Federal Regulations

29 CFR	*Part 1910.119 Process Safety management of Highly Hazardous Chemicals*
30 CFR	*Part 250 Oil and Gas Sulphur Regulations in the Outer Continental Shelf*
33 CFR	*Chapter I, Subchapter N Artificial Islands and Fixed Structures on the Outer Continental Shelf*
40 CFR	*Part 112, Chapter I, Subchapter D Oil Pollution Prevention*
49 CFR	*Part 192, Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standard*
49 CFR	*Part 195, Transportation of Liquids by Pipeline*

INDUSTRY CODES, STANDARDS, AND RECOMMENDED PRACTICES

ANSI — American National Standards Institute

B31.3	*Petroleum Refinery Piping*
B31.4	*Liquid petroleum Transportation Piping Systems*
B31.8	*Gas Transmission and Distribution Piping Systems*

	Y32.11	*Graphical Symbols for Process Flow Diagrams*
API		American Petroleum Institute
	RP 2D	*Operation and Maintenance of Offshore Cranes*
	RP 14B	*Design, Installation and Operation of Sub-Surface Safety Valve Systems*
	RP 14C	*Analysis, Design, Installation, and Testing of Basic Surface Safety Systems for Offshore Production Platforms*
	RP 14E	*Design and Installation of Offshore Production Platform Piping Systems*
	RP 14F	*Design and Installation of Electrical Systems for Offshore Production Platforms*
	RP 14G	*Fire Prevention and Control on Open Type Offshore Production Platforms*
	RP 14H	*Use of Surface Safety Valves and Underwater Safety Valves Offshore*
	RP 14J	*Design and Hazards Analysis for Offshore Production Facilities*
	RP 51	*Onshore Oil and Gas Production Practices for Protection of the Environment*
	RP 55	*Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide*
	RP 500	*Classifications of Locations for Electrical Installations at Petroleum Facilities*
	RP 505	*Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Zone 0, Zone 1, and Zone 2*
	API 510	*Pressure Vessel Inspection Code: Maintenance Inspection, Rating, Repair, and Alteration*
	RP 520	*Design and Installation of Pressure Relieving Systems in Refineries, Part I and II*
	RP 521	*Guide for Pressure-Relieving and Depressuring Systems*
	RP 540	*Electrical Installations in Petroleum Processing Plants*
	RP 550	*Manual on Installation of Refinery Instruments and Control Systems*
	RP 570	*Piping Inspection Code*
	RP 651	*Cathodic Protection of Aboveground Petroleum Storage Tanks*
	Spec 6A	*Wellhead Equipment*
	Spec 6D	*Pipeline Valves, End Closures, Connectors, and Swivels*
	Spec 12B	*Specification for Bolted Tanks for Storage of Production Liquids*
	Spec 12J	*Specification for Oil and Gas Separators*
	Spec 12R1	*Recommended Practice for Setting, Maintenance, Inspection, Operation, and Repair of Tanks in Production Service*
	Spec 14A	*Subsurface Safety Valve Equipment*
ASME		American Society of Mechanical Engineers
		Boiler and Pressure Vessel Code, Section VIII, "Pressure Vessels," Div. 1 and 2
ISA		Instrument Society of America
	55.1	*Instrument Symbols and Identification*
	102-198X	*Standard for Gas Detector Tube Units – Short Term Type for Toxic Gases and Vapors in Working Environments*
	S12.15	*Part I, Performance Requirements, Hydrogen Sulfide Gas Detectors*
	S12.15	*Part II, Installation, Operation, and maintenance of Hydrogen Sulfide Gas Detection Instruments*
	S12.13	*Part I, Performance Requirements, Combustible Gas Detectors*
	S12.13	*Part II, Installation, Operation, and Maintenance of Combustible Gas Detection Instruments*

NACE		National Association of Corrosion Engineers
	RPO169	*Control of External Corrosion on Underground or Submerged Metallic Piping Systems*
NFPA		National Fire Protection Agency
	20	*Stationary Pumps for Fire Detection*
	25	*Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*
	70	*National Electric Code*
	704	*Identification of the Hazards of Materials for Emergency Response*
CEC		California Electric Code

Appendix D
Team Members

FACILITY CONDITION TEAM

CSLC – MRMD	Mark Steinhilber David Rodriguez P.W. Lowry David Calderon
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ELECTRICAL TEAM

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TECHNICAL TEAM

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SAFETY MANAGEMENT TEAM

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