

California State Lands Commission

Safety and Oil Spill Prevention Audit

DCOR Platform Eva DCOR LLC, Oil Company



March 2010

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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY
Platform Eva Safety Audit

The objective of each safety audit is to ensure that all oil and gas production facilities on State leases or granted lands are operated in a safe and environmentally sound manner complying with federal, state and local laws, rules, regulations and codes, as well as industry standards considered good engineering practice.

The safety audit of DCOR’s Platform Eva was conducted from March 2009, through November 2009 with the final report being issued in March 2010.

Background

DCOR LLC is a privately owned company categorized under Oil and Gas Exploration and Development, located in Ventura, CA. The company was established in 2001 and incorporated in Texas. Current estimates show this company processes approximately 1100 Bbl./day of platform Eva oil. The facility is located 2.1 miles offshore of Huntington Beach, California on State Oil and Gas Leases PRC 3033.1 and PRC 3413.1 in 58 feet of water.

The platform produces crude oil on a continuous basis and pumps production through an 8” subsea pipeline to Ft. Apache, located on Heil Avenue, Huntington Beach, where it is processed. The crude oil is routed to a dehydration/water processing unit before entering the stock tank. Processed oil is then shipped, via the Lease Automatic Custody Transfer Meter, through the Chevron pipeline to sales. Produced water is released into the Orange County Sanitation District sewer. The platform is manned 24 hours per day and 365 days per year.

Safety Audit Results

The audit revealed 114 action items with two Priority One Action Items. The following table shows the Priority level and the nature of the Action Item as indicated by associated team:

**Action Items
 Priority**

Team	1	2	3	Total
ADM	0	0	2	2
EFI	2	8	43	53
ELECT	0	0	46	46
TECH	0	2	11	13
Total	2	10	102	114

The Equipment Functionality and Integrity Team accounted for 53 of the 114 Action Items or about 46 percent. These deficiencies are mostly Priority Two and Three Action Items typically related to missing inspection records or maintenance problems with the operating equipment. The two Priority One Action Items were about past due internal inspections on vessels V-111 and V-113. Both vessels also had numerous internal U/T inspection spots on the head or the shell that were at or below minimum required thickness. Vessel V-113 is still in service.

Much of the facility is comprised of the originally installed equipment, properly maintained so that it may safely remain in service. The external coatings of tanks, pressure vessels, and piping were observed to be in generally good condition. The firefighting and other emergency and spill response equipment were also observed to be maintained in good working order. Personal protective equipment was observed to be readily available and conscientiously used with Safety Programs in place and effective. The facility control and safety shutdown systems appeared to be designed and installed following the applicable governing codes and standards for the date of first installation and are typical of similar facilities within California.

The Electrical Team accounted for another 46 of the 114 Action Items or about 40 percent of the Action Items. The number of electrical action items identified in this audit was notably lower than in other audits for several reasons. The facility has received ongoing maintenance and upgrades by DCOR's electrician and instrumentation personnel who have typically demonstrated attention to the requirements in the National Electric Code (NEC) and California Electric Code (CEC). There were fewer installation and maintenance Action Items identified as a result. The grand total of the Electrical Team items combined with the EFI Team, accounted for 98 percent of all action Items, the remaining two percent were administrative items.

Conclusion

DCOR's Platform Eva was found to be predominantly in compliance with the MRMD regulations and other applicable regulations, codes and standards. The total number of Action Items identified is typical for a facility of this size, based on safety audits previously conducted. All DCOR personnel were very cooperative in conducting this audit and demonstrated responsiveness, wanting to quickly address the action items identified. When all Safety Audit Action Items have been fully addressed, DCOR's accident and spill prevention will be at a level considered commensurate with risk, comparing favorably with similar offshore production facilities along the coast. DCOR should be commended on their cooperation during this safety audit.

Introduction

1.0 INTRODUCTION:

1.1 Background:

The California State Lands Commission (CSLC) Mineral Resources Management Division (MRMD) staff is conducting detailed safety audits of operators and/or contractors for lands that have been leased for oil and gas production. The objective of these safety audits is to ensure that all oil and gas production facilities on State leases or granted lands are operated in a safe and environmentally sound manner and comply with Federal, State, and local codes/permits, as well as industry standards and practices. The MRMD staff is tasked with providing for the prevention and elimination of any contamination or pollution of the ocean and tidelands, for the prevention of waste, for the conservation of natural resources, and for the protection of human health, safety and property by sections 6103, 6108, 6216, 6301, and 6873(d) of the Public Resources Code (PRC). These PRC sections provide authority for MRMD regulations as well as the existing inspection program and the safety audit program that augments it.

The Safety Audit Program (SAP) was developed in response to Public Resources Code (PRC) 8757 (a), which originated from the Lempert, Keene, and Seastrand Oil Spill Prevention Act. In this Act, existing oil spill prevention programs were considered insufficient to reduce the risk of significant discharges of petroleum into marine waters. This Act also required Marine facilities to employ “best achievable technology” or protection to promote the updating and upgrading of oil and gas facilities. As a result, the CSLC is required to regularly inspect and monitor all marine facility operations for their effects on public health, safety, and the environment. The SAP was established to further prevent oil spills and other undesirable events at oil and gas processing facilities. This program supplements prevention efforts by thoroughly reviewing facility design, maintenance, training, human factors engineering and management activities. Adherence to local, state and federal codes and regulations are also evaluated as part of this program.

The MRMD uses five teams, each with specific focus, to conduct the safety audit. The five teams systematically evaluate the facilities, operations, personnel, and management from many different perspectives. The five teams and their areas of emphasis include:

- 1) Equipment Functionality and Integrity (EFI)
- 2) Electrical (ELC)
- 3) Technical (TEC)
- 4) Administrative (ADM)
- 5) Human Factors (HF)

Each team reports progress and findings periodically throughout their audit evaluations. For each of the teams appropriate company contacts and resources are identified. Each team records findings on an action item matrix for its area with recommended corrective actions and a priority ranking for the specified corrective action.

The audit report highlights the findings of each team and the most significant action items on a system-by-system basis that helps to avoid duplication in findings presented by various teams. It also includes the complete matrix of action items. Draft copies of the audit

report and the matrix of action items are provided to the company frequently throughout the audit. The final audit report is provided to company management during a formal presentation of the results. The presentation affords the opportunity to discuss the findings and the corrective actions proposed in the final report. The MRMD continues to assist the operator in resolving the action items and tracks progress of the proposed corrective actions. Adjustments to the inspection program are then made based on the Safety Audit.

This program could not be successfully undertaken without the cooperation and support of the operating company. It is designed to benefit both the company and the State by reducing the risk of personnel or environmental accidents, damage, and in particular, oil spills. Previous experience shows that the safety assessments help increase operating effectiveness and efficiency and lower cost. History has shown that improving safety and reducing accidents makes good business sense.

1.2 DCOR, LLC History:

Platform Eva began operation in 1963, as an asset of Unocal Oil. Nuevo Energy Company, a Houston based company, purchased Ft. Apache in conjunction with the purchase of Platform Eva in April of 1996 from Unocal Oil. Nuevo Energy exclusively owned and operated the facility until May of 2004 when Plains Exploration and Production Company (PXP) took over after a merger with Nuevo Energy. PXP subsequently entered into a purchase and sales agreement with DCOR, a Texas based LLC, in September of 2004, which involved the sale of PXP assets including Platform Eva and Ft. Apache to DCOR. The sale closed in December of 2004 with the approval of the lease assignment by the State Lands Commission on October 20, 2005.

DCOR is owned entirely by Castle Peak Resources, LLC, a Texas based LLC, which in turn is owned by Crescent Resources, LLC, a California limited liability company. All of these limited liability companies are 99% owned and controlled by Mr. William M. Templeton. DCOR's reported production is approximately 14,000 BOE/D.

The company owns and operates eleven offshore platforms. These include Platform Esther in State Waters and Platform Edith located in Federal Waters, as well as eight other offshore platforms located within the Santa Barbara/Ventura areas.

1.3 Platform Eva Description:

Platform Eva is an offshore oil and gas production facility operating within the boundaries of the State of California in the Huntington Beach Oil Field. The field was discovered on May 24, 1920 when Standard Oil Company struck oil at 2,199 feet. The facility is located approximately 40 miles south of the Los Angeles International Airport and 2.1 miles offshore of Huntington Beach, California on State Oil and Gas Leases PRC 3033.1 and PRC 3413.1, in 58 feet of water.

The platform was installed in 1962 by Union Oil Company and began production in 1963. It is a permanent, fixed base drilling and production platform with a 12-legged jacket structure anchored to the ocean bottom with pilings through each of the legs. The field is currently producing approximately 1100 barrels of oil per day (bopd), 18,500 barrels of water

per day (bwpd), and one hundred fifteen thousand cubic feet per day (115 MCFD) of natural gas.

Platform operations are continually manned by a normal complement of ten personnel, five personnel per 12 hour shift. Visitors and contract personnel vary as to platform operations and maintenance. The primary purpose of Platform Eva is to recover, process, and ship crude emulsion to Fort Apache for further processing and to ship natural gas directly to a Chevron sales pipeline onshore. The platform consists of two primary decks, one small sub deck and a lower level for boat access and diving operations. The upper primary deck is referred to as the Drilling Deck which houses the portable drilling rig, two electric cranes, chemical and equipment storage area, spill booms, safe welding shop, and various other equipment to support drilling / workover operations. The lower primary deck is divided into two sections known as the Well Bay and the Production Deck and is separated by a firewall. The Well Bay contains the production and injection wellheads and their flowlines, as well as associated electrical switchgear. The Production Deck houses the process facilities such as tanks, pressure vessels, pumps, control room, equipment shop, electrical switchgear, and other equipment required to support platform production operations. The lower Sub Deck, located below the Production Deck, contains waste collection tanks and pumps that are used to capture and separate hydrocarbon fluids recovered from process and gravity drains, including rainwater. For the purpose of this report the lower level, boat access deck is referred to as the Dive Deck. The Dive Deck is located just above the water level and consists mainly of grated walkways around the majority of the platform perimeter. It is utilized mainly as a crewboat landing area where personnel are transferred on and off the platform as well as an area for diving operations and it also allows for inspection of the platform legs and under structure.

There are currently 13 active producing wells and 8 water injectors, which includes one gas injection well. Produced fluid is pumped to the surface using downhole electrical submersible pumps (ESP). The field has been produced under waterflood since the 1960s and water cuts are typically high requiring the wells to be produced mechanically. The produced fluid is pumped directly into the gross three-phase separator V-301 where the produced oil, water and gas are separated. There are two test separators since the oil is produced from two separate leases. Production from each lease has its own separator for measurement of production. Wells selected for test are diverted into one of the two well test separators before entering the main separator. After metering, the oil is then transferred to the shipping tank and pumped to shore via the 8" wet oil line to DCOR operated Fort Apache onshore treating and separation facility.

Produced water which is recovered from the gross separator requires additional treatment before it is suitable for injection. The Downstream Enhancement Vessel (DEV) / Surge Tank V-302 operates as an oil / water separator. Water ponded in the DEV / Surge Tank is used for water injection via the Injection Charge Pumps. The Charge Pumps provide pressure to push the water through the injection filters and into the high-pressure pumps. The injection pumps provide the high pressures necessary to force water into the waterflood zones for enhanced oil recovery. The pumps are controlled by a variable frequency drive (VFD) which will allow for speed control of the pumps, thus altering the actual rate of flow in response to the level in the DEV / Surge Tank. Potable water is supplied to the platform through a 4" pipeline from shore.

Casing gas and gas from the separators is scrubbed through an Amine unit that removes the CO₂ from the gas. This process is used to meet the more stringent sales quality specifications of the power utilities that are purchasing DCOR's gas. The CO₂ is disposed via an injection well. The gas is then compressed by the gas compressor (CBA-100) before going through a chiller. A gas chiller (LTS unit) is used to lower the temperature of the gas below the dew point, thus reducing the amount of undesirable condensation and hydrates in the subsea pipeline and the sales pipeline. The gas, which leaves the chiller, is of sales quality. The liquids separated from the gas by the scrubbers are transferred to the shipping tank and mixed with the oil for delivery onshore through the oil pipeline.

Gas produced on DCOR's Platform Edith, in Federal waters, is shipped to Platform Eva via a 6" gas line. Previously, the gas stream was tied in with the Eva gas at the riser and was then transported to shore through the Platform Eva 8" subsea gas pipeline. The tie in has been modified so that the Edith gas is comingled with Eva's gas and is compressed by the second stage of the gas compressor (CBA-100). The Edith gas is then also dehydrated by the chiller unit. Edith's gas CO₂ content and quality does not require processing through the Amine unit (DEA unit). Both Eva' and Edith's gas streams can be diverted through a desiccant unit to remove moisture in the event that the gas chiller is out of operation. The gas then leaves Platform Eva via the 6" subsea gas pipeline to the beach. The comingled gas is ready for direct sales via the tie in to the main gas pipeline.

***Equipment
Functionality &
Integrity***

2.0 EQUIPMENT FUNCTIONALITY & INTEGRITY AUDIT

2.1 Goals and Methodology:

The primary goal of the Safety Audit was to evaluate the design, condition, and maintenance of Platform Eva and associated process equipment. A series of system, equipment inspections, field verifications of key drawings/plans, and technical design review of systems were employed by teams to accomplish this goal. Although the field inspection work was conducted in steps by teams with particular tasks or following checklists, this written evaluation report has been organized on a system basis for convenience of the user.

There were four main teams to conduct this Safety Audit. The Equipment Functionality and Integrity Team (EFI) field checked required Piping and Instrumentation Diagrams (P&IDs), Process Flow Diagrams (PFDs), other key drawings, and evaluated conditions, maintenance, and equipment functionality. A Technical Team (TEC) reviewed design documentation including the Safety Analysis Function Evaluation (SAFE) Chart, Hazards Analysis, and other design considerations and standards. The goal of the Electrical Audit Team (ELC) was to evaluate the electrical systems and operations to determine conformance to the California Electric Code (CEC) and industry standards. Finally, The Administrative Team (ADM) reviewed the various required plans and manuals.

References used in review of facilities include documents published by the American Petroleum Institute (API), National Fire Prevention Association (NFPA), the State of California Electric Code (CEC) and State Lands Commission Regulations. The ELC Team review comments are primarily based on API RP 14F, API RP 500, API RP 540, and the CEC. The drawings used in support of the audit were Electrical Single-lines and Area Classification Drawings for Platform Eva. A more complete list of references is contained in appendix A.3.

The Action Item Matrix at the end of the report provides a detailed listing of the locations and items identified for correction. The matrix is organized in sections. Significant findings are discussed below along with examples of typical items encountered.

2.2 General Facility Conditions:

2.2.1 Housekeeping: Platform Eva appeared clean and well maintained. DCOR's personnel appear to use proper housekeeping methods and keep work areas in order. Employees appear to understand that "good housekeeping" practices increase safety, improve company image, and enhance space utilization. The company's practices have also reduced the quantities on hand of crude oil, chemicals, and wastes on the platform that could potentially reach the ocean.

Platform Eva personnel appeared to be well organized and operations ran smoothly even with excess personnel from drilling aboard during the early portion of the audit. DCOR personnel exhibited dedication to keeping the platform and environment clean and free of debris. The platform control room was organized with appropriate reference materials readily available. A restroom is located adjacent and was found to be in satisfactory condition with no obvious health or sanitation concerns.

2.2.2 Stairs, Walkways, and Gratings & Ladders: All stairs, walkways, and gratings found within DCOR's offshore facilities are of a safe design and construction. These safeguards were in place wherever there was a need to travel between levels and for access to equipment during routine operations. There were two areas of the grating where their condition or maintenance was of concern; one in the well bay and an area of grating near the Monarch crane cab on the top deck. In both places the grating was not fastened to the platform and was unstable. The grating by the Monarch Crane generated a priority 2 deficiency. (EFI 2.15) These deficiencies were corrected prior to this report being issued. There were several portions of the solid guard wall on the exterior of the platform that were heavily corroded and required attention. This too was addressed during the audit. The portable ladders observed were in good usable condition free from oil and grease. Safe work practices define the use and care of lease ladder equipment.

2.2.3 Escape / Emergency Egress / Exits: The escape routes, emergency egress and exits all seemed to be adequately designed for Platform Eva. There are a total of two safe briefing areas, one being located on the top deck of the platform and one being located on the boat landing. The predominant wind direction determines which area is used, the upwind area being the desired location. The type of release determines whether the evacuees remain at a lower level on the platform or seek higher elevation. Emergency evacuation of the platform can be facilitated by either crew boat or helicopter during an extreme emergency. There were no access or egress concerns identified, the only concern noted was that the station bill did not have the safe briefing areas identified on a location map. (EFI 3.22)

2.2.4 Labeling, Color Coding and Signs: The design, application, and use of signs and symbols within the facilities define the specific hazards to workers and/or public. All employees are instructed on what the signs indicate and what if any special precautions are necessary to perform their task safely. Physical hazards such as tripping are identified with yellow coloring and fire protection equipment in red. When labels are missing, incorrect or misleading, workplace error becomes a higher risk and mistakes can occur.

Several action items were issued relating to labeling. The identification of the different alarm buttons at the various alarm stations was difficult to read. The combination of the small lettering as well as weathering caused the label to blend with the background. (EFI 2.09)

2.2.5 Security: Platform Eva has both physical and operational security measures in place to prevent unauthorized entry. The platform is manned twenty-four hours a day, seven days a week with at least two operators present at all times. There is a limited route of access from the boat deck and there is a sufficient number of restricted access signs posted which are clearly visible from all sides. Entry of authorized personnel to the platform is controlled and monitored by platform personnel via authorization to board the crew boat at their shore side departure points. Security gate(s) at the boat deck access to the upper areas of the platform may be considered to further limit unauthorized access from small boats or swimmers. DCOR is in the process of implementing a Platform Protection Plan (PPP), to provide security to their platforms. The plan is coordinated with the Mineral Management Service (M.M.S.), the Department of Homeland Security, and the U.S. Coast Guard.

2.2.6 Hazardous Material Handling and Storage: The storage of flammable and combustible liquids on Platform Eva conforms to Cal-OSHA and NFPA 30 standards. The MSDS are readily available for each hazardous substance on location and can be found inside the Control Room.

Chemical and diesel storage on the platform appears to be properly protected against external damage and leaks. Bulk chemical totes have proper labeling and adequate containment in the event of a spill.

Material Safety Data Sheets (MSDS) containing information on all chemicals used in the workplace were readily accessible to all personnel.

2.3 Field Verification of Plans:

2.3.1 Process Flow Diagrams (PFD): Three Process Flow Diagrams (PFD's) were provided by the operator and were found to be accurate; the drawings have been updated to reflect the recent changes on the platform following the prior audit in 2005.

2.3.2 Piping and Instrumentation Diagrams (P&ID): Comprehensive field verifications of all of the P&ID's were performed for Offshore Platform Eva. These drawings are reasonably accurate, but do require some updating. There were nineteen corrections identified as action items and can be found in section 5, of the Action Item Matrix. Discrepancies in the P&ID's included: sizing errors in valves and piping connections, missing equipment (valves), erroneous set points, and out of service or removed equipment.

In addition, drawings for the electrical systems were reviewed by an outside contractor to verify system safety.

2.3.3 Electrical Area 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. The ELC Team review comments for all hazardous areas are based on API RP 500, API RP 14F and CEC documents.

The purpose of an Electrical Area Classification Drawing is to define the locations of boundaries and areas where specific electrical 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 in order to insure compliance with the CEC. Electrical Area Classification Drawings are required to contain the information necessary for a qualified electrician to perform work in and around classified areas.

The addition, relocation or change in process equipment, lines and valves requires that classified areas be reassessed and that classified boundaries be redrawn. If the Area Classification drawings in some cases do not show the present conditions, all new electrical equipment purchased for installation should meet the most stringent requirements and be rated explosion-proof in accordance with the Code. (ELC 4.05 & 4.06)

Drill Deck: The vent stack at the north side of the platform between columns A and B needs to be located and shown on the Area Classification Plan.

Some major electrical equipment is not shown on the area classification plans. Drill Deck drawing should include: Location of the Drill Rig Transformer adjacent to the tele-communications room and identify crew quarters, galley, weld shop, etc. located below Helipad. (ELC 4.01)

Production Deck: GC-240 Gas Compressor is located in an acoustic enclosure room and would be normally classified as division 1 in accordance with CEC and API RP 500. Ventilation fan with auto-shutdown of compressor on loss of flow is used to achieve division 2 classification as the compressor control panel within the enclosure is not suitable for Division 1.

The plan view does not adequately address division 1 extent around drilling well bay. Recommend a section cut of the well bay per API RP 500 10.4.1 be added.

Sub Deck: Electrical Area Classification Drawings are not available for the Sub Deck. Tanks and pumps located on the Sub Deck (platform level +24-feet) may contain quantities of classified liquid requiring classification of the area and should be included in an area classification plan.

2.3.4 Fire Protection Drawings: Firewater / Foam Utility Flow Diagram and the Platform Station Bill were available and reviewed for Platform Eva. The Firewater / Foam drawing is current and up to date.

The Station Bill was found to have one inconsistency; a priority 3 action item was issued because the station bill does not show the Safe Briefing Area locations on the platform. (EFI 3.22)

Emergency and Evacuation Site Plans were available and reviewed for Platform Eva and were found to be accurate and up-to-date.

2.4 Condition and Integrity of Major Systems:

2.4.1 Piping: The overall condition of piping on Platform Eva appeared to be in serviceable working condition without obvious damage or problem.

2.4.2 Pipelines: The overall condition of the pipelines leaving Platform Eva and going to shore appear to be in good condition. An impressed current system provides protection for controlling external corrosion on sub-sea pipelines, the submerged portions of the well casings, and the submerged platform jacket. Readings of the rectifier's current output and voltage are done on a daily basis. The system appears to be operating correctly and appropriate records are being maintained.

The subsea pipelines also have internal corrosion protective measures. The in-service oil and gas shipping lines from offshore to onshore locations are pigged for maintenance cleaning every month. During the pigging operation, foam pigs are used to remove moisture and debris in order to preserve the life of the pipelines. Internal inspections of the pipeline wall with smart pigs are also used on the oil line to determine corrosion rates and anomalies on a yearly basis. Pressure testing is conducted on the gas pipelines, annually, as required by CSLC regulations to ensure their fitness for continued service. Visual inspections of the sub-sea pipelines are conducted annually on all exposed surface sections. The maximum allowable operating pressure is then established based on these results as well as fitness for continued service. In addition, metal corrosion coupons are used to determine internal corrosion rates and chemical treatment is used to control internal corrosion.

2.4.3 Tanks: Platform Eva has only 3 active tanks. Externally, the tanks appear to be in good condition; this was confirmed by a DCOR provided table showing recent UT data for these tanks. Maintenance records are housed at DCOR's Ventura office and were not reviewed. A sample of the records was sent electronically and was incomplete. No records of any internal inspections were available and no data was provided if future internal inspection have been scheduled or considered. Internal and external tank inspections should be conducted by certified contractors at frequencies consistent with API 653 recommended intervals. (EFI 2.27 & 2.28)

2.4.4 Pressure Vessels: Pressure vessels on Platform Eva, like the tanks above, have all had UT inspection completed within the past two years as provided by the table. Several vessels appear to have multiple UT locations where T-min is below zero years of life remaining. These vessels have been identified in the action item matrix and priority 1 action items have been issued on Vessels V-111 and V-113. (EFI 2.23 &

2.24) These vessels must be reviewed and internal inspection scheduled to verify that they are in working order and can remain in service. If this work has already been conducted, records should be provided so that staff can review this information. Also, several priority 2 matrix items were issued on V-111, V-114, V-301, V-302, and tanks T-103 and 104. (EFI 2.20, 2.25, 2.26, 2.27 & 2.28) There were no files available for review, (construction, repair or alteration histories) during the audit, which generated another priority 2 action item. (EFI 2.22)

The external and internal inspection intervals for all pressure vessels should comply with applicable regulations, recommended practices (API RP 510) and record keeping within a preventative maintenance system.

The exterior conditions of the pressure vessels appeared to have no signs of major coating failure, corrosion or pitting problems and the vessel exteriors appear to be in good condition.

2.4.5 Relief Systems: The piping for both relief vent systems on Platform Eva was evaluated for condition, maintenance, and functionality. Normal venting and process upsets which result in releases of process vapors are directed to safe locations by means of the gas vent system. The gas vent system traps and collects liquids before venting to atmosphere. The system appears to have all the necessary Pressure Safety High (PSH), Pressure Safety Low (PSL), and PSV devices. One major concern for the system is the servicing and condition of the flame arrestors and whether routine scheduled maintenance is being performed. Service of the flame arrestors has been sporadic in the past, and platform personnel have indicated they will soon be included as part of the preventive maintenance program. Frequency of inspection will depend on the service and should occur no less than once annually. A priority two matrix item recommends that manufacturer's directives for flame arrestor maintenance be followed and documented. (EFI 3.24)

The maintenance and servicing intervals for all pressure safety valves (PSVs) were examined for compliance with applicable regulations and recommended standards, as well as, record keeping within a preventive maintenance system. PSVs for Platform Eva are serviced and tested biannually by an outside contractor. Service records were in order with no action items identified.

2.4.6 Instrumentation, Alarm & Paging: 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 enunciators or displays are then used to troubleshoot the cause of a general alarm or shutdown.

General Alarms are required to be audible in all parts of the facility to notify personnel to abandon the facility or respond to an emergency. Alarms are tested

monthly and found to demonstrate adequate performance in the outdoor areas. In Indoor areas, including the switchgear room and MCC room, audible general alarms were difficult to hear. API 14F-11.16.1.2 requires that alarms must be able to be heard throughout a facility. An action item was issued to improve the ability to hear alarms in these locations. (ELC 4.45)

Pressure and temperature gauges are located throughout all processes on Platform Eva. A few gauges appeared to be weathered, but most were readable and seemed to function properly. All "direct read" instrumentation appeared to be in good operating condition. The process control system appears to be an excellent tool for monitoring and notifying personnel of operating conditions.

The standard for the production safety systems on platform Eva is API RP 14C as required by MRMD regulation 2132(g). MRMD regulations also further modify those requirements. The API RP 14C recommended practice requires two levels of protection independent of and in addition to the control devices used in normal process operation. The SAFE chart for Platform Eva was evaluated for appropriate safety devices and adequate levels of safeguards beyond normal process control. The design of the platform was also evaluated for the elimination of hazards and adherence to safe design concepts identified in API RP 14J.

The Technical Design Review found the design of the platform safety system to be fully compliant with API RP 14C. All safety shutdown features were provided as required and the SAFE chart appeared to be current with minor exceptions. There were 10 action items identified that included incorrect Safety Analysis Checklist (SAC) references, mislabeled equipment, and the number of devices in the SAFE Chart not matching what is shown on the P&IDs. (TEC 5.01 thru 5.10) The platform's operating history indicates safe, reliable, and efficient operation of the platform safety system.

2.4.7 Emergency Shutdown System (ESD): The platform is equipped with 6 manual Emergency Shutdown (ESD) stations that 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. MRMD regulations specify that ESD shutdowns be located at the helicopter deck and at the boat landing, and these locations are included. Additional operational safeguards include shutdowns based on pressure or level parameters. These shutdowns protect against overpressure as well as under pressure. Similarly shutdowns protect against abnormal levels. The ESD stations on Platform Eva, along with all other pressure and level shutdowns, are tested monthly by DCOR and witnessed by MRMD personnel to verify calibration and proper operation. The ESD system appears fully compliant with API RP 14C with no problems noted.

2.4.8 Combustible Gas and H₂S Detection: Platform Eva is equipped with fixed gas (LEL) detectors. H₂S detectors are not required and not installed because H₂S levels in the gas stream are negligible. The gas detection sensors are strategically located to provide adequate protection to all operating personnel. The sensors detect

lower explosion level concentrations at 25% by triggering computer generated alarms and a visual warning beacon. There are no items of concern with this equipment.

2.4.9 Fire Detection Systems: Fire detection systems utilized on the platform are designed to detect fires in their earliest stages and alert personnel to the existence of a fire condition on the platform. Fire detectors are tested monthly and records are maintained. Smoke detectors are also employed as required in accommodation spaces. An outside contractor services the platform equipment monthly and maintains proper records. Facility personnel who observe a fire or an alarm may also manually initiate fire suppression systems before automatic sensing devices have activated fixed fire suppression systems.

2.4.10 Fire Suppression: Platform Eva's primary fire pump is a vertical shaft turbine pump with a GM diesel driver that appears to be well maintained. The platform has a back-up fire water pump. In addition to the two fire pumps, the firefighting system includes the distribution piping, hose stations with reels, the deluge/water spray system, and a 200 gallon foam tank. MRMD regulations require that firefighting systems be maintained in accordance with applicable NFPA standards. These standards require that flow tests to measure output and pressure be performed annually on the system components. Distribution piping appears properly supported and adequately maintained. The firewater hose stations are strategically located throughout the platform and appear accessible from other decks. Firewater hose stations appear to provide proper coverage of the target area and typically from two directions.

Dry chemical canister fire extinguishers were found to be compliant with NFPA and Cal OSHA regulations, inspected monthly and serviced annually. Cal OSHA regulations stipulate that employees receive annual training in the use of fire extinguishers, and DCOR's training fulfills this requirement. Several extinguishers were placed on the deck and not hung on hooks outlined on P&ID. A matrix item identifies these locations. (EFI 2.19)

There was a priority 2 action item added to the matrix due a faulty solenoid in the fire fighting system. In the event of a fire, this solenoid is supposed to open, allowing foam to be inducted into the fire fighting system. The solenoid had been found to be leaking by, allowing the foam to be lost, so the foam tank was isolated by closing the inlet and outlet valves around the tank until the solenoid could be replaced. A priority 2 action item was issued to repair the solenoid valve. (TEC 5.11) Some other minor concerns were noted. A fire hose located on the production deck had tape covering a potential hole in hose that needs to be repaired or replaced. (EFI 2.18) Missing covers were noted on several extinguishers located around the platform. (EFI 3.25)

2.4.11 Spill Containment: Spill containment on Platform Eva appeared adequate. Platform Eva maintains a total of 4 bags of assorted sorbent pads for use on the platform as well as 2, 750-foot sections of Series 4300 Expandi-boom, and a 240' sorbent boom to contain any spill that might get into the ocean. These supplies are maintained and inventoried monthly by DCOR operating personnel as part of the MRMD

monthly safety inspection. Platform Eva's containment system described above appears to conform to all spill control and containment (SPCC) regulations.

2.4.12 Spill Response: In addition to Platform Eva's 3 spill containment booms and sorbent pads mentioned above, DCOR maintains additional resources on the platform specifically for spill response that include marine radios, tracking flags and electronic tracking buoys. These are in addition to phone/fax lines, company radios and the Ship Services contracted supply boat. All of the equipment appears to be well maintained and is inventoried as part of the MRMD monthly safety inspection. Spill drills with boom deployment occur semiannually and are held in conjunction with Clean Seas, a marine spill response Company.

2.4.13 Mechanical Lockout-Tagout, Safety, and Personal Protective Equipment (PPE): The Safety Standards (procedures) document covering the lockout / tagout / blockout program was reviewed. The scope, responsibility and procedures outlined in the document appear to be adequate and complete.

DCOR has well-defined Personal Protective Equipment (PPE) Requirements that are enumerated in handouts distributed at all DCOR safety orientations. No PPE deficiencies or infractions were observed on the platform. Only minor deficiencies were noted including a Priority 3 action item due to minor problems with eye wash stations.

2.4.14 Compressed Air System: On Platform Eva there are two air compressors that supply air to a utility and an instrument air receiver. An air dryer is located between the discharge of the compressors and the utility air receiver to remove moisture from the air. The system is designed so that one compressor is used continuously to provide instrument and utility air to both systems throughout the platform, while the other compressor is maintained in standby. They are rotated periodically to divide the workload and improve longevity. Compressed air is fed through the dryer to the utility air receiver, which provides a high air pressure for pneumatic tool connections throughout the platform. The utility air receiver feeds air to the instrument air receiver through a regulator that reduces the air pressure for instrument and control usage. The pressure regulator acts as a check valve by not allowing the air to bleed back into the Utility air receiver.

Air receivers are monitored and maintained following a program of external and internal examination. The external and internal inspection intervals for all air-receivers were analyzed for compliance with applicable regulations, recommended practices, and record keeping within a preventative maintenance system, Cal OSHA 461, 462, 465 & 466. The air receivers are being externally inspected at five-year intervals by a State approved inspector. Inspection records for the air receivers, for the most part, are well maintained and easily accessible

2.4.15 Pump Units, Wellhead Equipment & Well Safety Systems: Surface safety valves (SSV), flow safety valves (FSV) and shutdown valves are installed on flow lines, process lines and pipelines to shutdown and isolate a line if a leak was to occur. SSVs

and FSVs are checked monthly as required by CSLC regulations to ensure they are capable of holding pressure and are not leaking.

2.4.16 Cranes: The cranes on Platform Eva consist of an electric driven Monarch crane and a smaller electric Alaskan crane. The Alaskan crane is used to move items from the top deck down to the Production Deck. Reviews of crane records determined that maintenance and repair records are kept in very good condition and were readily available. There were not any deficiencies noted for the crane records.

Electrical Power Equipment Condition and Functionality:

2.4.17 Electrical Power Distribution Systems: Electric utility service is supplied by Edison at 34.5 kV via submarine cable from shore (Fort Apache). The cable also includes a fiber optic cable for communications; monitoring and control (see section 3.9.5). Electric service is provided under the terms of an I6 contract and includes provision for interruption of service with a 30-minute prior notification.

The service location is at the Edison transformer and 34.5kV outdoor overhead disconnect located near the Aera, Huntington Beach facility. The substation supplies a Cutler-Hammer outdoor power-house (Electro-Center) containing 34.5kV, 1200-amp, 1500MVA Bus and medium voltage metal enclosed vacuum breaker. The breaker supplies power for both platforms EVA and Edith via #1/0 AWG 35kV cable routed in tray and below grade conduit to a nearby vault. Within the vault, the cable is tee spliced (using separable splices) to separate submarine cables for platform Eva and platform Edith.

The submarine cable to platform Eva supplies 34.5kV electrical power to an SF₆ gas insulated three position switch consisting of a one disconnect switch for the 34.5 kV supply and two vacuum interrupter switches. The first vacuum interrupter position feeds a 3000kVA 34.5kV-480Y/277V transformer to supply power to the operating platform main switchgear. The second vacuum interrupter position is connected to a 3000kVA; 34.5kV-600Y/347V transformer located on the drill deck and is used to supply temporary power for drilling rig operations when required. At the time of inspection, there were no drilling operations so the second vacuum interrupter was pad-locked in the open position.

Emergency power on the platform is limited to one 15kW generator that does not support production or process equipment. Future plans call for the addition of a larger backup generator. This should improve the emergency power available on the platform. Various small battery and UPS systems are provided to supply alarms and controls. The single line diagrams indicate provision for a future 150kW generator. Emergency power systems are discussed in Section 3.5.

The electrical single-line drawings sent by DCOR for use in review of facilities included modifications to switchgear and MCCs that are not yet constructed. The single-lines did not match the actual facilities. (ELC 3.3.1.01) Single-line drawings from the

2004 inspection were obtained on-site and, with few exceptions, matched the actual installation. Equipment that will change in the future is identified as follows:

- New MCC-1 replaces the existing MCC-1, MCC-2 & MCC-3 in the existing electrical switchgear room.
- Distribution switchgear MS-PDB2 will be reconfigured to supply the new MCC-1, Breakers feeding old MCC-2 and MCC-3 will become spare.
- Packaged backup generator will be added to replace the existing generator. The new unit will be connected to the existing ATS in the modular main switchgear room.

This new equipment and installation will need to be inspected for conformance with codes and standards when it is installed.

The audit focused on power distribution systems 480 V and above and excluded the lower voltage systems. Discrepancies observed between the installed equipment and the single-line diagrams are listed in the matrix.

Equipment and Component Ratings: The normal power system capacity is adequate based on present usage. Except as noted below and in the matrix, overcurrent protection and wire sizes were found to be appropriate. The application of overcurrent devices with respect to equipment ratings is generally satisfactory.

System Electrical Design Safety: The power system installation, in general, appears to be adequate. In a few cases, misapplication of overcurrent protection devices was noted during spot checks on individual low voltage branch circuits. The matrix includes items identified during inspection.

2.4.18 Auxiliary Generator: The electrical audit noted that the standby generator's size, condition and age were in question. DCOR has been addressing this issue by proposing a replacement which is larger in size to be placed on the Drill Deck in the near future.

Platform Eva presently has the original 15kW, single phase, 240 V/120 V auxiliary generator available for use in the event of a power outage. The generator supplies emergency panel "E" through an aged 70-amp auto-transfer-switch (ATS). Panel "E" supplies the gas & fire detection (General Monitors), public address system, limited emergency lighting, foghorn, navigation lights, general alarms, main control room CRTs, MCC room pressurization blower and power to the UPS. The uninterruptible power supply (UPS) maintains power for the computer (CPUs) and PLC (A-B model SLC 5/03) for process control and monitoring. A separate UPS in the switchgear room supplies both the communications system and a second PLC (A-B model SLC 5/03) also located in the switchgear room. MRMD regulation 2132(g)(7) requires "an auxiliary electrical power supply shall be installed to provide sufficient emergency power for all the equipment required to maintain safety of operation in the event the primary electric power fails". The present 15kW emergency generator arrangement and provisions for

emergency power are only marginally adequate. The existing generator has only limited sufficient capacity to maintain safety of operation in the event of an extended power outage. The reliability of the generator is also questionable due to the age and condition of the generator. The auxiliary generator is located in a corner of the tool room and is difficult to access for maintenance and testing. Although the generator is run under limited load every month, the generator speed governor has required repair in the recent past. Repair and maintenance of the generator is becoming more difficult due to the age of the generator. DCOR has plans for the replacement of the auxiliary generator. Replacement at the earliest possible date is encouraged.

A new auto transfer switch and emergency MCC are already in place, but at this time are fed from normal power only. Future plans include a replacement 150kW emergency generator which will also tie in and feed the MCC.

UPS power for control and safety systems is provided from units in two locations. A MGE Comet EX4.5 UPS complete with bypass & external battery is located in the UPS room above the control room. This unit powers control room equipment and has full load battery capacity of 1-1/2 hours. A Tripp-Lite UPS with two external battery packs is located in the switchgear room and provides power to the communications equipment and PLC located there. The Tripp-Lite UPS has full load battery capacity of 4 hours. A recent UPS upgrade was completed in October 2009, although no additional information is known at this time on the size or type.

2.4.19 Grounding (System and Equipment): CEC Article 250 provides the rules for power system grounding and bonding. The requirements for grounding are established to prevent or reduce the possibility of personnel injury due to shock hazards resulting from elevated touch potential as a result of improper grounding. The rules of grounding also contribute to reduction of equipment damage. Three specific types of grounding are required at the facilities; power system grounding, safety or equipment grounding, and static grounding. Transformers of separately derived systems for 480Y/277 V, 240/120 V, and 208Y/120 V are solidly grounded and satisfy Code requirements for power system grounding.

Article 501-16, Bonding in Class I areas, states that all non current carrying metal parts and enclosures associated with electrical components shall be connected together, bonded, and be continuous between the Class I area equipment and the supply system ground. Bonding shall provide reliable grounding continuity from the load back to the power transformer grounding. The best way to achieve this is to include properly sized equipment grounding conductors with each set of power conductors from the source of power to each of the equipment grounding points and include bonding jumpers at points of discontinuity along the route. Equipment grounding conductors are not installed on all circuits and bonding is achieved through continuity of raceways and fittings. Equipment bonding conductors to major equipment; transformers, switchgear and the like, were installed and appeared adequate.

Static grounding conductors to the portable storage containers (some containing hazardous liquids) on the Drill Deck were found to be not connected. The ground clamps need to be re-attached each time a container is changed out. (ELC 4.15)

2.4.20 Wiring Methods and Enclosures: Given the harsh environmental conditions of the open sea, the overall condition of electrical equipment can be rated as good, except as noted in the Matrix where corrosion of enclosures and raceways is severe. Broken and missing enclosure covers, broken supports, rusted enclosures, deteriorated weatherproof gaskets and missing bolts occur to a small extent throughout the facilities. There are numerous items regarding lack of support or improper support of raceways, enclosures and fittings also listed in the ELC Matrix. (ELC 4.16 thru 4.24, 4.32, 4.33, 4.36, 4.39 4.40, 4.42 4.43, & 4.46)

2.4.21 Electrical Lockout-Tagout and Safety Procedures: Arc-flash labels and PPE protection labels were not installed at the time of the inspection. The arc flash labels are on-order by DCOR and are being shipped to the platform. The ELC team reviewed and marked the electrical equipment that would need labeling with the DCOR electrician during the inspection.

2.4.22 Communication equipment: 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. A UPS capable of providing power for four hours supplies the communications equipment.

Incoming Service: A fiber optic (FO) line is included with the incoming 34.5kV submarine cable from shore (Fort Apache) to Platform Eva. The fiber optic cable is separated from the power cables at the main interrupter switchgear in the switchgear room and routed through a FO/Ethernet converter to the platform Ethernet. Three phone lines and one fax line extend from the converter panel in the switchgear room to the communications shelter on the drill deck where each phone line is converted from digital-to-analog signal for tie in to the existing phone system.

Also in the switchgear room is located the bridge radios for communication to platforms Edith and Esther. Communications equipment in the switchgear room is powered through a local UPS unit. The Tripp-Lite UPS unit with two external battery units has capacity to serve the communications equipment for 4 hours.

A radio base station in the communications shelter with a remote terminal in the control room provides radio communication with the crew boat. Antenna for the system is located on the communications shelter. Emergency power is supplied to a panel in the communications shelter from Emergency Panel "E".

Commercial TV reception to TVs in the control room and crew area is provided by coax cable from an antenna on the heliport access stair. The coax cable has several

long unsupported sections. Recommend cable be supported at approximate 6-foot intervals. (ELC 4.44)

2.4.23 Lighting: Platform Eva lighting is provided by ceiling and pole mounted fixtures with high-pressure sodium vapor bulbs or similar type lighting.

Fixtures are installed in conformance with the NEC and appear to be located to provide adequate lighting levels for the tasks performed. Fixtures are appropriate types and designs for the environmental and hazardous area conditions.

The emergency lighting is powered from the Emergency Panel "E" which receives power from the emergency generator in the event of main power failure. Review of the layout and location of emergency light fixtures indicates adequate provisions for the purpose of safe egress.

Since the platform operates around the clock, seven days a week, operators and maintenance personnel may need to perform work during nighttime hours. Personnel working at night carry flashlights and temporary lighting equipment is available for planned maintenance and larger tasks.

A survey of lighting conditions on platform Eva was completed in 2004. The survey verified proper lighting levels for both normal power and emergency power conditions. General lighting remains essentially the same as at the time of the last inspection and light levels can be assumed to be satisfactory. Temporary rig lights on the Drill Deck that were used for the recent well maintenance project are not operational and are scheduled to be removed.

2.4.24 Process Instrumentation Wiring Methods, Materials and Installation: The process control system uses a combination of pneumatic, hydraulic and electrical instruments and controls. It includes the use of computers, PLC's and relay logic to control and interface with valves, solenoids and pump controllers. Alarms are produced by level, temperature, pressure and flow sensors advising operators of process conditions. A number of instruments are outdated but are in the process of being replaced by modern equivalents.

Two redundant PCs with the CPUs located in the UPS room and the monitors located in the control room provide operator interface to the process control system. Both PCs are linked to the local Ethernet system and run the Wonderware software package. A third PC is also loaded with the software and may be substituted upon failure of either of the two primary PCs.

Two other PCs, one located in the UPS room and the other in the crew quarters allow remote monitoring (mimic), but no control, of the system.

Two Allen-Bradley SLC 5/30 processors (PLCs), one located in control board CP-1 in the control room and the other located in the Switchgear room monitor and

control operations on the platform. PLC-1 in control board CP-1 monitors main control board alarms and functions. PLC-2 in the Switchgear room monitors the well point pressures and flow rates and provides outputs for well shutdown. PLCs are interconnected over the RS-485 Data Hwy. Although a hand drawn "Block diagram" of the system interconnection was made during the safety audit, no formal plans, logic diagrams, or instructions were available and this information should be developed for the platform.

2.4.25 Safety Control Systems: 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. Safety control systems are required to be a combination of devices arranged to safely affect platform shutdown. Electrical safety control systems are energized in normal operations. Failure of external power to a safety control circuit requires an audible or visual alarm to be initiated or operation of the relay system so that it automatically opens the circuit to the equipment as a fail-safe feature.

The safety control system currently requires additional evaluation by DCOR as a result of the recent modifications that enable processing of Edith's gas on Platform Eva. Although the SAFE chart (showing the functions of the safety devices on Platform Eva) was updated for the new equipment added during this modification, some items were overlooked. A priority 2 action item, (TEC 5.12) has been identified that requires the SAFE charts to be updated. The new equipment needs to be more comprehensively integrated into the existing SAFE charts so that all emergency shutdowns are identified, including manual pull stations, fire detection, gas detection, and other safety devices that will cause the shutdown valve for the incoming Edith gas pipeline to close. This is a requirement from both API 14C and the MRMD regulations 2132 (h) (8) for pipelines. It is further recommended that all Emergency Safety Systems as defined in API 14C be grouped together on the SAFE Chart so that their function and effect may be easily compared and verified.

2.4.26 Aids to Navigation: The US Coast Guard requires aids to navigation in offshore facilities close to the shore to include obstruction lights. Dual lamp navigation beacons are provided at the drill deck level on each corner of the platform. All lamps were operating properly at the time of inspection.

2.4.27 Cathodic Protection: The impressed current cathodic protection system consists of two cathodic protection rectifiers located in the MCC room and ten anode locations. Rectifier #1 is connected to the six anodes on the West side of the platform (below the drilling area). Rectifier #2 connects to four anodes on the East side. Both units appear to be working order. Conduits routed on the lower deck to anodes are corroded through in some locations and should be repaired or replaced.

2.5 Preventive Maintenance and Mechanical Reliability:

This section gives a general evaluation of the maintenance program and comments on management's approach to preventative maintenance. This section also provides comments on specific areas of concern.

DCOR uses preventive maintenance as a companion to good housekeeping. They regularly schedule preventive maintenance on equipment, pumps, piping systems and valves which minimize the occurrence of leaks and releases of chemicals and other materials to containment systems, or to the environment. The adoption of these programs appears to have resulted in more efficient operations, reduced regulatory compliance concerns, reduced waste management costs, and reduced spill cleanup costs.

A preventative maintenance plan for critical process equipment such as pumps and compressors appears to be implemented using a computer based maintenance program. DCOR's Mainsaver maintenance program is utilized to schedule some or most preventative and corrective maintenance, track work order status and record costs. But, an ongoing inspection program for vessels, tanks and piping is also in place, yet it does not appear to be interfaced with the Mainsaver program, so preventive maintenance scheduling and record keeping is questionable in several areas.. On Platform Eva, company personnel provide preventative maintenance on rotating equipment while tank and vessel inspections are contracted to an outside contractor. DCOR also uses the team concept to address maintenance needs such as the Equipment Improvement Team (EIT) that identifies a piece of equipment, determines all existing deficiencies and formulates a methodology for restoration.

Administrative Audit

3.0 ADMINISTRATIVE AUDIT

3.1 Goals and Methodology:

The goal of the Administrative Audit (ADM) team was to verify the availability of procedures, contingency plans, and records required by Federal, State and local authorities as well as adherence to good engineering practices. Specific compliance requirements with applicable safety standards were confirmed within the content of the following manuals:

- Standard Operating Procedures (SOP)
- Spill Prevention, Control and Countermeasures (SPCC)
- Oil Spill Response Plan (OSRP)
- Business Emergency Plan (BEP)

A review of company policies and records was also conducted, as well as observing the application of these policies and procedures in the field.

3.2 Operations Manual:

Platform Eva has an Operations Manual as well as Standard Operating Procedures (SOPs). DCOR's SOPs are written in a concise, step-by-step, easy-to-read format. The information within the manual is clear and not overly complicated. The SOPs were consistent with the process safety information and written with sufficient detail so that employees can reproduce the procedure(s) unsupervised. The SOPs address steps for each of the following:

- Operating Phases
- Operating Limits
- Safety and Health Considerations
- Safety Systems and their Functions

SOPs are systematically reviewed on a yearly basis to ensure that the policies and procedures are current and appropriate. A review date is added to the SOPs and any revised SOP or no longer followed process is withdrawn from the manual. Hard copies of the SOPs are readily accessible for reference in Platform Eva's control room.

3.3 Spill Response Plans:

DCOR has an extensive Oil Spill Response Plan (OSRP) that fulfills the requirements of the California Department of Fish and Game, Office of Spill Prevention and Response (OSPR) regulations, CCR Title 14, reg 817. This plan is coordinated with the Federal Spill Prevention, Control, and Countermeasures Plan (SPCC) requirements that are contained in the EPA regulations, Title 40 CFR 112.

DCOR's OSRP provides spill responders with detailed information needed to prevent or minimize the overall impacts of an oil spill at Platform Eva. It identifies the procedures and resources needed to implement the plan, specifies priorities for protection of the environment and clean up, and contains all the relevant information needed to respond to a spill in a clear, concise and easy-to-use format. The plan also contains strategies for sampling, monitoring, training, conducting exercises, and plan reviews. However, the plan contained several out-of-date drawings from a prior facility owner. (ADM 6.01)

The SPCC Plan is well thought out and approved by DCOR's management. The plan puts into place existing containment and other countermeasures to prevent oil from reaching navigable water. The SPCC Plan also appears to conform to the oil spill prevention and containment procedures established for onshore oil processing facilities. In addition, inspections, evaluations, and testing of facility equipment by DCOR personnel has improved their discharge prevention strategy. However, since the SPCC rule is a performance-based regulation it relies on the use of good engineering practices, based on the professional judgment of a registered professional engineer (PE). While the plan includes a demonstration of management's approval, it has not been certified by a PE (40 CFR 112.3(d)). Because this certification is missing from DCOR's SPCC Plan, an action item was issued recommending review by a PE. (ADM 6.00) A copy of the entire SPCC Plan is maintained at the facility and is available for on-site review and inspection during normal business hours.

The Business Emergency Plan (BEP) and the Emergency Response Plan (ERP) was reviewed in conjunction with DCOR's other two locations, Ft. Apache and Platform Esther. No deficiencies were noted. Both manuals were up to date.

3.4 Additional Documents, Plans and Records:

DCOR has a number of other regulatory agency required documents, plans, and records that are available at the Platform Eva's operating location. Some of these policies include an injury and illness policy, Environmental Health and Safety (EHS) manual, and hazardous materials response plans just to mention a few.

The EHS Manual appeared to be a well developed and suggested a sound safety culture and management within the company. The Manual defines DCOR's policies in regards to environmental issues, as well as personnel health and safety policies. It also addresses safety orientation training that is required for contractors and visitors to ensure they are familiar with DCOR's EHS policies before entering Ft. Apache. All training is documented and records are kept on location. The EHS Manual also defines policies and procedures for operating tasks such as lock-out/tag-out (LO/TO) and confined space entry.

DCOR's has a written Management of Change (MOC) policy that addresses facility as well as operational changes. Any change to the facility, documentation, personnel or operations is captured by this process. This management system ensures

that the safety, health and environmental risks arising from these changes are evaluated, managed and controlled. Maintenance records show that this management system was used during recent wastewater tank repairs.

3.5 Training, Drills and Applications:

DCOR's training records are accurate and current. The company has a comprehensive ongoing education program that includes refresher and mandatory training for its personnel. A sample of the training provided includes classes on, confined space entry, DOT pipeline operations, oil spill drills, hazard communication, HAZWOPER, hot work permitting, H₂S, and lock-out/tag-out. This program also includes mandatory training as required by OSHA and the Office of Oil Spill Prevention and Response (OSPR). In addition, employees are retrained when there is a change to the layout or design of the facility, when new equipment, hazardous materials, or processes are introduced that affect evacuation routes, or when new types of hazards are introduced that require special actions.

Spill drills are conducted per schedule and the results are reviewed by management. Evacuation, and other safety and environmental training, drills, and exercises have also been instituted and documented. Both monthly and morning safety meetings are conducted as scheduled. General and topic specific monthly and weekly safety meetings, training, and pre-job safety meetings are recorded and records of the meetings are maintained.

Human Factors Audit

4.0 HUMAN FACTORS AUDIT:

4.1 Goals of the Human Factors Audit:

The primary goal of the Human Factors Team is to evaluate the operating company's human and organizational factors by using the Safety Assessment of Management Systems (SAMS) interview process. The SAMS is planned to be conducted following audits of the three state lease facilities. Results of this team's work will be considered confidential between CSLC, and DCOR and will be contained in a separate report.

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

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

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

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

4.2 Human Factors Audit Methodology:

The CSLC Mineral Resources Management Division will schedule the SAMS interviews with DCOR staff and sub-contractors after completion of the other DCOR State leases. The assessors will evaluate the responses based on SAMS guidelines and develop a separate confidential report. The MRMD staff will provide the confidential report accompanied by a formal presentation that summarizes the report to DCOR management.

Appendices

TEAM MEMBERS

EQUIPMENT FUNCTIONALITY AND INTEGRITY TEAM

CSLC – MRMD	Mark Steinhilber Mark LeClair Craig Webster
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DCOR	Mike Finch Rob Hurley Angelo Nicotera Tina Wiegman Shane Grinnell Dean Mesner
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TECHNICAL TEAM

CSLC – MRMD	Mark Steinhilber Mark LeClair Craig Webster
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DCOR	Mike Finch Rob Hurley Angelo Nicotera Tina Wiegman Shane Grinnell Dean Mesner
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ADMINISTRATIVE TEAM

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DCOR	Mike Finch Rob Hurley Angelo Nicotera Tina Wiegman Shane Grinnell Dean Mesner
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ELECTRICAL TEAM

Power Engineering Services (PES)	Doug Effenberger Larry Collins
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DCOR	Dennis Conley Emily Conley
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ACRONYMS

ADM	Administration
ANSI	American National Standards Institute
API	American Petroleum Institute
BAT	Best Achievable Technology
CEC	California Electrical Code
CFC	California Fire Code
CSLC	California State Lands Commission
EFI	Equipment Functionality and Integrity
ELC	Electrical
ESD	Emergency Shutdown
ESP	Electric Submersible Pump
FSL	Flow Safety Low
FSV	Flow Safety Valve
HF	Human Factor
H ₂ S	Hydrogen Sulfide
kVA	KiloVolt Amperes
kW	Kilowatts
LACT	Lease Automatic Custody Transfer
MOC	Management of Change
MRMD	Mineral Resources Management Division
NEC	National Electrical Code
NFPA	National Fire Protection Association
OSHA	California Occupational Safety & Health Administration
OSPR	Office of Spill Prevention and Response
P&ID	Piping and Instrumentation Diagrams
PHA	Process Hazard Analysis
PM	Preventative Maintenance
PPE	Personal Protective Equipment
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
PSV	Pressure Safety Valve
RP	Recommended Practice
SAFE	Safety Analysis Function Evaluation
SAC	Safety Analysis Checklist
SAMS	Safety Assessment of Management Systems
SCADA	Supervisory Control and Data Acquisition
SCBA	Self Contained Breathing Apparatus
SCE	Southern California Edison
SSV	Surface Safety Valve
TEC	Technical
UBC	Uniform Building Code
UFC	Uniform Fire Code
VSD	Variable Speed Drive

REFERENCES

GOVERNMENT CODES, RULES, AND REGULATIONS

Cal OSHA	California Occupational Health and Safety
3215	<i>Means of Egress</i>
3222	<i>Arrangement and Distance to Exits</i>
3225	<i>Maintenance and Access to Exits</i>
3308	<i>Hot Pipes and Hot Surfaces</i>
3340	<i>Accident Prevention Signs</i>
5189	<i>Process Safety Management of Acutely Hazardous Materials</i>
6533	<i>Pipe Lines, Fittings, and Valves</i>
6551	<i>Vessels, Boilers and Pressure Relief Devices</i>
6556	<i>Identification of Wells and Equipment</i>
CCR	California Code of Regulations
1722.1.1	<i>Well and Operator Identification</i>
1774	<i>Oil Field Facilities and Equipment Maintenance</i>
1900-2954	<i>California State Lands Commission, Mineral Resources Management Division Regulations</i>
CFR	Code of Federal Regulations
29 CFR	<i>Part 1910.119 Process Safety management of Highly Hazardous Chemicals</i>
30 CFR	<i>Part 250 Oil and Gas Sulphur Regulations in the Outer Continental Shelf</i>
33 CFR	<i>Chapter I, Subchapter N Artificial Islands and Fixed Structures on the Outer Continental Shelf</i>
40 CFR	<i>Part 112, Chapter I, Subchapter D Oil Pollution Prevention</i>
49 CFR	<i>Part 192, Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standard</i>
49 CFR	<i>Part 195, Transportation of Liquids by Pipeline</i>

INDUSTRY CODES, STANDARDS, AND RECOMMENDED PRACTICES

ANSI	American National Standards Institute
B31.3	<i>Petroleum Refinery Piping</i>
B31.4	<i>Liquid petroleum Transportation Piping Systems</i>
B31.8	<i>Gas Transmission and Distribution Piping Systems</i>
Y32.11	<i>Graphical Symbols for Process Flow Diagrams</i>
API	American Petroleum Institute
RP 14B	<i>Design, Installation and Operation of Sub-Surface Safety Valve Systems</i>

- 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 *Classification 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, Parts 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," Divisions 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	<i>Part II, Installation, Operation, and Maintenance of Combustible Gas Detection Instruments</i>
NACE	National Association of Corrosion Engineers
RPO169	<i>Control of External Corrosion on Underground or Submerged Metallic Piping Systems</i>
NFPA	National Fire Protection Agency
20	<i>Stationary Pumps for Fire Detection</i>
25	<i>Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems</i>
70	<i>National Electric Code</i>
704	<i>Identification of the Hazards of Materials for Emergency Response</i>
CEC	California Electric Code