PROCESS SAFETY MANAGEMENT/ RISK MANAGEMENT PLAN COMPLIANCE AUDIT

Richmond Refinery
Chevron —Global Manufacturing

Report of Audit Findings

Audit Dates: February 8 - 19 and May 10 – 21, 2010

Report Date: August 17, 2010

Prepared for:

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August 17, 2010

Mr. Mike Coyle
Refinery Manager
Richmond Refinery
Chevron —Global Manufacturing
841 Chevron Way
Richmond, CA 94802

Subject: ***Process Safety Management/Risk Management Plan Compliance Audit Report – Richmond Refinery***

Dear Mr. Coyle:

Enclosed is the report of the results of the Process Safety Management (PSM)/Risk Management Plan Compliance Audit for Chevron's Richmond Refinery located in Richmond, California. The audit was conducted in two parts, February 8-19 (Mechanical Integrity) and May 10-21, 2010 (remainder of the elements).

The Process Safety & Risk Team of Chevron's Energy Technology Company (ETC) appreciates the opportunity to provide continued services to Chevron's Global Manufacturing Company, and specifically the personnel at the Richmond Refinery. We especially acknowledge the assistance provided by Refinery personnel (specifically, Karen Draper, Gary Ryan and several of the WPIAs) during the audit process.

After reviewing this report, a member of Refinery Management should sign the attached certification that the audit has been completed and that a report of findings has been developed in accordance with the U.S. Occupational Safety and Health Administration (OSHA) PSM Standard 29 CFR 1910.119(o)(1). Please prepare an action plan for responding to audit findings, assign a responsible party to address each finding, and track each resolution to completion. Please communicate these activities to Dan Teichman, Global Manufacturing's General Manager of Process Safety, Reliability and Energy Management.

Once again, thank you for the hospitality extended to the audit team during our on-site activities. If you have any questions regarding report content, please contact me at (713) 954-6987 or via e-mail at tbbb@chevron.com .

Sincerely,

Tim D. Blackford, CSP
Staff Fire & Process Safety Engineer
Chevron Energy Technology Company
Safety Technology Unit

Attachments

PSM COMPLIANCE AUDIT
CERTIFICATION

An audit was conducted at Chevron's Richmond Refinery from February 8-19 and May 10-21, 2010, to evaluate compliance with the provisions of applicable Process Safety Management Standards (29 CFR 1910.119 and 8 CCR, sec 5189) and the accident prevention program provisions of applicable Risk Management Programs [40 CFR Part 68, and California Accidental Release Prevention (CalARP) Program 19 CCR, sec. 2735] and to verify that the Refinery's PSM procedures and practices developed under the applicable standards are adequate and are being followed as of the date of the audit.

Michael E Coyle
Printed Name – Richmond Refinery Management Authority

Richmond Refinery General Manager
Printed Title – Richmond Refinery Management Authority

Signature -- Richmond Refinery Management Authority

Executive Summary

Overview

A Process Safety Management (PSM) Compliance Audit was conducted at Chevron's Richmond Refinery between the dates of February 8-19 and May 10-21, 2010. The Richmond Refinery has crude oil processing capability of 243,000 bpd and manufactures a wide range of products. These product streams are shipped via various transportation mechanisms to downstream customers. The facility is located on Chevron property in Richmond, California.

The audit was conducted by a team of Chevron personnel, and supplemented with external consultants, having significant experience with refinery operations, PSM systems, and general auditing techniques. The Audit was coordinated by Tim Blackford, a member of Chevron's Energy and Technology Company (ETC) – Process Safety & Risk Team. The audit evaluated facility compliance with applicable requirements of the U.S. Occupational Safety & Health Administration (OSHA) PSM Standard, 29 CFR sec. 1910.119, and California OSHA PSM Standard, Title 8 CCR, sec. 5189; and applicable requirements of the U. S. Environmental Protection Agency (EPA) Risk Management Program (RMP) Rule 40 CFR Part 68, and the California Accidental Release Prevention (CalARP) Program, 19 CCR sec. 2735, as they apply to specific areas of the facility covered by the standards. These requirements apply to facilities that store or handle quantities of flammable liquids in excess of 10,000 lbs.

As noted above, both the U.S. and California State OSHA PSM Standards and the U.S. EPA and California RMP requirements have, as a central component, the implementation of accidental release prevention programs. Historically, such programs were called "process safety management" programs. In subsequent sections of this report, the term "PSM" will be used to refer to the accidental release prevention program requirements under either, or both, U.S. or state requirements.

Background

The U.S. OSHA PSM Standard requires implementation of 14 Prevention Program Elements and includes a requirement that compliance with the standard be confirmed by audits conducted at an interval not to exceed three years. The RMP Rule includes similar accident prevention program requirements for processes covered under the Rule's Program Level 3.

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Scope and Approach

The audit covered all elements of both the PSM Standard, and the analogous requirements of the RMP Rule (See Table 1.2), as applied to the equipment and processes at the facility; and, where required by the Standards, those supporting facilities that might affect the covered processes.

Through a combination of field inspections, document reviews, and interviews of facility personnel, the audit team evaluated compliance with the PSM Standard. As the basis for conducting the 2010 audit, the team used the current audit protocol endorsed by ETC for conducting Process Safety Management Audits at covered facilities within the State of California. The compliance section of this protocol is primarily based upon that provided in the U.S. OSHA PSM compliance directive[1]. Additional details on the conduct of the audit are provided in Section 2.

To be "in compliance" with the Compliance Audit element of the PSM standard, employers must "verify that procedures and practices developed under the standard are adequate and are being followed" (29 CFR 119(o). Chevron ETC auditors define "adequate" as meeting the intents and purposes of the regulation, which includes effective implementation and programs designed to support sustainability throughout the life of the process.

Results

Based on the review of documents, interviews, and observations, the audit team assessed the adequacy and implementation of each PSM element and found that all of the elements are being addressed at the Richmond Refinery. The audit team identified 12 findings. The audit results are summarized in Table 1.1 below.

[1] CPL 2-2.45A (CH-1), *Process Safety Management of Highly Hazardous Chemicals—Compliance Guidelines and Enforcement Procedures,* Revised 9/13/94.

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Audit Results – 2010
Chevron – Global Manufacturing
Richmond Refinery

PSM Element	Findings
Employee Participation	0
Process Safety Information (PSI)	1
Process Hazard Analysis (PHA)	0
Operating Procedures	1
Training	0
Contractors	0
Pre-startup Safety Review (PSSR)	1
Mechanical Integrity	6
Hot Work Permit & Other Safe Work Practices	0
Management of Change (MOC)	3
Incident Investigation	0
Emergency Planning and Response	0
Compliance Audits	0
Trade Secrets	0
Risk Management Plan	0
TOTAL	**12**

Table 1.1 Audit Results

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1. Introduction

1.1 Purpose

This report summarizes the results of the 2010 PSM/RMP Compliance Audit conducted at Chevron's Richmond Refinery in Richmond, California. The audit:

- Assessed facility performance against the requirements of the U.S. OSHA PSM Standard 29 CFR sec. 1910.119; and, the California PSM Standard, Title 8 CCR, sec. 5189, and applicable related requirements, including:
  - Emergency action plans, 29 CFR 1910.38(a)
  - Confined space entry, 29 CFR 1910.146
  - Hot work, 29 CFR 1910.252(a)
  - Hazard communication, 29 CFR 1910.1200(g)
- Assessed compliance with applicable recognized and generally accepted good engineering practices, including:
  - API RP 500, *Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Division 1 and Division 2*
  - API RP 570, *Inspection, Repair, Alteration, and Re-rating of In-Service Piping Systems*
  - API RP 752, *Management of Hazards Associated with Location of Process Refinery Buildings*
  - API RP 753, *Management of Hazards Associated with Location of Process Refinery Portable Buildings*
  - ASME *Boiler and Pressure Vessel Code*
- Assessed facility performance against applicable Chevron PSM policies and procedures;
- Addressed the requirement in 29 CFR 1910.119(o) that compliance audits be conducted at least every three years; and,
- Provides a report of the audit findings, to not only satisfy 29 CFR 1910.119(o), but to also facilitate improvement in the area of safe, reliable operation of the Richmond Refinery.

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1.2 Scope

The audit covered all elements of the U.S. and California PSM Standards and the analogous requirements of the RMP Rules as they applied to the equipment and processes at the facility, and, where required by the Standard, those supporting facilities that might affect the covered processes. The U.S. PSM Standard addresses fourteen management program elements, as shown in Table 1.2 below. For RMP Program Level 3 processes, the accidental release prevention program requirements are largely identical to the PSM Standard requirements, with two exceptions as shown in the table. Under the RMP Rule, the Emergency Planning and Response requirements are addressed separately from the prevention program portion of the rule. Additionally, the RMP rule Trade Secrets element is addressed under 40 CFR Part 2. The California State PSM Standard generally has the same requirements as the U.S. OSHA Standard, with a few exceptions and a different organization of specific element components. The primary differences between the OSHA and California OSHA PSM Standards are the inclusion of an Injury and Illness Prevention Program in the California Standard, and non-inclusion of the Compliance Audit and Trade Secret elements.

Program Element	U.S. OSHA 29 CFR 1910.119 Paragraph	California OSHA 8 CCR Section 5189 Paragraph	EPA 40 CFR 68 Program 3
Employee Participation	c	p	68.83
Process Safety Information	d	d	68.65
Process Hazard Analysis	e	e	68.67
Operating Procedures, including Safe Work Practices	f	f	68.69
Training	g	g	68.71
Contractors	h	h	68.87
Pre-startup Safety Review	i	i	68.77
Mechanical Integrity	j	j	68.73
Hot Work Permit	k	k	68.85
Management of Change	l	l	68.75
Incident Investigation	m	m	68.81
Emergency Planning/Control/Response	n	n	68.95, not part of the prevention program under RMP
Audits	o	Not Addressed	68.79
Trade Secrets	p	Not Addressed	Covered by 40 CFR 2.
Injury and Illness Prevention Program	Not Addressed	o	Not Addressed

Table 1.2 – Comparison of Standards

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2. Conduct of the Audit

2.1 General Audit Technique

The audit was performed using methods consistent with the guidance provided in the AIChE, Center for Chemical Process Safety publication, *Guidelines for Auditing Process Safety Management Systems*.

The audit consisted of a review of the written PSM procedures and documentation resulting from the PSM activities, interviews with facility personnel, and field observations. These audit techniques reviewed the management systems in place to determine if compliance involving each element had been achieved, and whether the systems would reasonably support sustained compliance.

The audit team used as an audit guide the compliance section of the current audit protocol endorsed by ETC for conducting Process Safety Management Audits at covered facilities within the State of California, which is based upon the U.S. OSHA PSM compliance directive, CPL 2-2.45A (CH-1, dated 9/13/94).

2.2 PSM Compliance Audit Requirements

The U.S. OSHA PSM Standard contains five distinct requirements under the Compliance Audit element, in paragraph 1910.119(o), as follows:

PSM Audit Requirements (verbatim excerpt from 29 CFR 1910.119)

(o) Compliance Audits.
- (1) Employers shall certify that they have evaluated compliance with the provisions of this section at least every three years to verify that the procedures and practices developed under the standard are adequate and are being followed.
- (2) The compliance audit shall be conducted by at least one person knowledgeable in the process.
- (3) A report of the findings of the audit shall be developed.
- (4) The employer shall promptly determine and document an appropriate response to each of the findings of the compliance audit, and document that deficiencies have been corrected.
- (5) Employers shall retain the two most recent compliance audit reports.

The manner in which these five requirements were addressed is documented as follows:

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2.2.1 Evaluation of Compliance within Three-year Interval

The previous PSM compliance audit at the Richmond Refinery was conducted in June, 2007, with the final report dated July 25, 2007. The present audit, conducted February 8-19 and May 10-21, 2010, satisfies the requirement that such audits be conducted within a time period of "at least every three years".

2.2.2 Audit Team

The audit team was comprised of individuals with varied backgrounds. Mr. Tim Blackford, Staff Fire & Process Safety Engineer in Chevron's Energy Technology Company (ETC) served as the audit team leader, who facilitated and documented the Compliance Audit of the Richmond Refinery. Mr. Blackford is a degreed Fire Protection & Safety Engineer with broad experience in chemical and refinery operations and PSM implementation, trained in PSM auditing, and has conducted, led, or participated in numerous PSM audits. The other members of the audit team included:

- Mr. Roger Hansen, Chevron Business Improvement Network Team Leader - Fixed Equipment
- Ms. Carol-Ann Laughlin, Leader, Chevron Reliability Center of Excellence
- Mr. Marty Bowin, OE Audit Consultant
- Mr. David Kehn, HES Advisor, Global Upstream & Gas
- Ms. Paula Hogan, PSM & OE Manager, Pembroke Refinery
- Mr. Mark Miller, OEAG Advisor
- Mr. Carlos Adams, OEAG Advisor
- Mr. Jeff Todd, PSM Compliance Team Leader, Pascagoula Refinery
- Mr. Rick Curtis, Sr. Risk /Reliability Engineer, ABS Consulting

Mr. Blackford provided an overview of PSM auditing to the team prior to the audit and guidance to the auditors throughout the conduct of the audit. Two of the team members have experience in refinery processing units, while all of the team members have significant experience in an auditing environment and subject matter expertise in the areas they audited. Auditor Qualification Forms providing detailed qualifications and experience levels of each auditor can be found in Appendix A.

The audit team members' assignments are shown in Table 2.1 on the following page. Auditor assignments were made based upon the auditors' relevant experience and knowledge in the PSM elements they were to audit. The make-up of the team adequately addresses the second compliance audit requirement.

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Mr. Mark Miller Safe Work Practices	Ms. Paula Hogan Incident Investigation
Mr. Jeff Todd Pre-Startup Safety Reviews Management of Change	Mr. David Kehn Process Hazards Analysis Process Safety Information
Mr. Marty Bowin Compliance Audits	Mr. Roger Hansen Ms. Carol-Ann Laughlin Mechanical Integrity
Mr. Carlos Adams Contractor Safety	Mr. Tim Blackford (Team Lead) Employee Participation Trade Secrets Emergency Response & Planning RMP issues
Mr. Rick Curtis Operating Procedures Training	

Table 2.1 Auditor Assignments

2.2.3 Audit Report

This report documents the basis for and findings of the audit team to the personnel and management of the Richmond Refinery.

2.2.4 Follow up to Findings

Refinery management will determine and document an appropriate response to each of the audit team's findings in the form of an Action Plan. Responses to the findings and supporting documentation to verify implementation of each finding should be forwarded to the facility's Process Safety Management Coordinator for review and incorporation into a final written record of completed actions, indicating that the findings were fully addressed. Periodic updates of the Action Plan will be transmitted to Global Manufacturing's General Manager of Process Safety Management & Reliability.

2.2.5 Report Retention

The Richmond Refinery will retain the two most recent reports of its PSM audit findings (this report and that of the 2007 audit).

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3. Results

The purpose of a PSM Compliance Audit is to determine if the facility program, as described in facility procedures, is adequate to implement the ***intent*** of the PSM Standard. Since the PSM Standard is a "performance standard", outlining requirements in broad terms, OSHA anticipates that facility procedures may be more detailed and, in some cases, may exceed the literal requirements of the Standard. In other words, OSHA expects the facility to provide the detail necessary to describe a program that is necessary and sufficient to implement the ***intent*** of the Standard. OSHA has taken the position that if a facility creates a PSM-related requirement, then that requirement is necessary to implement PSM to meet the needs unique to the facility. Consequently, the audit team was charged with verifying compliance with requirements described in facility procedures as well as the literal requirements of the PSM Standard. The audit team's findings are written in the form of an "exception" report.

A finding was identified if the audit team perceived an omission in the written PSM procedures, a failure to follow the procedures, or a significant lack of understanding on the part of interviewed employees with regard to their responsibilities concerning procedures applicable to their job function. The balance of this section of the report includes the audit team's findings, broken down by PSM element. Each finding cites the applicable regulatory provision (e.g., 29 CFR and/or 8 CCR) or refinery procedure addressed by the finding.

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3.1 Employee Participation

Item ***Findings***

All provisions in section reviewed. The audit team did not identify any compliance exceptions with respect to this element.

3.2 Process Safety Information (PSI)

All provisions in section reviewed. The following exception was identified by audit team:

Item ***Findings***

3.2.1 A copy of the process safety information and communication shall be accessible to all employees who perform duties in or near the process. [8 CCR Section 5189 (d)(4)]

Based on interviews and document review, some process safety information found not current or accurate during PHA revalidation was not available until after an MOC was written and the data was electronically updated. "Owner" responsibilities and updating workflow were not clear on the responsibility to communicate the means to access this "redlined" PSI during the target 30 days it takes to update the drawings electronically.

3.3 Process Hazard Analysis (PHA)

All provisions in section reviewed. The audit team did not identify any compliance exceptions with respect to this element.

3.4 Operating Procedures

All provisions in section reviewed. The following exception was identified by audit team:

Item ***Findings***

3.4.1 The employer shall develop and implement written operating procedures that provide clear instructions for safely conducting activities involved in each process consistent with the process safety information and shall include:..Operating limits: (1) consequences of deviation from operating limits and (2) steps required to correct and/or avoid deviation.. [8 CCR Section 5189 (f)(1)(B)(1&2)]

The audit team reviewed the following operating procedures in the electronic operating manuals (EOM) software tool to determine whether the procedures contained all of the required content:

- RLOP: PH/NH3/H2S18P-NP-2001
- B&S: TBCT9026

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- Cracking: FCC-NP-3002
- D&R West: 4RH-NP-2015
- North ISOMAX:
- South ISOMAX: TKC-NP-3004
- U&E: HBCN2010

Not all of the operating procedures reviewed contained statements addressing the potential consequences of deviation from all safe operating limits, nor did they consistently address the steps necessary to correct or avoid deviation. The refinery had developed comprehensive consequence of deviation (CoD) tables in the EOM for each of the processes that were evaluated by the audit team. However, the CoD tables do not all contain information that would assist an operator to clearly understand the consequences that may occur if they fail to follow the procedure as written and/or operate outside predetermined safe operating limits. Using the FCC CoD table as an example, the audit team made the following observations:

1. The consequence as listed did not always clearly explain the potential consequence to employees, environment, etc. Example: (ref variable 51LB908) consequence was "High – Water carryover into recovered oil system". This does not clearly explain the potential undesirable consequences.
2. The CoD tables appeared to list all instruments, not just those with safe operating limits. The FCC table contained 53 pages and approximately 800 parameters. It could be difficult for an operator to know which of those parameters and CoDs have significant process safety implications.
3. Not all parameters with upper and lower limits had a CoD listed (e.g., P-20, high limit = 45 KBPD and no high CoD)
4. The Range column did not clearly indicate whether the information represented the instrument calibration range, the normal operating range, or the safe operating range.

The audit team determined that some of the operating procedures had caution and warning statements embedded into the procedure that actually served better to define the safe operating limits and describe the potential consequences of deviation than was contained in the CoD tables. In addition, the steps to be taken to avoid the deviation were sometimes contained in the operating steps that followed the caution/warning. Even with this understanding, the audit team identified examples in all 7 procedures reviewed where sufficient caution/warning statements did not to adequately address the CoD for each safety parameter. Specifically, 3 of the procedures (B&S, D&R, South ISOMAX) contained no caution/warning statements associated with safe operating limits, 2 (RLOP, U&E) contained one warning statement that addressed a safe operating limit, but the procedure appeared to have other important safe operating limits that were not addressed, and while the other 2 procedures (Cracking and North ISOMAX) had several well

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placed, well written warning statements, there appeared to be additional safe operating limits that may not be adequately covered with CoD precautions.

In instances observed by the audit team where the CoD descriptions were not part of the above procedures, steps to avoid the deviation were also not found in the procedures.

3.5 Training

All provisions in section reviewed. The audit team did not identify any compliance exceptions with respect to this element.

3.6 Contractors

All provisions in section reviewed. The audit team did not identify any compliance exceptions with respect to this element.

3.7 Pre-Startup Safety Review (PSSR)

All provisions in section reviewed. The following exception was identified by audit team:

Item	*Findings*
3.7.1	The employer shall perform a pre-startup safety review (PSSR) for new facilities and for modified facilities when the modification is significant enough to require a change in the process safety information. The pre-startup safety review shall confirm that prior to the introduction of highly hazardous chemicals to a process: that construction and equipment is in accordance with design specifications; and that safety, operating, maintenance, and emergency procedures are in place and are adequate. [8 CCR Section 5189 (i)(1&2)] Refinery Instruction RI-367 requires a PSSR to be completed prior to the introduction of a regulated substance, acutely hazardous, flammable, explosive materials, or sources of energy to a process or whenever a modification to the unit or equipment was significant enough to require a change in the Process Safety Information. Documentation for PSSRs reviewed by the audit team, particularly for those that are not associated with a major project, did not consistently identify detailed or individual items that were reviewed or discussed. Generally accepted industry practice is to use guidance checklists to identify and record mechanical, instrumentation, housekeeping/cleanup and documentation items that can be and are reviewed in an audit or as part of an incident investigation. Such checklists were not observed to be in standard use.

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3.8 Mechanical Integrity

All provisions in section reviewed. The following exceptions were identified by audit team:

Item ***Findings***

3.8.1 The frequency of inspections and tests of process equipment shall be consistent with applicable manufacturers' recommendations and good engineering practices, and more frequently if determined to be necessary as dictated by operating history. [8 CCR Section 5189 (j)(2)(C)]

The audit team observed past due inspections and tests for the following process equipment, consistent with applicable manufacturers' recommendations or good engineering practices, as established by industry consensus standards and company practices:

a. Ten (10) pressure relief devices overdue for testing (per Refinery Instruction RI-609 and API 510 & 576)
   i. PC-12 - due 1/4/10
   ii. C6-16 - due 2/6/10
   iii. C6-39 - due 2/6/10
   iv. C6-41 - due 2/6/10
   v. IX-3050 - due 11/18/09
   vi. IX-311 - due 2/3/10
   vii. IX-310 - due 1/29/10
   viii. IX-746 - due 1/12/10
   ix. IX-9478 - due 1216/09
   x. IX-897 - due 1/29/09
b. Two tanks overdue for 20 year internal inspection (per API 653)
   i. T-3146 due 8/8/07
   ii. T-1108 due 8/8/08
c. Overspeed Trip Test of TP-263 was due 1/8/2010

3.8.2 The employer shall correct deficiencies in equipment which are outside acceptable limits defined by the process safety information in subsection (d) before further use, or in a safe and timely manner provided means are taken to assure safe operation. [8 CCR Section 5189 (j)(3)]

Per ETC's Master List of Fitness For Service (FFS), Item #4 Wharf Fuel Oil Line (Fitness for Service Level 2) was observed by the audit team to be overdue for special inspection, monitoring or action.

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3.8.3 Inspection and testing procedures shall follow recognized and generally accepted good engineering practices [8 CCR Section 5189 (j)(2)(B)]

a. Refinery piping procedure required addressing anomalous growth +/- .030 inches. Two Corrosion Monitoring Locations (1611-009-032 UT 004; UT 008 and 1611-009-003 UT 001; UT 004) were found with growth greater than .030 inches. The audit team did not observe follow up documentation addressing the anomaly (API 510 & API 571).

b. Two pressure vessels (C-1100 UT TML Point #10 and V-1103 UT TML Point # 1) were found with anomalous thickness growth up to .100 inches. The audit team did not observe follow up documentation explaining or following up this anomaly.

c. The audit team did not observe that T-1821 acid tank inspection frequencies were established consistent with NACE RP 0294-04.

3.8.4 The employer shall establish and implement written procedures to maintain the on-going integrity of process equipment and appurtenances. [8 CCR Section 5189 (j)(1)]

Based on document reviews and interviews, the audit team did not locate written procedures (or found deficiencies in existing written procedures) that described the scope and technical conduct of integrity testing, documentation of results, technical review of the results, and the scheduling process and management of deficient results for:

a. Storage Tanks

b. Valves - not mentioned in the internal piping procedure

c. Instrument & Electrical Equipment

d. A Quality Assurance Program for non-welded equipment

e. Pressure vessel TML Procedure (Inspection Equipment Drawing & TML Placement Standard - 2002) [API 570 & 571]:

   i. Did not address anomalous thickness growth in vessels

   ii. Did not address lined vessels

   iii. Procedure has been a draft since 2002

3.8.5 The employer shall have a certification record that each inspection and test that has been performed in accordance with this subsection. The certification shall identify the date of the inspection, the name of the person who performed the inspection and test, and the serial number or other identifier of the equipment. [8 CCR Section 5189 (j)(2)(D)]

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The audit team reviewed documentation for inspections and tests and observed that documentation of PRD servicing in TKN was not consistently checked for content and quality accuracy. The set pressure was sometimes entered on the 705a sheets as final pop after servicing, there appeared to be confusion between "final popped at "and "final reset at" values on the 705a sheets and the pre-pop value was missing in 50 of 92 records reviewed.

3.8.6 The employer shall correct deficiencies in equipment which are outside acceptable limits defined by the process safety information in subsection (d) before further use, or in a safe and timely manner provided means are taken to assure safe operation. [8 CCR Section 5189 (j)(3)]

Per refinery instruction RI-609, equipment overdue for inspection is to undergo management of change (MOC) for continuing to operate. Six pressure relief devices were observed to be overdue for inspection, but completed MOC documentation was not located.

PRDs	Equipment #
C6-16	K-900 H2 Booster 2d stage discharge
C6-39	K-900 1st stage booster discharge (onV-952A)
C6-41	K-900 2nd stage discharge
IX-311	V-310 steam drum
IX-310	V-310 steam drum
IX-746	GRU 7 E793 shell side outlet

3.9 Hot Work and Safe Work Practices

All provisions in section reviewed. The audit team did not identify any compliance exceptions with respect to this element.

3.10 Management of Change (MOC)

All provisions in section reviewed. The following exceptions were identified by audit team:

Item ***Findings***

3.10.1 The employer shall establish and implement written procedures to manage changes (except for "replacement in kind") to process chemicals, technology, and equipment, and changes to facilities. [8 CCR Section 5189 (l)(1)]

The audit team did not observe MOC documentation (and related updated process safety information) for the use of a portable, temporary pump being utilized in Crude Unit #4 due to maintenance on P-1198 on V1198 Relief Knockout Drum. The audit team did not review the use of other portable, temporary equipment during similar maintenance of unspared equipment.

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3.10.2 The employer shall establish and implement written procedures to manage changes (except for "replacement in kind") to process chemicals, technology, and equipment, and changes to facilities. The procedures shall assure that the following considerations are addressed prior to any change: Impact of change on safety and health. [8 CCR Section 5189 (l)(1) and (2)(B]

Safety and health considerations relating to MOC are addressed in Refinery Instruction RI-370 Sections 2.2, 4.2, 5.2, and Appendix I and Appendix II. Each MOC reviewed had a completed Health and Safety Evaluation (HSE). The HSE review utilized a series of "Thought-Provoking Questions" designed to stimulate thinking in the meeting. However, the documentation for the HSE reviews observed by the audit team was for concerns noted and did not in all cases detail issues that were actually discussed. A sampling of 17 HSE documents from 2010 showed 3 with good detail but several with a note of "No concerns" without further explanation.

3.10.3 Employees involved in the process shall be informed of, and trained in, the change in the process as early as practicable prior to its start up. [8 CCR Section 5189 (l)(3)]

Of 162 MOCs reviewed, 136 (84%) were Level 1, 20 (12%) were Level II and 6 (4%) were Level III. Per Refinery Instruction RI-370, Level II and III changes required documented training, whereas Level I reviews required only e-mail notification. Each MOC contained a listing of the people notified.

The notification e-mails reviewed did not contain detailed information concerning the change, but had a hyperlink to the MOC Data Search webpage. Per interviews, 2 of 8 console operators stated they had deleted these notification e-mails without reading them or accessing the MOC content. No documentation was observed documenting acknowledgement by the affected persons of receipt of the notification.

3.11 Incident Investigation

All provisions in section reviewed. The audit team did not identify any compliance exceptions with respect to this element.

3.12 Emergency Planning and Response

All provisions in section reviewed. The audit team did not identify any compliance exceptions with respect to this element.

3.13 Compliance Audits

All provisions in section reviewed. The audit team did not identify any compliance exceptions with respect to this element.

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3.14 Trade Secrets

All provisions in section reviewed. The audit team did not identify any compliance exceptions with respect to this element.

3.15 Risk Management Plan

All provisions in section reviewed. The audit team did not identify any compliance exceptions with respect to this element.

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APPENDIX A

AUDITOR QUALIFICATION FORMS

NAME:	**Tim Blackford** (CAI – TBBB)
POSITION:	**Staff Fire & Process Safety Engineer**
ORGANIZATION:	**Chevron Energy Technology Company**

1) Role as Participant: Check all that apply:

_____ Design Engineer,

_____ Process Engineer,

_____ Operations Representative,

_____ Process Master/Expert,

_____ Management Representative,

_____ Maintenance Representative,

15 years Trained Process Hazards Analysis Facilitator,

_____ Trained Latent Conditions Facilitator,

_____ Trained Inherently Safer Solutions Facilitator,

_____ Participant knowledgeable in the process involved,

Yes Trained Tap RooT® Facilitator

Yes Trained PSM Audit Facilitator

_____ Contractor: If involved in a Tap RooT® Investigation,

Yes Other person with appropriate knowledge and experience to thoroughly investigate and analyze an incident,

28 Years Other: Safety, Health & Fire Protection Specialist in the Petrochemical industry

2) Please document the extent that you are familiar or qualified to participate in these assessments include years of experience:

Training: Trained in Hazop, Auditing, Incident Investigation, Emergency Response,

Education: B.Sc Fire Protection & Safety Engineering Technology, Oklahoma State Univ., 5/82

Other Relevant Experience: Have performed dozens of corporate audits of safety, health, fire protection and PSM subjects over the past 20 years.

NAME:	**Martin G. Bowin (CAI-MXVD)**
POSITION:	**Consultant**
ORGANIZATION:	**Chevron Bridges**

1) Role as Participant: Check all that apply:

Yes Design Engineer,

_____ Process Engineer,

_____ Operations Representative,

_____ Process Master/Expert,

_____ Management Representative,

_____ Maintenance Representative,

_____ Trained Process Hazards Analysis Facilitator,

_____ Trained Latent Conditions Facilitator,

_____ Trained Inherently Safer Solutions Facilitator,

Yes Participant knowledgeable in the process involved,

_____ Trained Tap RooT® Facilitator

_____ Trained PSM Audit Facilitator

_____ Contractor: If involved in a Tap RooT® Investigation,

_____ Other person with appropriate knowledge and experience to thoroughly investigate and analyze an incident,

37 years Other: Engineering, Operations, Health, Environmental, Safety Management

2) Please document the extent that you are familiar or qualified to participate in these assessments include years of experience:

Training: Emergency Response IC, Industrial Firefighting, Auditing, Incident Investigation

Education: M.S. Mechanical Engineering University of Missouri, Rolla

Other Relevant Experience: Registered Professional Engineer, State of Mississippi – Retired Status

NAME:	**Jeffery E. Todd P.E. (CAI – JTVK)**
POSITION:	**Team Leader – PSM and Compliance Assurance**
ORGANIZATION:	**Pascagoula Refinery**

1) Role as Participant: Check all that apply:

_____	Design Engineer,
_____	Process Engineer,
_____	Operations Representative,
_____	Process Master/Expert,
_____	Management Representative,
_____	Maintenance Representative,
23 Years	Trained Process Hazards Analysis Facilitator,
_____	Trained Latent Conditions Facilitator,
_____	Trained Inherently Safer Solutions Facilitator,
Yes	Participant knowledgeable in the process involved,
Yes	Trained Tap RooT® Facilitator
_____	Trained PSM Audit Facilitator
_____	Contractor: If involved in a Tap RooT® Investigation,
Yes	Other person with appropriate knowledge and experience to thoroughly investigate and analyze an incident,
_____	Other: _____

2) Please document the extent that you are familiar or qualified to participate in these assessments include years of experience:

Training:	Trained in HazOp, FMEA and Incident Investigation
Education:	B.S. Chemical Engineering, Mississippi State University 12/84
Other Relevant Experience:	Have performed PSM audits at several facilities (chemical industry) Professional Engineer (AL, MS)

NAME:	**Rick Curtis** (CAI – RIPS)
POSITION:	**Senior Risk Engineer**
ORGANIZATION:	**ABSG Consulting, Inc.**

1) Role as Participant: Check all that apply:

_____ Design Engineer,

_____ Process Engineer,

_____ Operations Representative,

_____ Process Master/Expert,

_____ Management Representative,

_____ Maintenance Representative,

_____ Trained Process Hazards Analysis Facilitator,

_____ Trained Latent Conditions Facilitator,

_____ Trained Inherently Safer Solutions Facilitator,

_____ Participant knowledgeable in the process involved,

_____ Trained Tap RooT® Facilitator

Yes Trained PSM Audit Facilitator

_____ Contractor: If involved in a Tap RooT® Investigation,

Yes Other person with appropriate knowledge and experience to thoroughly investigate and analyze an incident,

28 Years Other: PSM Specialist in petrochemical industries also production/process/project engineer

2) Please document the extent that you are familiar or qualified to participate in these assessments include years of experience:

Training:	Trained in all aspects of risk assessment and compliance assistance regarding the OSHA PSM standard (e.g., HAZOP, LOPA, human factors, auditing, incident investigation, emergency response)
Education:	BSChE, University of Utah, 3/1982
Other Relevant Experience:	CSP certification (inactive), team lead and participant on numerous PSM related audits and risk assessments

NAME:	**David Kehn**
POSITION:	**GUG Process Safety Advisor**
ORGANIZATION:	**Upstream Capability – HES**

1) Role as Participant: Check all that apply:

X Design Engineer, 12 years chemical/petrochemicals, 6 years deepwater upstream

____ Process Engineer,

____ Operations Representative,

____ Process Master/Expert,

____ Management Representative,

____ Maintenance Representative,

X Trained Process Hazards Analysis Facilitator, since 1988

____ Trained Latent Conditions Facilitator,

____ Trained Inherently Safer Solutions Facilitator,

____ Participant knowledgeable in the process involved,

____ Trained Tap RooT® Facilitator

____ Trained PSM Audit Facilitator since 1992

____ Contractor: If involved in a Tap RooT® Investigation,

____ Other person with appropriate knowledge and experience to thoroughly investigate and analyze an incident,

X Other: 28 years of Fire, Safety & Environmental

2) Please document the extent that you are familiar or qualified to participate in these assessments include years of experience:

Training: 1992 AD Little PSM Auditing
Chevron Audit 301

Education: BS Chem E, University of Missouri-Columbia, May 1982

Other Relevant Experience: 28 Years – Have performed dozens of Process Safety Audits and assessments.

Developed and piloted OxyChem's Coordinated Audit Program with Environmental and Safety representatives using protocols to assure compliance with OSHA, EPA and other federal authorities. Pilot included chlor-alkali and phthalate anhydride plants in Brazil.

Contributed to the success of the Center for Chemical Process Safety's (CCPS) textbook for "Guidelines for Auditing of Process Safety management Systems".

NAME:	**Mark Miller** (CAI – MILA)
POSITION:	**OE Process Advisor**
ORGANIZATION:	**Chevron, Corp HES**

1) Role as Participant: Check all that apply:

_____ Design Engineer,

_____ Process Engineer,

_____ Operations Representative,

_____ Process Master/Expert,

_____ Management Representative,

_____ Maintenance Representative,

5 years Trained Process Hazards Analysis Facilitator,

Yes Trained Latent Conditions Facilitator,

Yes Trained Inherently Safer Solutions Facilitator,

_____ Participant knowledgeable in the process involved,

Yes Trained Tap RooT® Facilitator

_____ Trained PSM Audit Facilitator

_____ Contractor: If involved in a Tap RooT® Investigation,

Yes Other person with appropriate knowledge and experience to thoroughly investigate and analyze an incident,

10 Years Other: PSM & HES Specialist in the Petrochemical industry

2) Please document the extent that you are familiar or qualified to participate in these assessments include years of experience:

Training: Hazop, Auditing, Incident Investigation, Emergency Response

Education: Los Medanos College, Pittsburgh, CA. AA Mechanical Technology

Other Relevant Experience: Have performed dozens of corporate audits of safety, health, fire protection and PSM subjects over the past 20 years.

NAME:	**Paula Hogan** (CAI – HOGP)
POSITION:	**PSM & OE Manager, Pembroke Refinery**
ORGANIZATION:	**Chevron UK Ltd**

1) Role as Participant: Check all that apply:

_____	Design Engineer,
Yes	Process Engineer,
_____	Operations Representative,
_____	Process Master/Expert,
Yes	Management Representative,
_____	Maintenance Representative,
Yes	Trained Process Hazards Analysis Facilitator,
_____	Trained Latent Conditions Facilitator,
_____	Trained Inherently Safer Solutions Facilitator,
_____	Participant knowledgeable in the process involved,
Yes	Trained Tap RooT® Facilitator
_____	Trained PSM Audit Facilitator
_____	Contractor: If involved in a Tap RooT® Investigation,
Yes	Other person with appropriate knowledge and experience to thoroughly investigate and analyze an incident,
13 Years	Other: Refinery experience in Operations/Process/Control/Planning teams

2) Please document the extent that you are familiar or qualified to participate in these assessments include years of experience:

Training:	Trained in Hazop, Incident Investigation
Education:	MEng (Hons) Chemical Engineering with a Year in Europe, Imperial College, University of London. 1997
Other Relevant Experience:	

NAME:	**Carlos Adams**
POSITION:	**OEAG Lead Advisor**
ORGANIZATION:	**Corporate OEAG**

1) Role as Participant: Check all that apply:

_____ Design Engineer,

_____ Process Engineer,

_____ Operations Representative,

_____ Process Master/Expert,

_____ Management Representative,

_____ Maintenance Representative,

_____ Trained Process Hazards Analysis Facilitator,

_____ Trained Latent Conditions Facilitator,

_____ Trained Inherently Safer Solutions Facilitator,

X Participant knowledgeable in the process involved,

X Trained Tap RooT® Facilitator

X Trained PSM Audit Facilitator

_____ Contractor: If involved in a Tap RooT® Investigation,

_____ Other person with appropriate knowledge and experience to thoroughly investigate and analyze an incident,

39 years Other: HES Corporate and Facility experience

2) Please document the extent that you are familiar or qualified to participate in these assessments include years of experience:

Training: Trained in Hazop, Auditing, Incident Investigation, Emergency Response, CHESM, MOC and MSW

Education: BS Industrial Technology Lamar University 1985

Other Relevant Experience: Have performed dozens of corporate audits of safety, health, fire protection and PSM subjects over the past 20 years.

NAME:	**Carol-Ann Laughlin**
POSITION:	**Reliability Leader**
ORGANIZATION:	**GMfg Reliability Center of Excellence**

1) Role as Participant: Check all that apply:

_____	Design Engineer,
_____	Process Engineer,
2 yrs OA	Operations Representative,
_____	Process Master/Expert,
6 yrs Reliability Manager	Management Representative,
_____	Maintenance Representative,
_____	Trained Process Hazards Analysis Facilitator,
_____	Trained Latent Conditions Facilitator,
_____	Trained Inherently Safer Solutions Facilitator,
22 yrs	Participant knowledgeable in the process involved,
_____	Trained Tap RooT® Facilitator
_____	Trained PSM Audit Facilitator
_____	Contractor: If involved in a Tap RooT® Investigation,
22 yrs	Other person with appropriate knowledge and experience to thoroughly investigate and analyze an incident,
14 yrs	Other: Chevron Materials Engineer

2) Please document the extent that you are familiar or qualified to participate in these assessments include years of experience:

Training:	Trained and certified as API 510 and 570 Inspector;
Education:	B.S. Metallurgical Engineering, California Polytechnic State University, 1988
Other Relevant Experience:	22 year career has centered around reliability and mechanical integrity; leader in National Association of Corrosion Engineers (currently as national chairperson for Subcommittee on Refining and Gas Processing) organization which develops RAGAGEP;

NAME:	**Roger B. Hansen**
POSITION:	**Fixed Equipment Business Improvement Network (BIN) Leader**
ORGANIZATION:	**Reliability Center of Excellence, Global Manufacturing**

1) Role as Participant: Check all that apply:

	Design Engineer,
	Process Engineer,
	Operations Representative,
Yes	Process Master/Expert,
	Management Representative,
	Maintenance Representative,
	Trained Process Hazards Analysis Facilitator,
	Trained Latent Conditions Facilitator,
	Trained Inherently Safer Solutions Facilitator,
Yes	Participant knowledgeable in the process involved,
	Trained Tap RooT® Facilitator
	Trained PSM Audit Facilitator
	Contractor: If involved in a Tap RooT® Investigation,
	Other person with appropriate knowledge and experience to thoroughly investigate and analyze an incident,
25 years	Other: Inspection and Reliability in Petrochemical industry; 10 yrs Leadership / Management roles

2) Please document the extent that you are familiar or qualified to participate in these assessments include years of experience:

Training:	Hold NBIC Commission with Supervisory endorsement and API 570 / 510 certificates
Education:	AAS; two yrs additional study-Management: Brenau Univ & Univ of So Miss; Retired Military Reserve Officer
Other Relevant Experience:	Serve on a State Jurisdiction Boiler & Pressure Vessel Technical Advisory Committee; Leadership role in 2009 OSHA NEP audit of Pascagoula Refinery

Richmond PSM 2010 Audit Action Plan/Status

Audit Number & Description	PSM Area	Description of audit finding	Describe how it was remediated, or Plan for corrective action	Date remediation was in place, or estimated date of corrective action	Status
4Q 2011	4Q 2011 updates in yellow. Status: 11 of 12 findings (92%) complete (1 finding pending V&V). 32 of 34 milestones complete. (94%). All Mechanical Integrity findings are now closed. Remaining finding is in the Operating Procedures element specifically related to COD tables, in particular identified that not all potential consequences, nor the steps to address were adequately documented.				
3Q 11 Summary	3Q 2011 updates in green. 3Q 2011 Status, 10 of 12 (83%) findings complete and V&V'd. 31 of 34 total milestones complete (91%).				
2Q 11 Summary	2Q 2011 updates in yellow. 2Q 2011 Status, 8 of 12 (67%) findings complete and V&V'd. 29 of 34 total milestones complete (85%).				
1Q 11 Summary	As of the close of 1 Q 2011, 5 findings completed with verification and validation complete. 1 finding completed and pending V&V. 24 of 34 total milestones complete (70.6%). 1 milestone recycled. 3 findings with 1 or 2 month shift in overall due dates, still well within completion of 1 year from final PSM report.				
4Q 10 Summary	As of the close of 4Q 2010, 6 of the findings are closed and 17 of the milestones (52%) have been completed. 4 of the milestones are behind schedule – Overall finding should still be completed by the initial plan for two of the three findings with milestones behind schedule. Shifted overall due date for the last MI finding for I&E MI inspection and testing. 13 of the remaining 17 milestones are scheduled for completion in 1 Q 2011.				
3Q 10 Summary	The Richmond Refinery PSM Audit resulted in 12 findings. All findings have action plans and 33 distinct milestones, with due dates, have been generated. As of the close of 3Q 2010, 6 of the findings (50%) and 15 of the milestones (45%) have been completed, all within expected deadlines. No findings or milestones are overdue, and all open findings and milestones are on track for completion by their current due dates.				
3.10.3	MOC	Employees involved in the process shall be informed of, and trained in, the change in the process as early as practicable prior to its start up. [8 CCR Section 5189 (l)(3)] Of 162 MOCs reviewed, 136 (84%) were Level 1, 20 (12%) were Level II and 6 (4%) were Level III. Per Refinery Instruction RI-370, Level II and III changes required documented training, whereas Level I reviews required only e-mail notification. Each MOC contained a listing of the	Plan: 1 - Add MOC title to email notification. Complete 6-30-2010 2 - Add the description of the change to the Stage 2 Trg & Comm Review	8-15-2011	Recycled action complete. IT issues repaired.

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Audit Number & Description	PSM Area	Description of audit finding	Describe how it was remediated, or Plan for corrective action	Date remediation was in place, or estimated date of corrective action	Status
		people notified. The notification e-mails reviewed did not contain detailed information concerning the change, but had a hyperlink to the MOC Data Search webpage. Per interviews, 2 of 8 console operators stated they had deleted these notification e-mails without reading them or accessing the MOC content. No documentation was observed documenting acknowledgement by the affected persons of receipt of the notification.	on MOC Browse. Complete 7-29-2010 3 - Build tracking system on MOC Browse web page to record persons notified vs. persons visited. ~~Complete 8-9-2010~~ – Recycled – Testing identified unexpected issues with metric. IT making changes to calculations. New ETC is 4/30/2011 - Completed 5/12/2011 4 - Communicate expectation. Due by 8/15/2011 Owner: Gary Lassen		
3.10.2	MOC	The employer shall establish and implement written procedures to manage changes (except for "replacement in kind") to process chemicals, technology, and equipment, and changes to facilities. The procedures shall assure that the following considerations are addressed prior to any change: Impact of change on safety and health. [8 CCR Section 5189 (l)(1) and (2)(B] Safety and health considerations relating to MOC are addressed in Refinery Instruction RI-370 Sections 2.2, 4.2, 5.2, and Appendix I and Appendix II. Each MOC reviewed had a completed Health and Safety Evaluation (HSE). The HSE review utilized a series of "Thought-Provoking Questions" designed to stimulate thinking in the meeting. However, the documentation for the HSE reviews observed by the audit team was for concerns noted and did not in all cases detail issues that were actually discussed. A sampling of 17 HSE documents from 2010 showed 3 with good detail but several with a note of "No concerns" without further explanation.	Plan: 1 - Provide HSE facilitator training. Complete 10-19-2010 2 - Modify MOC dB so HSE can't be performec until all Functional reviews are completed. Complete 10-19-2010 3 - Audit all HSEs for quality and provide feedback. Complete 10-19-2010 Owner: Gary Lassen	10-19-2010	Complete and V&V'd
3.10.1	MOC	The employer shall establish and implement written procedures to manage changes (except for "replacement in kind") to process chemicals, technolcgy, and equipment, and changes to facilities. [8 CCR Section 5189 (l)(1)]	Plan: 1 - Review existing temporary pump use with all RBUs. Due 12-31-10 Complete 1/15/2011 - Only one business unit in refinery using	8/15/2011	Complete d & V&V'd

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Audit Number & Description	PSM Area	Description of audit finding	Describe how it was remediated, or Plan for corrective action	Date remediation was in place, or estimated date of corrective action	Status
		The audit team did not observe MOC documentation (and related updated process safety information) for the use of a portable, temporary pump being utilized in Cruce Unit #4 due to maintenance on P-1198 on V1198 Relief Knockout Drum. The audit team did not review the use of other portable, temporary equipment during similar maintenance of unspared equipment.	temporary portable pumps without an MOC. Revised plan based on this information. 2 - Work with Business Unit and Designs engineering to ensure MOC process is followed for temporary pumps - including portable pumps. 4/30/2011 2Q 2011 Update: Completed and posted all procedures for temporary pumps for the D&R ABU. 3 - Communicate and share with all Business Units to ensure we don't see a repeat in other areas. Revised Date: 8/15/2011 Owner: Gary Lassen		
3.2.1	PSI	A copy of the process safety information and communication shall be accessible to all employees who perform duties in or near the process. [8 CCR Section 5189 (d)(4)] Based on interviews and document review, some process safety information found not current or accurate during PHA revalidation was not available until after an MOC was written and the data was electronically updated. "Owner" responsibilities and updating workflow were not clear on the responsibility to communicate the means to access this "redlined" PSI during the target 30 days it takes to update the drawings electronically.	General Information: During a PHA, the team may find inaccuracies or questionable items on the P&IDs. At the PHA Close out meeting, a PHA recommendation is generated to update the P&IDs, and this recommendation is assigned an owner/due date. Though PHA recommendations are required to be completed within one year, it is reasonable to expect that P&ID updates should completed in a more timely manner. Action Plan: 1) Define process and establish expectations/timing for updating P&IDs following a PHA. Communicate	6/28/2011	Complete and V&V'd

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Audit Number & Description	PSM Area	Description of audit finding	Describe how it was remediated, or Plan for corrective action	Date remediation was in place, or estimated date of corrective action	Status
			expectations to appropriate personnel. Due 1-15-2011 Status: MXEW 4/6/2011 Step one complete as of Jan 30, 2011. Mark Crow has communicated expectations to appropriate personnel at each of the PHA closeout meetings in 2011 (LPG Storage, NH3 Storage, DHT, and the HNF PHAs). Expectations are that the MOC to update P&ID's following a PHA should be issued to drafting group within 30 days from the action item assignment and that the drafting group has a goal of completing MOC, with P&IDs updated to the web, in 60 days. When the MOC is issued, the originator should notify Drafting Supervisor so that he can expedite completion of the MOC. The PHA Close Out Meeting Guideline has been updated to reflect this communication. 2) Update appropriate guidelines and procedures to ensure sustainable process. Complete 6/28/2011 Responsibility: Mark Crow		
3.4.1	Operating Procedures	Not all of the operating procedures reviewed contained statements addressing the potential consequences of deviation from all safe operating limits, nor did they consistently address the steps necessary to correct or avoid deviation. The refinery had developed comprehensive consequence of deviation (CoD) tables in the EOM for each of the processes that were evaluated by the audit team. However, the CoD tables do not all contain information that would assist an	Plan: 1. The L&D Manuals and Procedures group will create/define a standard Consequence of Deviation table to include content expectations (what is to be included) content definitions (how it is to be included), and	6-30-2012	In Progress, 1 item with revised due date to align

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Audit Number & Description	PSM Area	Description of audit finding	Describe how it was remediated, or Plan for corrective action	Date remediation was in place, or estimated date of corrective action	Status
		operator to clearly understand the consequences that may occur if they fail to follow the procedure as written and/or operate outside predetermined safe operating limits. Using the FCC CoD table as an example, the audit team made the following observations: 1. The consequence as listed did not always clearly explain the potential consequence to employees, environment, etc. Example: (ref variable 51LB908) consequence was "High – Water carryover into recovered oil system". This does not clearly explain the potential undesirable consequences.2. The CoD tables appeared to list all instruments, not just those with safe operating limits. The FCC table contained 53 pages and approximately 800 parameters. It could be difficult for an operator to know which of those parameters and CoDs have significant process safety implications.3. Not all parameters with upper and lower limits had a CoD listed (e.g., P-20, high limit = 45 KBPD and no high CoD)4. The Range column did not clearly indicate whether the information represented the instrument calibration range, the normal operating range, or the safe operating range. The audit team determined that some of the operating procedures had caution and warning statements embedded into the procedure that actually served better to define the safe operating limits and describe the potential consequences of deviation than was contained in the CoD tables. In addition, the steps to be taken to avoid the deviation were sometimes contained in the operating steps that followed the caution/warning. Even with this understanding, the audit team identified examples in all 7 procedures reviewed where sufficient caution/warning statements did not to adequately address the CoD for each safety parameter. Specifically, 3 of the procedures (B&S, D&R, South ISOMAX) contained no caution/warning statements associated with safe operating limits, 2 (RLOP, U&F) contained one warning statement that addressed a safe operating limit, but the procedure appeared to have other important safe operating limits that were not addressed, and while the other 2 procedures (Cracking and North ISOMAX) had several well placed, well written warning statements, there appeared to be additional safe operating limits that may not be adequately covered with CoD precautions. In instances observed by the audit team where the CoD descriptions were not part of the above procedures, steps to avoid the deviation were also not found in the procedures.	content formatting (where in the table). This standard will address the range column concerns, the inadequate consequence descriptions, limit expectations, and overall cumbersome nature of the lengthy documents. It will also include parameters for the placement of operating limits with in operating procedures. Owner: L&D Due Date: ~~9/30/2011~~ will coordinate with External Agency Audit Finding Resolution S. Dub 4/5/2011 - Will include the COD table standardization with the recent CCHMP audit findings and address as one EOM Guidebook update and subsequent gap analysis and material/content updating. The path forward will be address all the procedures, Human Factors and PSI findings into one standard that holistically aligns with all compliance requirements rather than address findings in a piece meal fashion. 2. The Area Business Units will then update their current Consequence of Deviation Table content to meet the defined and documented standard. L&D will aid in the formatting and human factoring of the new COD tables but will not be responsible for the content itself. The ABUs will		work with external audit findings in 1Q 11

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Audit Number & Description	PSM Area	Description of audit finding	Describe how it was remediated, or Plan for corrective action	Date remediation was in place, or estimated date of corrective action	Status
			ultimately be responsible for making the necessary changes and additions as they own the content and are the SMEs. Owner: ABU Sponsor Due 6-30-2012		
3.7.1	PSSR	The employer shall perform a pre-startup safety review (PSSR) for new facilities and for modified facilities when the modification is significant enough to require a change in the process safety information. The pre-startup safety review shall confirm that prior to the introduction of highly hazardous chemicals to a process: that construction and equipment is in accordance with design specifications; and that safety, operating, maintenance, and emergency procedures are in place and are adequate. [8 CCR Section 5189 (i)(1&2)] Refinery Instruction RI-367 requires a PSSR to be completed prior to the introduction of a regulated substance, acutely hazardous, flammable, explosive materials, or sources of energy to a process or whenever a modification to the unit or equipment was significant enough to require a change in the Process Safety Information. Documentation for PSSRs reviewed by the audit team, particularly for those that are not associated with a major project, did not consistently identify detailed or individual items that were reviewed or discussed. Generally accepted industry practice is to use guidance checklists to identify and record mechanical, instrumentation, housekeeping/cleanup and documentation items that can be and are reviewed in an audit or as part of an incident investigation. Such checklists were not observed to be in standard use.	1 - Review available checklists and pilot use during 4Q 2010 Cracking T/A (Appendix I & II). Due 11-30-2010 – Pilot of Ops checklist in 4Q 2010. Will Pilot rest of checklists in Hydro in 1Q 2011. Complete 2/28/2011 – Piloted 3 different checklists in Hydro 1Q T/A and selected one. 2 - Have SME review checklists for content and accuracy. Due 1-31-2011 Complete 2/28/2011 in parallel with pilot at Hydro. 3 - Determine method to capture checklist (Appendix I & II) for use on current dB. Due 1-31-2011 - Complete 2/28/2011 - added to PSSR access database. 4 - Adapt checklist for simple changes and include in MOC dB for PSSR Appendix I & II and optional for Appx. III . Due 1-31-2011 - Complete 1/30/2011 5 - Update RI-367 to reflect changes. Complete May 2011	5-31-2011	Complete & V&V'd

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Audit Number & Description	PSM Area	Description of audit finding	Describe how it was remediated, or Plan for corrective action	Date remediation was in place, or estimated date of corrective action	Status
			6. Train Section 2 Reviewers on changes. Complete May 2011 Owner: Gary Lassen		
3.8.1	MI	The frequency of inspections and tests of process equipment shall be consistent with applicable manufacturers' recommendations and good engineering practices, and more frequently if determined to be necessary as dictated by operating history. [8 CCR Section 5189 (j)(2)(C)] The audit team observed past due inspections and tests for the following process equipment, consistent with applicable manufacturers' recommendations or good engineering practices, as established by industry consensus standards and company practices: a. Ten (10) pressure relief devices overdue for testing (per Refinery Instruction RI-609 and API 510 & 576) i. PC-12 - due 1/4/10 ii. C6-15 - due 2/6/10 iii. C6-39 - due 2/6/10 iv. C6-41 - due 2/6/10 v. IX-3050 - due 11/18/09 vi. IX-311 - due 2/3/10 vii. IX-310 - due 1/29/10 viii. IX-746 - due 1/12/10 ix. IX-9478 - due 1216/09 x. IX-897 - due 1/29/09 b. Two tanks overdue for 20 year internal inspection (per API 653) i. T-3146 due 8/8/07 ii. T-1108 due 8/8/08 c. Overspeed Trip Test of TP-263 was due 1/8/2010	a. Resolve overdue testing for the 10 overdue PRDs. Status: PRD testing was completed for C6-16, C6-39, C6-41, IX-310, IX-311, and IX-746, which were all serviced during the March 2010 TKN H2A shutdown event and Rheniformer catalyst regeneration shutdown. PC-12 was serviced on-the-run in March 2010. IX-3050 was serviced in August 2010 when the natural gas import system was idle. IX-9478 was serviced during the H2A shutdown in March, and IX-897 was serviced during the 8-Plant shutdown in March. Complete 8-30-2010. b. Resolve overdue tank 20 year inspections per API-653 for T-3146 and T-1108. They were inspected on 11/1/2010 and 7/9/2010 respectively. Complete 11-1-2010. c. Resolve overspeed trip test of TP-263. Unreliable spare pump turbine and motor TP-264 and MP-262 at the Isomax Cooling Tower interfered with taking TP-263 out of service for timely testing. The spares were eventually restored to reliable condition in July to allow the overspeed trip test at TP-263. Status: Overspeed trip test of TP-263 was performed at the first	11-17-2010	Complete, V&V Complete d

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Audit Number & Description	PSM Area	Description of audit finding	Describe how it was remediated, or Plan for corrective action	Date remediation was in place, or estimated date of corrective action	Status
			opportunity. Complete 8-30-2010.		
3.8.2	MI	The employer shall correct deficiencies in equipment which are outside acceptable limits defined by the process safety information in subsection (d) before further use, or in a safe and timely manner provided means are taken to assure safe operation. [8 CCR Section 5189 (j)(3)] Per ETC's Master List of Fitness For Service (FFS), Item #4 Wharf Fuel Oil Line (Fitness for Service Level 2) was observed by the audit team to be overdue for special inspection, monitoring or action.	A required hydrotest has been been performed on #4 Wharf Line per the Coast Guard regulations that apply to it. The Level 2 FFS assessment requirements needed to be restated on the FFS database to specify exactly what inspection to perform at the welds with incomplete penetration and the appropriate intervals. The UT inspection adjacent to welds has been performed. Completed in 8/2010 by Dale Blume. The follow-up inspections were revised in the FFS database and updated by Dave Bosi to read "8/2010-Bosi changed criteria for UT of these welds to UT adjacent to welds and perform hydrotests on three year intervals."	11-15-2010	Complete , V&V Complete
3.8.3	MI	Inspection and testing procedures shall follow recognized and generally accepted good engineering practices [8 CCR Section 5189 (j)(2)(B)] a. Refinery piping procedure required addressing anomalous growth +/- .030 inches. Two Corrosion Monitoring Locations (1611-009-032 UT 004; UT 008 and 1611-009-003 UT 001; UT 004) were found with growth greater than .030 inches. The audit team did not observe follow up documentation addressing the anomaly (API 510 & API 571). b. Two pressure vessels (C-1100 UT TML Point #10 and V-1103 UT TML Point # 1) were found with anomalous thickness growth up to .100 inches. The audit team did not observe follow up documentation explaining or following up this anomaly. c. The audit team did not observe that T-1821 acid tank inspection frequencies were established consistent with NACE RP 0294-04.	a. 1611-009-003-001 and 1611-009-032 are both on the wharf. Historically, technician abilities were limited for locating CMLs, and gauging and discounting coating thickness. New procedures are in place to assure consistency with regard to location of measurements on the wharf which include painting a circle at the CML. B. C-1100 thickness discrepancy is also related to old measurements. Considering the bottom head is ~ 19'-0" in diameter and approximately 1 7/8" thick, a 0.040" increase between 2002 and 2007 is	11-15-2010	Complete , V&V Complete

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Audit Number & Description	PSM Area	Description of audit finding	Describe how it was remediated, or Plan for corrective action	Date remediation was in place, or estimated date of corrective action	Status
			acceptable. The measurements of 1.781 (7/6/1976 - nominal wall thickness) and 1.79 (10/5/1988 - old reading) are too old to be considered accurate or relevant to the current integrity of this vessel. V-1103 thickness discrepancy is only 0.010" and acceptable. The measurement of 0.938" was from 7/6/1976 and was the nominal wall thickness rather than an actual thickness reading. C. NACE recommended inspection interval is 6 years. After the next inspection, scheduled during the 2010 FCC TA, we will complete a RBI analysis to establish an appropriate inspection frequency based on service and performance. This was an ABU business decision and all possible in-service inspections were performed. Complete 10/6/2010. a. Technicians will follow procedures to followup and document thickness growth. B. C-1100 thickness discrepancy is acceptable given the size and thickness of this vessel. C. T-1821 inspection was completed during the Cracking shutdown in October 2010 as planned. The inspection frequency has been established consistent with NACE RP		

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Audit Number & Description	PSM Area	Description of audit finding	Describe how it was remediated, or Plan for corrective action	Date remediation was in place, or estimated date of corrective action	Status
			0294-04.		
3.8.4	MI	The employer shall establish and implement written procedures to maintain the on-going integrity of process equipment and appurtenances. [8 CCR Section 5189 (j)(1)] Based on document reviews and interviews, the audit team did not locate written procedures (or found deficiencies in existing written procedures) that described the scope and technical conduct of integrity testing, documentation of results, technical review of the results, and the scheduling process and management of deficient results for: a. Storage Tanks b. Valves - not mentioned in the internal piping procedure c. Instrument & Electrical Equipment d. A Quality Assurance Program for non-welded equipment e. Pressure vessel TML Procedure (Inspection Equipment Drawing & TML Placement Standard - 2002) [API 570 & 571]: i. Did not address anomalous thickness growth in vessels ii. Did not address lined vessels iii. Procedure has been a draft since 2002	a. Develop a formal written procedures for management of tank inspections. Status: A storage tank inspection procedure was written and an MOC was initiated to formally adopt this procedure throughout the refinery. MOC # 21978 was reviewed by the FER team lead and HSE team lead. Next step is for the Reliability Manager to perform an HSE review. In progress: Due 11-30-2010. HSE completed 01-04/2011. Next step: Post on Web. ETC 1/31/2011 Item A is complete via approved MOC 21978. b. Piping inspection procedures do not currently address process block valves or control valves. Operations tracks valve deficiencies with the MOAN database to manage routine and shutdown work requests to address valve malfunctions, and the LSR database to track TLRs related to valves. Instr&Controls analysts track deficiencies with control valves to generate work requests and manage the timely repair and replacement. FER inspectors are brought in for associated piping and fitting inspections and as SME's though not responsible for routine process and control valve inspections. Valve deficiencies on common systems are added to the RPI database to create future repair	12/22/2011	Completed, still needs V&V

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Audit Number & Description	PSM Area	Description of audit finding	Describe how it was remediated, or Plan for corrective action	Date remediation was in place, or estimated date of corrective action	Status
			opportunities. Status: Determine language to include in existing procedures regarding valve inspection. Determine next steps. Existing procedures RI-368, RI-636 (NH3), RI-641 (actuators), and standards API-570 section 5.9 (valves), API-574 (valves), API-553 (control valves), and API-598 regarding valve inspections, testing, and preventive maintenance are suitable. Complete: 11/17/2010. Item B is complete since existing inspection procedures RI-368, API-570 and API-574 regarding valve inspections, testing, and repairs are already in place. c. Instrument & Electrical BIN Leaders Bart Floryancic and Ed Burghardt to develop or organize procedures for inspection testing and preventive maintenance of I&E equipment for the benefit of all refining sites. Status: Discuss development and organization of proposed I&E procedures and plan, schedule and execute same. In progress: Date Due ~~6/30/2011~~ revised due date 12/31/2011. Completed on 12/22/2011 d. A new work process document has been developed for the equipment types that the Quality Mangement Group will address, which includes non-welded equipment with QM inspectors assigned to Machinery,		

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Audit Number & Description	PSM Area	Description of audit finding	Describe how it was remediated, or Plan for corrective action	Date remediation was in place, or estimated date of corrective action	Status
			Instrumentation, and Electrical. This does not includes other craft work, for example, insulation, coatings, and civil/structural items. A QM page has been published recently that links to the new work process, which covers routine repairs, though will be expanded further into Small Capital. Complete 10-30-2010. Item D is complete with new work process linked to the QM page. e. Update IED & TML Placement Standard from Draft Status and address the anomalous vessel thickness growth issues and liner inspection issues. Status: An MOC was initiated to formally adopt this procedure throughout the refinery. MOC # 21982 was reviewed by the FER team lead and HSE team lead. Next step is for the Reliability Manager to perform an HSE review. For vessel growth issues see finding ID 3.8.3 in record ID 285. Regarding strip lined vessels, the pressure vessel TML placement standard has been modified to address strip-lined vessels. In progress: Due 11-30-2010. Behind schedule: Completed HSE in January. Minor revisions id'd in HSE. Will make changes and post by 1/31/2011. Item E is complete via approved MOC 21982.		
3.8.5	MI	The employer shall have a certification record that each inspection and test that has been performed in accordance with this subsection. The certification shall identify the date of the inspection, the name of the	Resolve incorrect info found in Meridium for these PRDs. Resolve confusion between similar fields on	9-30-2010	Complete , V&V Complete

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Audit Number & Description	PSM Area	Description of audit finding	Describe how it was remediated, or Plan for corrective action	Date remediation was in place, or estimated date of corrective action	Status
		person who performed the inspection and test, and the serial number or other identifier of the equipment. [8 CCR Section 5189 (j)(2)(D)] The audit team reviewed documentation for inspections and tests and observed that documentation of PRD servicing in TKN was not consistently checked for content and quality accuracy. The set pressure was sometimes entered on the 705a sheets as final pop after servicing, there appeared to be confusion between "final popped at "and "final reset at" values on the 705a sheets and the pre-pop value was missing in 50 of 92 records reviewed.	705A data sheets and 707A forms. Train refinery PRD maintenance individuals by 9/30/2010. Review PRD documentation process to ensure information is properly collected for repaired PRDs and entered into Meridium by RFMS. Implement quality checks for data entry individuals and include process in appropriate RFMS desk manuals by 9/30/2010. Missing data (pre-pop / final reset at / final popped at) for PRDs in Meridium were corrected for the PRDs in question by RFMS using info on the 705A data sheets, and by contacting the vendors (Swan and Bay Valve) and Richmond's valve maintenance shop for 707A forms as needed. In some cases, PRD data was field checked to resolve discrepancies between 707A data sheets. As of 2008, the 705A data sheets for PRDs from shutdowns as well as routine maintenance are being forwarded to RFMS for entry into Meridium with the correct information in the correct fields. For new PRDs, the pre-pop value is not relevant thus indicated by a check mark rather than a value. As of 2009, all 707A forms are being filled out with the proper information in the correct locations and provided		

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Audit Number & Description	PSM Area	Description of audit finding	Describe how it was remediated, or Plan for corrective action	Date remediation was in place, or estimated date of corrective action	Status
			to the PRD supervisor for entry into Meridium. The PRD supervisor periodically spot-checks the 707A forms for compliance with RI-609. In 2009, Richmond discontinued maintaining PRDs onsite and established a routine maintenance PRD service agreement with Swan and a shutdown PRD service agreement with Bay Valve. In September 2010, refinery PRD maintenance individuals were trained and certified. The refinery PRD supervisor periodically reinforces the expectation to provide the properly completed 705A data sheets and 707A repair forms with Swan, Bay Valve, and refinery PRD maintenance individuals. Implemented PRD data entry quality check process to ensure 705A forms and 707A forms are correctly updated in the Meridium database by RFMS Equip Controller and Administrative personnel. Updated RFMS Equipment Controller and Administrative Staff Desk Manuals with process for PRD data entry quality check. Completed 9/30/2010. Missing and incorrect PRD data has been resolved. Confusion regarding fields on 705A forms has been resolved		

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Audit Number & Description	PSM Area	Description of audit finding	Describe how it was remediated, or Plan for corrective action	Date remediation was in place, or estimated date of corrective action	Status
			with responsible personnel trained on expectations. Proper collection of PRD data and repair history was verified. The PRD data entry quality check process was implemented within RFMS with this process included in appropriate Desk Manuals.		
3.8.6	MI	The employer shall correct deficiencies in equipment which are outside acceptable limits defined by the process safety information in subsection (d) before further use, or in a safe and timely manner provided means are taken to assure safe operation. [8 CCR Section 5189 (j)(3)] Per refinery instruction RI-609, equipment overdue for inspection is to undergo management of change (MOC) for continuing to operate. Six pressure relief devices were observed to be overdue for inspection, but completed MOC documentation was not located. PRDs - Equipment # C6-16 - K-900 H2 Booster 2d stage discharge C6-39 - K-900 1st stg booster discharge (on V-952A) C6-41 - K-900 2nd stage discharge IX-311 - V-310 steam drum IX-310 - V-310 steam drum IX-746 - GRU 7 E793 shell side outlet	Confirm that PRD's overdue for inspection undergo MOC process and documentation to continue operating. On 2/16/2010 there were 10 overdue, of which 6 MOCs were not readily traceable in OERI. Locate missing MOC numbers for PRDs shown overdue in OERI. Generate MOCs as needed for overdue PRDs that did not undergo MOC for continuing to operate. Gain commitment from Operations to route Approved MOCs for PRD interval extension to RFMS to update Comment field in Meridium such that the approved PRD inspection interval extension is readily traceable in OERI. The MOC documentation was completed for C6-16, C6-39, C6-41, IX-310, IX-311, and IX-746, which were all subsequently repaired during the March 2010 shutdowns and Rheniformer catalyst	9-30-2010	Complete, V&V Complete

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Audit Number & Description	PSM Area	Description of audit finding	Describe how it was remediated, or Plan for corrective action	Date remediation was in place, or estimated date of corrective action	Status
			regeneration shutdown. Comments field for each PRD was updated in Meridium to reflect MCC numbers for interval extensions. Gained commitments from Operations coordinators to route approved MOCs for PRD interval extension to RFMS to reflect the extension in the comments field that appears in OERI for overdue inspections. In doing so, Operating Assistants can efficiently recognize from OERI reports that an MOC review is truly needed. Completed 4/12/2010. All OERI data for overdue PRD inspections were properly updated in Meridium with temporary MOC numbers, and all six PRDs previously overdue in February 2010 were properly inspected and repaired during the March 2010 shutdowns in accordance with RI-609.		

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