

***Mechanical Integrity Program Consent Order
Progress Evaluation of Tier I Recommendations
for the Valero Delaware City Refinery*
in Delaware City, Delaware***

DNREC Report No. 6

Written by:

*Walt Frank
Randy Montgomery*

Working Draft Report Submitted: April 9, 2007
Final Report Submitted: May 14, 2007

This work was performed by ABSG Consulting Inc. for the Valero Delaware City Refinery under proposal number PROP-618-01.

**On September 1, 2005, Premcor Inc. merged with and into Valero Energy Corporation, a Delaware corporation. As a result of the merger, The Premcor Refining Group Inc. (Premcor) became a wholly owned subsidiary of Valero Energy Corporation. Premcor remains a legal entity and operator of the Delaware City Refinery. However, because Premcor does business in Delaware under the trade name "Valero Delaware City Refinery," the name "Valero" is used in this report.*

NOTICE

This report was prepared by ABSG Consulting Inc. (ABS Consulting) for the benefit of Valero Delaware City Refinery (Valero). Neither ABS Consulting, Valero, nor any person acting in their behalf makes any warranty (express or implied), or assumes any liability to any third party, with respect to the use of any information or methods disclosed in this report. Any third-party recipient of this report, by acceptance or use of this report, releases ABS Consulting and Valero from liability for any direct, indirect, consequential, or special loss or damage, whether arising in contract, tort (including negligence), or otherwise.

ABS Consulting and its employees, subcontractors, consultants, and other assigns cannot, individually or collectively, predict what will happen in the future. ABS Consulting personnel made a reasonable effort, based on the information supplied to us and the scope of work defined by Valero and the Delaware Department of Natural Resources and Environmental Control, to help Valero identify opportunities to improve its mechanical integrity (MI) program and related systems. If the suggestions in this report are followed, the likelihood of MI-related accidents occurring at the Valero Delaware City Refinery (DCR) should decrease. However, even if the suggestions in this report are followed, accidents may still occur. Moreover, the actions associated with implementing the suggestions in this report may subject Valero employees or their assigns to unforeseen hazards. Therefore, Valero personnel should carefully review the suggestions before implementing them to determine whether they are in Valero's best interest. ABS Consulting accepts no liability for any incident or regulatory impact that occurs at the Valero DCR or at any other Valero facility.

BUSINESS CONFIDENTIAL

EXECUTIVE SUMMARY

In 2002, Motiva Enterprises, LLC (Motiva), on behalf of the Delaware Department of Natural Resources and Environmental Control (DNREC), contracted with ABSG Consulting Inc. (ABS Consulting), an engineering consulting firm that specializes in safety and reliability analysis, to conduct an evaluation of the mechanical integrity program at the Delaware City Refinery (DCR). The evaluation began with requested documents being provided by Motiva to ABS Consulting on May 7, 2002, and continued through a series of visits to the refinery between May 20, 2002, and August 16, 2002. ABS Consulting issued a draft report in September 2002 documenting the results of this evaluation, for review and comment by Motiva and DNREC. ABS Consulting then issued a final report in March 2003.

Motiva and DNREC subsequently entered into a negotiated consent order (CO) documenting Motiva's agreed response to some of the recommendations contained in the March 2003 final report. The CO was signed by Motiva and DNREC on December 12, 2003, and approved by the Delaware Court of Chancery on January 12, 2004.

The CO classified the recommendations by priority, with Tier I (higher priority) actions required to be completed in accordance with an implementation schedule that established specific deadlines over a 3-year period. Tier II (lower priority) actions were required to be completed by the end of the 3-year period. This report addresses the Tier I actions.

The CO required (1) semiannual implementation progress reports for the Tier I actions from Motiva and (2) semiannual audits to be conducted by an independent third-party organization, over the 3-year period covered by the CO. In May 2004, Motiva sold the DCR to The Premcor Refining Group, Inc. On September 1, 2005, Premcor Inc. merged with and into Valero Energy Corporation, a Delaware corporation. As a result of the merger, The Premcor Refining Group Inc. (Premcor) became a wholly owned subsidiary of Valero Energy Corporation. Premcor remains a legal entity and operator of the Delaware City Refinery. However, because Premcor does business in Delaware under the trade name "Valero Delaware City Refinery," the name "Valero" is used in this report. Thus, Valero is bound by the terms of the CO and the contract with ABS Consulting to perform these audits.

Valero was required by the CO to deliver its sixth semiannual Tier I progress report to ABS Consulting by January 12, 2007. ABS Consulting received this report (dated January 9, 2007) at its offices in Wilmington, Delaware, prior to January 12, 2007. ABS Consulting concludes that the DCR satisfied the Tier I reporting requirements established by the CO.

BUSINESS CONFIDENTIAL

ABS Consulting was required by the CO to conduct an audit by February 26, 2007, to verify the work described in the most recent DCR Tier I progress report. Mr. Walt Frank and Mr. Randy Montgomery of ABS Consulting conducted the bulk of the onsite portion of this audit at the DCR on January 15 through January 19, 2007, and January 22 and January 23, 2007. Mr. Frank made several more part-day visits to the refinery, and both auditors had extensive telephone and e-mail communications with refinery staff throughout the balance of January and through February 26, 2007.

ABS Consulting was further required by the CO to issue a report by April 12, 2007, documenting the results of its audit. Because of the volume of data required to be reviewed, and the detailed deliberations necessary to determine compliance or noncompliance with CO requirements in this, the last semiannual audit, ABS Consulting was not able to issue a draft report to Valero for its review and comment until April 9, 2007. The CO allows Valero up to 15 days to review the draft report, and ABS Consulting received Valero's comments by e-mail on April 24, 2007. After consideration of Valero's comments, ABS Consulting is issuing this final report of the sixth and final semiannual Tier I progress audit on May 14, 2007. ABS Consulting emphasizes (as we communicated to DNREC on April 9, 2007) that the delivery of this final report beyond the April 12, 2007, deadline was due to our delay, and not Valero's.

ABS Consulting has concluded, based upon the observed progress made through February 26, 2007, that the DCR has complied with all the CO Tier I applicable requirements, with the exception of item 44.b relating to the implementation of instrumented safety system testing procedures. Our concerns with the status of item 44.b are detailed further in Table 1 of the report.

The need for further work under item 44.b notwithstanding, ABS Consulting would like to acknowledge the progress made to date under the CO at the DCR. As this report details, considerable efforts have been devoted to implementing the requirements of the CO. We have consistently found the DCR staff to be open and supportive of our audit efforts and desirous of the successful implementation of the requirements of the CO and the realization of the benefits of doing so.

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
NOTICE.....	ii
EXECUTIVE SUMMARY.....	iii
1. INTRODUCTION	1
2. COMPLIANCE WITH SCHEDULE DEADLINES FOR PROGRESS REPORT AND AUDIT.....	2
3. EVALUATION OF COMPLIANCE WITH CO REQUIREMENTS FOR MI PROGRAM UPGRADES	3
<u>Table</u>	<u>Page</u>
1 Mechanical Integrity Consent Order Audit Results.....	6

1. INTRODUCTION

In 2002, Motiva Enterprises, LLC (Motiva), on behalf of the Delaware Department of Natural Resources and Environmental Control (DNREC), contracted with ABSG Consulting Inc. (ABS Consulting), an engineering consulting firm that specializes in safety and reliability analysis, to conduct an evaluation of the mechanical integrity (MI) program at the Delaware City Refinery (DCR). The evaluation began with requested documents being provided by Motiva to ABS Consulting on May 7, 2002, and continued through a series of visits to the refinery between May 20, 2002, and August 16, 2002. ABS Consulting issued a draft report in September 2002 documenting the results of this evaluation, for review and comment by Motiva and DNREC. ABS Consulting then issued a final report in March 2003.

Motiva and DNREC subsequently entered into a negotiated consent order (CO) documenting Motiva's agreed response to some of the recommendations contained in the March 2003 final report. The CO was signed by Motiva and DNREC on December 12, 2003, and approved by the Delaware Court of Chancery on January 12, 2004.

The CO classified the recommendations by priority, with Tier I (higher priority) actions required to be completed in accordance with an implementation schedule that established specific deadlines over a 3-year period. Tier II (lower priority) actions were required to be completed by the end of the 3-year period. This report addresses the Tier I actions.

The CO required (1) semiannual implementation progress reports for the Tier I actions from Motiva and (2) semiannual audits to be conducted by an independent third-party organization, over the 3-year period covered by the CO. In May 2004, Motiva sold the DCR to The Premcor Refining Group, Inc. On September 1, 2005, Premcor Inc. merged with and into Valero Energy Corporation, a Delaware corporation. As a result of the merger, The Premcor Refining Group Inc. (Premcor) became a wholly owned subsidiary of Valero Energy Corporation. Premcor remains a legal entity and operator of the Delaware City Refinery. However, because Premcor does business in Delaware under the trade name "Valero Delaware City Refinery," the name "Valero" is used in this report. Thus, Valero is bound by the terms of the CO and the contract with ABS Consulting to perform these audits.

This report documents ABS Consulting's observations and conclusions from the sixth and final semiannual audit required by the CO of the Tier I work.

***2. COMPLIANCE WITH SCHEDULE DEADLINES FOR PROGRESS
REPORT AND AUDIT***

Valero was required by the CO to deliver its sixth semiannual Tier I progress report to ABS Consulting by January 12, 2007. ABS Consulting received this report (dated January 9, 2007) at its offices in Wilmington, Delaware, prior to January 12, 2007.

ABS Consulting was required by the CO to conduct an audit by February 26, 2007, to verify the work described in the DCR Tier I progress report. Mr. Walt Frank and Mr. Randy Montgomery of ABS Consulting conducted the bulk of the onsite portion of this audit at the DCR on January 15 through January 19, 2007, and January 22 and January 23, 2007. Mr. Frank made several more part-day visits to the refinery, and both auditors had extensive telephone and e-mail communications with refinery staff throughout the balance of January and through February 26, 2007.

Because of the volume of data required to be reviewed, and the detailed deliberations necessary to determine compliance or noncompliance with CO requirements in this, the last semiannual audit required by the CO, ABS Consulting was not able to issue the draft report to Valero for its review and comment until April 9, 2007. The CO allows Valero up to 15 days to review a draft report, and ABS Consulting received Valero's comments by e-mail on April 24, 2007. After consideration of Valero's comments, ABS Consulting is issuing this final report of the sixth and final semiannual Tier I progress audit on May 14, 2007. ABS Consulting emphasizes (as we communicated to DNREC on April 9, 2007) that the delivery of this final report beyond the April 12, 2007, deadline was due to our delay, and not Valero's.

3. EVALUATION OF COMPLIANCE WITH CO REQUIREMENTS FOR MI PROGRAM UPGRADES

This report is the sixth in a series of reports prepared by ABS Consulting to evaluate the progress of the DCR in implementing the Tier I requirements of the CO. Some of these CO requirements were ‘once-and-done’ activities to be completed by a deadline specified in the CO, while other CO requirements established ongoing activities that were monitored over multiple audit cycles. All Tier I requirements were required to be completed within 3 years after the effective date of the CO. In prior reports, ABS Consulting addressed only the CO requirements coming due at the particular 6-month milestone.¹

The scope of this sixth and final audit differed markedly from the prior audits because it addressed every Tier I requirement in the CO. Even once-and-done activities, previously determined to have been completed, were examined to reconfirm that activities “remained completed.” For example, if the CO required that a procedure be prepared to address a certain mechanical integrity (MI) activity, this last audit sought to determine whether the procedure was still in use. For ongoing activities, the audit sought to determine whether the activities continued to be implemented in a fashion that met or exceeded the level of performance required to support the conclusion that the requirements of the CO had been satisfied.

The 3-year retrospective for all CO requirements associated with this final audit necessitated the review and careful analysis of a considerable amount of information to ensure that the interests of both DNREC and the DCR were represented in a fair and balanced fashion.

Table 1 lists (1) all the Tier I tasks specified by the CO, (2) observations made by ABS Consulting related to the means of the DCR’s compliance with the relevant CO requirements, and (3) ABS Consulting’s conclusions as to whether the DCR was in compliance with the requirements at the time of this final audit. To provide a historical perspective on the DCR’s efforts and ABS Consulting’s past assessments of the progress for each Tier I requirement, a summary of the content from the past reports for each Tier I requirement has been included.

As documented in Table 1, ABS Consulting concluded, based upon the progress observed through the conclusion of the current audit, that the DCR had complied with all the CO Tier I applicable requirements, with the exception of item 44.b relating to the implementation of instrumented safety system testing procedures. ABS Consulting found that significant gaps in the

¹ Prior semiannual reports and their dates of issue:

1st Tier I, September 9, 2004

2nd Tier I, March 14, 2005

3rd Tier I, September 9, 2005

4th Tier I, March 3, 2006

5th Tier I, September 11, 2006

BUSINESS CONFIDENTIAL

implementation of this item existed at the start of the audit. While the DCR made substantive progress toward closing these gaps during the course of the audit, some gaps still remain. Overall, ABS Consulting does not believe that a sufficiently mature management system for implementing the requirements of item 44.b exists and, thus, ABS Consulting cannot conclude that all the requirements of this action item have been satisfied.

During the course of the audit, ABS Consulting identified possible opportunities for enhancing the implementation of the programs and initiatives covered by the audit, some of which are documented in this report. ABS Consulting has verbally shared other such observations with the DCR and notes the receptivity of the DCR to such suggestions. Such observations in no way constitute noncompliances with the CO requirements, and our suggestions must not be construed as attempts on the part of ABS Consulting to broaden the obligations imposed upon the DCR by the CO.

In this, and the accompanying Tier II audit report (ABS Consulting report 618.11-01), ABS Consulting cites two factors that we perceive to have been particularly important to the progress the DCR has made in improving its MI program during the course of the CO. These are:

1. In item 49.b of the Tier II audit report, ABS Consulting cites the FERRET database as a pivotal factor in the success of a number of MI-related initiatives at the DCR and suggests that FERRET, or a similarly configured and implemented action tracking database, is essential to ensuring the continued success of these initiatives. For this reason, ABS Consulting urges the DCR to approach with caution any substantive changes to the FERRET system.

2. In item 39.b of this Tier I audit report, ABS Consulting cites the assignment of a senior Fixed Equipment Department (FED) inspector to peer review inspection reports (IRs) as being one of the most significant factors in addressing issues related to the quality of IRs. It is noted that increased oversight by this same individual has resulted in improvements in other FED initiatives, such as the temporary repair program (see item 46.b). ABS Consulting recommends that this role be maintained and provided the priority and resources necessary to sustain these important functions.

ABS Consulting would also like to cite the EMPRV inspection database (see item 42 in this report) and the routine maintenance process (RMP) (see item 51 in the accompanying Tier II audit report) as notable practices. We believe that the MI program will continue to benefit from the continued diligent implementation of both of these initiatives.

Finally, ABS Consulting would like to cite a factor that is not directly tied to a particular Tier I or Tier II requirement. In implementing the CO, the DCR elected to staff a position providing for enhanced oversight and coordination of the remedial MI activities required by the CO. We believe that this oversight and coordination role has been a crucial factor in the progress made under the CO.

BUSINESS CONFIDENTIAL

ABS Consulting is not necessarily suggesting that this position be retained after CO requirements have been completed. However, we believe that this situation graphically illustrates the importance of a strong management review function in any process safety management (PSM) system. The American Institute of Chemical Engineers' Center for Chemical Process Safety provides extensive guidance for the implementation of a management review function as part of a PSM system in its recent publication *Guidelines for Risk Based Process Safety*.

BUSINESS CONFIDENTIAL

Table 1 Mechanical Integrity Consent Order Audit Results

Consent Order Tier I Applicable Requirements	Observations/Basis for Audit Conclusions	Audit Conclusions
39. Pressure Equipment Integrity ("PEI") Inspection Report Quality Control Procedure		
<p>a. Within six (6) months of the Approval Date, Motiva shall develop a formalized, written procedure (the "PEI Inspection Report Procedure") that (i) establishes the required content for the PEI inspection reports, (ii) identifies required follow-up to identified PEI issues as part of the inspection report recommendations, (iii) specifies requirements regarding inspection scheduling, (iv) establishes a process by which recommendations in the PEI inspection reports are communicated to a responsible individual, and tracked for progress, and (v) assures that referenced calculations are accurate and appropriate.</p>	<p>As noted in the first Tier I report (issued September 9, 2004), Fixed Equipment Department (FED, formerly PEI/Inspection Department) procedure 4B, <i>Inspection Guidelines and Procedures – Report Issuing: IR’s and MR’s</i>, was issued on February 1, 2003, and subsequently revised on July 8, 2004. The procedure addresses the following required contents:</p> <ul style="list-style-type: none"> (i) PEI inspection report content (ii) Identification of follow-up actions in recommendations (iii) Inspection interval setting (iv) Assignment of recommendation responsibility and follow-up tracking (v) Review and approval of reports, including calculations <p>During this final Tier I audit, ABS Consulting confirmed that procedure 4B was still being implemented at the DCR.</p>	<p>In the first Tier I report (issued September 9, 2004), ABS Consulting concluded that the DCR had completed the Tier I applicable requirements for this action item.</p> <p>The current audit indicated that the DCR continues to follow FED procedure 4B, satisfying the intent underlying this action item.</p>
<p>b. ABSG shall review a representative sample of the PEI inspection reports generated at the DCR during the first two (2) Semi-Annual Audits to determine if such PEI inspection reports substantially comply with the PEI Inspection Report Procedure.</p>	<p>As noted in the first Tier I report (issued September 9, 2004), ABS Consulting reviewed approximately 75 inspection reports (IRs) generated subsequent to the CO approval date (January 12, 2004). ABS Consulting noted significant improvement in the content and administration of the IRs relative to the performance observed during the 2002 audit, but noted that some inconsistent practices continued (e.g., with respect to inspection scheduling, technical accuracy and review of calculations, timely recommendation resolution). It was noted that the July 8, 2004, revision of procedure 4B, <i>Inspection Guidelines and Procedures – Report Issuing: IR’s and MR’s</i>, incorporated changes to better align the procedure with the requirements of the CO, and that many of the IRs reviewed had been generated before this revision of the procedure. However, ABS Consulting noted that further improvements would be required to justify a conclusion that the DCR had made sufficient progress toward satisfying the CO requirement for this action item.</p>	<p>In the first Tier I report (issued September 9, 2004), ABS Consulting concluded that the DCR was, at that time, substantially compliant with the Tier I applicable requirements for this action, but noted that continued improvement would be required to warrant a conclusion in the subsequent audit that the DCR was compliant with the requirements.</p>

BUSINESS CONFIDENTIAL

Table 1 Mechanical Integrity Consent Order Audit Results (cont'd)

Consent Order Tier I Applicable Requirements	Observations/Basis for Audit Conclusions	Audit Conclusions
	<p>As noted in the second Tier I report (issued March 14, 2005), ABS Consulting reviewed 40 of the approximately 350 PEI inspection reports related to vessel, tank, and heat exchanger inspections, and 18 PEI inspection reports for piping, completed since July 2004. ABS Consulting noted that the DCR had maintained a significant improvement in the content and administration of the inspection reports (relative to the performance observed during the 2002 audit), but noted that some inconsistent practices continued relative to the requirements of procedure 4B. Specifically, ABS Consulting found the following inconsistencies in the PEI inspection reports during the second Tier I audit:</p> <ul style="list-style-type: none"> • Five of seven inspection reports requiring corrosion rate calculations contained errors • Recommendations in three of eight PEI inspection reports for vessels, tanks, and heat exchangers were not completed by the scheduled due dates. Similarly, during this audit, ABS Consulting found recommendations in three of eight piping inspection reports that were not completed by the scheduled due dates • Three piping PEI reports did not include (or reference) calculations that indicated that mechanical stresses had been evaluated <p>Also, during the second Tier I audit, ABS Consulting noted that some PEI inspection reports contained unsupported assertions, either implicit or explicit, that an equipment item with a deficient condition (such as a piping segment at or below renewal thickness or, sometimes, just “thin”) could be safely left in service until the due date specified in the PEI inspection report recommendation. These due dates, established without a technical basis supported by documented data or calculations, became an even greater concern since the FERRET database indicated that, for some, the deficient condition remained months after the original due date specified for correction.</p> <p>Because of these issues of concern, ABS Consulting suggested that DCR still needed to make implementation improvements to ensure that inspection results, reports, and resulting recommendations were reviewed, approved, and managed as outlined in procedure 4B, and requested an additional audit of the CO requirements regarding this action item. This follow-up audit was conducted during the third Tier I audit.</p> <p>As noted in the third Tier I audit report (issued September 9, 2005) ABS Consulting personnel (1) interviewed FED personnel to determine what corrective actions had been taken to address the PEI IR issues previously identified and (2) reviewed a sample of IRs to verify that the corrective actions had effectively addressed the issues. ABS Consulting found that the DCR had implemented several corrective actions, with the most notable corrective action being the assignment of IR review responsibilities to one senior FED inspector. This inspector had assumed his new duties in April 2005.</p>	<p>In the second Tier I report (issued March 14, 2005), ABS Consulting concluded that, while the DCR had made considerable progress in implementing the PEI Inspection Report Procedure, gaps still remained in the implementation of the PEI inspection program. Therefore, ABS Consulting suggested the need for continued and closer scrutiny of inspection reports to ensure that recommendations were substantiated by correct calculations and a sound technical basis. Also, ABS Consulting suggested the need for increased emphasis on the timely resolution of recommendations and the timely documentation of the closure of recommendations that had been resolved. In conclusion, ABS Consulting recommended that this Tier I requirement be audited again during the next semiannual audit.</p> <p>In the third Tier I audit (issued September 9, 2005), it was ABS Consulting’s opinion that the DCR has substantively addressed the IR QA issues identified in the second Tier I audit and that the DCR was compliant with the Tier I applicable requirements for this action.</p> <p>Based on the results of this final Tier I audit, it is ABS Consulting’s opinion that the DCR is compliant</p>

BUSINESS CONFIDENTIAL

Table 1 Mechanical Integrity Consent Order Audit Results (cont'd)

Consent Order Tier I Applicable Requirements	Observations/Basis for Audit Conclusions	Audit Conclusions
	<p>ABS Consulting reviewed approximately 15% of the 585 PEI IRs that had been logged (in the 2005 Inspection Report Log) since the January 2005 audit. These reviews included vessel, heat exchanger, tank, and piping IRs. The results of this review found some minor deficiencies and some calculation errors for IRs approved in the period shortly after the April 2005 reorganization, but did not identify any continuing, systematic deficiencies such as those described above for the second Tier I audit. It was ABS Consulting's opinion that the DCR had made a significant reduction in the rate of IR errors after the dedicated inspector had become oriented in his new role. Thus, the DCR's corrective actions were effective.</p> <p>However during the third audit, ABS Consulting's review of IRs noted a continued practice of failing to provide a strong technical basis for the due dates for IR recommendations related to the correction of coating and/or insulation failures and the need to perform additional inspections to quantify the extent or rate of degradation (e.g., determination of remaining wall thickness where corrosion was, or potentially was, present). In response to this issue, ABS Consulting recommended that the DCR review and implement NACE International's recommended practice RP-0198, <i>The Control of Corrosion Under Thermal Insulation and Fireproofing Materials – A Systems Approach</i>.</p> <p>Overall, based on the results of the third Tier I audit, it was ABS Consulting's opinion that the DCR had implemented positive improvements in the IR quality assurance (QA) process to address the IR QA deficiencies identified in the second Tier I audit. ABS Consulting also suggested additional actions to help ensure continued improvement.</p> <p>During the final Tier I audit, ABS Consulting reviewed a sampling of 67 PEI IRs, which represents about 10% of the IRs issued during the last 12 months. This sampling includes IRs written by all six DCR inspectors and by contract inspectors. IRs for internal and external pressure vessel inspections, special pressure vessel inspections, piping inspections, internal and external atmospheric storage tank inspections, tank seal gap inspections, and fixed equipment repairs were included in the sample. In general, the quality of the IRs reviewed was good and met the requirements outlined in procedure 4B. However, ABS Consulting did identify some IRs with minor deficiencies. These deficiencies included five IRs missing or having incomplete information (e.g., minimum thickness calculations not attached) and four IRs with technical errors (e.g., nozzle sizes on the inspection drawing did not match nozzle sizes on the ASME U1 form, and a tank inspection note that did not appear to agree with the referenced inspection issue). Each of these deficiencies was reviewed with DCR inspection personnel and resolved. While none of the identified deficiencies affected any technical decisions related to the mechanical integrity of the equipment reviewed, this situation points to the need for continued diligence in the peer review of IR reports.</p>	<p>with the Tier I applicable requirements for this action item.</p>

BUSINESS CONFIDENTIAL

Table 1 Mechanical Integrity Consent Order Audit Results (cont'd)

Consent Order Tier I Applicable Requirements	Observations/Basis for Audit Conclusions	Audit Conclusions
	<p>In conclusion, ABS Consulting believes that the assignment of a senior inspector to peer review IRs has been one of the most significant factors in addressing issues related to the quality of IRs. ABS Consulting notes that increased oversight by this same individual has resulted in improvements in other FED initiatives, such as the temporary repair program (see 46.b). ABS Consulting recommends that this role be maintained and provided the priority and resources necessary to sustain these important functions.</p>	
<p>40. Overdue Pressure Vessel ("PV") Equipment Internal Inspections</p>		
<p>a. Motiva shall review the inspection history of all PV equipment for which inspections are overdue based on the Pressure Vessel database listing as of January 1, 2003, and document the steps to be taken to verify the basis(es) for continued operation of such PV equipment pending internal inspection (the "PV Internal Inspection Reviews"). The PV Internal Inspection Reviews shall include, if necessary, the gathering of additional data to assess the current status and condition of the PV Equipment.</p>	<p>As noted in the first Tier I report (issued September 9, 2004), the DCR had completed the internal inspections of all overdue pressure vessels by the end of December 2003 (i.e., prior to the approval of the CO). See 40.b below for additional details.</p>	<p>As noted in the first Tier I report (issued September 9, 2004), the Tier I applicable requirements for this action item had been completed prior to the first Tier I audit, and there were no follow-on activities appropriate to this action item.</p>
<p>b. Within six (6) months of the Approval Date, Motiva shall complete fifty percent (50%) of the PV Internal Inspection Reviews, and shall be audited by ABSG within thirty (30) days of such date to confirm that the reviews have been performed.</p>	<p>As noted in the first Tier I report (issued September 9, 2004), the DCR had completed, prior to the end of December 2003, the inspection of all pressure vessels that were overdue as of January 1, 2003. In fact, DCR records showed that there were no overdue pressure vessels as of the end of December 2003 (i.e., the inspection backlog existing at the beginning of the year had been worked off, and all inspections that had come due in 2003 had been completed).</p> <p>ABS Consulting noted in the September 9, 2004, report that external, on-stream inspections (incorporating ultrasonic wall thickness measurements) had been used in lieu of internal inspections for some vessels. This is consistent with industry recognized and generally accepted inspection practices as authorized by API 510, <i>Pressure Vessel Inspection Code: Maintenance Inspection, Rating, Repair, and Alteration</i>.</p>	<p>In the first Tier I report (issued September 9, 2004), ABS Consulting concluded that the Tier I applicable requirements for this action item had been completed.</p> <p>The current audit indicated that the DCR continues to meet the pressure vessel internal inspection schedules, satisfying the intent underlying this action item.</p>

BUSINESS CONFIDENTIAL

Table 1 Mechanical Integrity Consent Order Audit Results (cont'd)

Consent Order Tier I Applicable Requirements	Observations/Basis for Audit Conclusions	Audit Conclusions
	<p>For the current audit, ABS Consulting reviewed records of recent pressure vessel inspections and determined that, for all vessels sampled, the inspections had either been conducted before the applicable deadline, or the vessel inspection history had been reviewed and the inspection due date had been appropriately deferred.</p> <p>Inspection due dates and histories are now being tracked within the EMPRV system. API 510 specifies that internal inspections be conducted at an interval typically not exceeding 120 months, and more frequently if warranted by service conditions and past inspection results. The current audit revealed that some FED inspectors have been establishing shorter-than-required inspection intervals to ensure that vessels were taken out of service for required maintenance activities. Thus, the review of the monthly pressure vessel inspection summary report, generated from EMPRV records, indicated a large number of deferred inspections due to, for example, changes in turnaround schedules. A review of the inspection histories for such vessels often revealed that the deferred inspection intervals were actually still within the technically justifiable inspection interval established in accordance with API 510.</p> <p>For example, a vessel might warrant an internal inspection every 60 months based upon API 510 considerations, but the inspector might enter a 36-month inspection interval into EMPRV with the intent of ensuring that the vessel becomes available for maintenance (e.g., a nozzle replacement). A subsequent 12-month delay in the turnaround schedule would then necessitate an inspection deferral, even though the vessel would then have been inspected at 48 months, well within the 60-month interval established based upon API 510 considerations.</p> <p>Also, some inspectors have been entering into EMPRV shorter-than-required inspection intervals corresponding to the anticipated next opportunity for inspection (typically, the scheduled start date for the next unit turnaround). This practice also results in the need to sometimes defer inspections beyond the interval within EMPRV, when turnaround schedules change, even though the technically justifiable inspection interval would not have been exceeded.</p> <p>While these practices are conservative (i.e., they may result in inspections more frequently than actually required), they create the initial perception that inspections are commonly being deferred and they potentially unnecessarily increase the workload of the FED inspectors (by prompting inspections more frequently than condition-based considerations would warrant). The DCR has other effective means of tracking inspection-related maintenance activities (i.e., the FERRET system). The internal inspection interval entered into EMPRV should be the technically justifiable inspection interval established based upon API 510 considerations, and not some likely to change interval based upon diverse and unrelated considerations.</p>	<p>However, the implementation of the pressure vessel internal inspection system could be made more transparent if the DCR were to take steps to ensure that (1) the internal inspection intervals entered into EMPRV are based upon the technical considerations established by API 510 rather than unrelated issues, (2) past inspection data are entered into EMPRV on a timely basis, and (3) the technical basis and decision process for inspection deferrals, where validly required, are documented in a readily retrievable form, such as in an inspection report.</p>

BUSINESS CONFIDENTIAL

Table 1 Mechanical Integrity Consent Order Audit Results (cont'd)

Consent Order Tier I Applicable Requirements	Observations/Basis for Audit Conclusions	Audit Conclusions
	The DCR was able to show, for each of the vessels reviewed during this audit, that the technically justifiable inspection interval had not been exceeded by any of the various deferrals. However, locating relevant inspection records and resolving the status of a particular vessel were not always straightforward matters. Our observations suggest the need for greater emphasis on the timely entry of past inspection data into EMPRV and the documentation of the technical basis for inspection deferrals.	
c. Within twelve (12) months of the Approval Date, Motiva shall complete one hundred percent (100%) of the PV Internal Inspection Reviews, and shall be Audited by ABSG within thirty (30) days of such date to confirm that the reviews have been performed.	See 40.b.	See 40.b.
41. Resolve pre-FERRET PEI Inspection Report Recommendations		
a. For each operating area, Motiva shall review the inspection reports between the end of the last Turnaround Date and November 1, 2001, to identify any unresolved matters, including any open recommendations with respect to PEI that have not been entered into FERRET (the "Pre-FERRET Inspection Review"). Unresolved issues identified by Motiva during the Pre-FERRET Inspection Report review shall be added to the FERRET database and assigned a target performance date.	This paragraph contains no auditable performance criteria. See 41.b below.	Not applicable.

BUSINESS CONFIDENTIAL

Table 1 Mechanical Integrity Consent Order Audit Results (cont'd)

Consent Order Tier I Applicable Requirements	Observations/Basis for Audit Conclusions	Audit Conclusions
<p>b. Within six (6) months of the Approval Date, Motiva shall have performed the Pre-FERRET Inspection Report review on twenty-five percent (25%) of the inspection reports and, within thirty (30) days of such date, shall be Audited by ABSG to confirm that the review has taken place, and that unresolved matters have been included in the FERRET database and assigned a target performance date.</p>	<p>As noted in the first Tier I report (issued September 9, 2004), DCR records showed that 100% of the pre-FERRET IRs had been reviewed and FERRET entries, with due dates and responsible parties identified, had been made to address any unresolved matters discovered during the reviews. Approximately 130 items were added to the FERRET database in the course of these reviews.</p>	<p>In the first Tier I report (issued September 9, 2004), ABS Consulting concluded that the Tier I applicable requirements for this action item had been completed.</p> <p>By completing the review of 100% of the pre-FERRET IRs, the DCR satisfied the requirements of 41.b (which were to be completed during this first 6-month period), as well as 41.c and 41.d (which were to be completed no later than 12 months and 18 months, respectively, after the CO approval date). As such, the DCR completed all CO requirements related to pre-FERRET Inspection reports 12 months ahead of the final CO deadline.</p> <p>As documented in the accompanying Tier II audit report, (see action items 49.a, b, c, and d) the DCR continues to implement the FERRET database, satisfying the intent underlying this action item.</p>
<p>c. Within twelve (12) months of the Approval Date, Motiva shall have performed the Pre-FERRET Inspection Report review on seventy-five percent (75%) of the inspection reports and, within thirty (30) days after such date, the DCR shall be Audited by ABSG to confirm that the review has taken place, and that unresolved matters have been included in</p>	<p>See 41.b.</p>	<p>See 41.b.</p>

BUSINESS CONFIDENTIAL

Table 1 Mechanical Integrity Consent Order Audit Results (cont'd)

Consent Order Tier I Applicable Requirements	Observations/Basis for Audit Conclusions	Audit Conclusions
the FERRET database and assigned a target performance date.		
d. Within eighteen (18) months of the Approval Date, Motiva shall have performed the Pre-FERRET Inspection Report review on one hundred percent (100%) of the inspection reports and, within thirty (30) days of such date, the DCR shall be Audited by ABSG to confirm that the review has taken place, and that unresolved matters have been included in the FERRET database and assigned a target performance date.	See 41.b.	See 41.b.
42. Piping Inspections		
a. Within six (6) months of the Approval Date, Motiva shall select a process unit and perform a trial review on such unit for the purpose of assisting the DCR in developing a piping inspection program, and an associated database for the scheduling of future inspections of the remaining DCR piping systems, including pipe rack piping (the "Piping Inspection Program"). Within thirty (30) days of the development of the program, ABSG shall Audit the DCR to confirm that the Piping Inspection Program is in place.	As noted in the first Tier I report (issued September 9, 2004), the DCR performed a trial review on two units, the hydrocracker (Unit 36) and the CCR (Unit 42), and all of the piping inspections had been completed for the trial units. In addition, an inspection schedule had been developed for the rest of the DCR, including the rack piping. Also, a new database tool, EMPRV, had been implemented for collecting and analyzing piping and vessel inspection data.	In the first Tier I report (issued September 9, 2004), ABS Consulting concluded that the Tier I applicable requirements for this action item had been completed. Also, by performing a trial review on two units, the DCR had exceeded the minimum Tier I requirements for this action. Item 42.b addresses the continuing implementation of the piping inspection program.
b. ABSG will review the DCR's progress with respect to the actual piping inspection reviews	As noted in the first Tier I report (issued September 9, 2004), the schedule for the piping inspection program had been implemented.	In the first Tier I report (issued September 9, 2004), ABS Consulting concluded that the

BUSINESS CONFIDENTIAL

Table 1 Mechanical Integrity Consent Order Audit Results (cont'd)

Consent Order Tier I Applicable Requirements	Observations/Basis for Audit Conclusions	Audit Conclusions
<p>against the Piping Inspection Program during each subsequent Semi-Annual Audit.</p>	<p>During the first Tier I audit, ABS Consulting reviewed the data from the implementation of the piping inspection program for the two completed units and identified several instances where anomalous piping thickness data had been entered into EMPRV and had been left unresolved (anomalous data include situations where a piping thickness measurement is greater than the previous reading, resulting in the calculation of a negative corrosion rate). ABS Consulting noted that EMPRV was a relatively new tool for the DCR and that staff was still learning its functions and capabilities. Therefore, ABS Consulting anticipated further improvements in the implementation of the piping inspection program as the FED staff gained familiarity with the EMPRV system.</p> <p>During the second Tier I audit, ABS Consulting found that the schedule for the piping inspection program was being met. Specifically, ABS Consulting found that the DCR had completed (or would have soon completed) for seven units: (1) the review and definition of the piping inspection program (i.e., completion of the corrosion control documents [CCDs]) and (2) the entry of the piping inspection plan into EMPRV.</p> <p>ABS Consulting also reviewed the DCR's resolution of anomalous piping thickness data and found that FED personnel were aware of the impact of anomalous data on the calculations and had begun to implement a system to identify and correct anomalous data.</p> <p>At the time of the second Tier I audit, the EMPRV team included a project manager, six inspectors, and contract nondestructive testing (NDT) personnel. The objectives of this team of inspectors were to (1) provide inspection data for corrosion monitoring locations (CMLs) for which no historical inspection data existed and (2) perform inspections on any CMLs that were past due or would be due within 120 days of entering previous inspection data in EMPRV.</p> <p>During the third Tier I audit, ABS Consulting again reviewed the DCR's piping inspection program implementation, finding that the DCR had completed (or would soon have completed) the entry of the piping inspection plan in EMPRV for four units. In addition, the DCR had begun developing the piping inspection program for an additional three units.</p> <p>ABS Consulting reviewed anomalous piping data (specifically, piping data that resulted in negative inspection intervals or incorrectly short inspection intervals). As noted in the second Tier I audit, the DCR was aware of this problem. To resolve this problem, the DCR developed and implemented new EMPRV reports that allowed inspection intervals to easily be viewed at the CML-level versus the circuit-level. These reports allowed the inspectors to more quickly (1) spot the data anomalies and (2) identify the correct inspection interval for each CML. To verify the effectiveness and use of these new reports, ABS Consulting reviewed four completed units for anomalous data and found that for two of the four units, no</p>	<p>DCR had made substantial progress toward complying with the Tier I applicable requirements for this action.</p> <p>In the second Tier I report (issued March 14, 2005), ABS Consulting concluded that the DCR had continued to make substantial progress toward complying with the Tier I applicable requirements for this action.</p> <p>In the third Tier I audit (issued September 9, 2005), ABS Consulting (1) concluded that the DCR's progress in establishing the EMPRV database (as compared to the planned schedule) had slipped during the previous 6 months and (2) identified a potentially greater concern that the progress in scheduling and completing piping inspections, and analyzing and reconciling the data, had continued to slip.</p> <p>Despite the noted schedule slippage problems, ABS Consulting did not believe it was appropriate to declare that the DCR was noncompliant with the Tier I applicable requirements for this action because (1) some delays were due to factors beyond the DCR's control, (2) progress was being made with the expenditure of significant effort and resources, and (3) ABS Consulting believed that, with appropriate response, the DCR</p>

BUSINESS CONFIDENTIAL

Table 1 Mechanical Integrity Consent Order Audit Results (cont'd)

Consent Order Tier I Applicable Requirements	Observations/Basis for Audit Conclusions	Audit Conclusions
	<p>data anomalies existed. (Note: In a subsequent audit, ABS Consulting was informed that the other two units with data anomalies were not complete at the time of the third audit.)</p> <p>Based on the progress at the time of the third audit, the development of the piping inspection plan in EMPRV (i.e., entering and reviewing the data, determining inspection baseline needs) was estimated by the DCR to be about 1 month behind schedule due, partially because of the unexpected absences of EMPRV personnel (i.e., two inspectors and the EMPRV team leader) due to illnesses requiring significant time away from work.</p> <p>In addition, ABS Consulting found that the completion of the CCDs, which contain the information used to determine the inspection strategy (e.g., piping design and operating data, potential corrosion damage mechanisms, inspection history), and the inspection strategies for some of the above-mentioned units were hindered by contract negotiations with the DCR's corrosion consultant (i.e., Shell).</p> <p>The DCR had begun to develop a plan for correcting the CCD issue, but had not documented a schedule for completing the CCDs. Because of the CCD issue, ABS Consulting concluded that progress in implementing the piping inspection program in the prior 6 months was less than the progress required by DCR's EMPRV program schedule (i.e., the program was further behind schedule than the 1 month estimated by the DCR).</p> <p>Also during the third Tier I audit, ABS Consulting raised a concern that the schedule for collecting data for entry into EMPRV apparently continued to slip. ABS Consulting acknowledged that the documented schedule for this project only addressed the creation of the EMPRV database. However, EMPRV, without data, would not effectively improve piping mechanical integrity. DCR and ABS Consulting personnel discussed that the DCR's target for completing initial data collection was no more than 4 to 5 months after the date when that unit had been set up in EMPRV to receive data. Because the DCR had not developed, at the time of the third Tier I audit, a schedule for each unit's initial data collection and analysis, it was not clear just what the typical lag time was, but it appeared (to ABS Consulting) to be in excess of 5 months and growing.</p> <p>Overall, ABS Consulting concluded that the DCR was from 1 to 2 months behind on the 37-month schedule for developing the EMPRV database, but found that the DCR was working on developing a plan for addressing the database schedule slippage. However, at the time of the third Tier I audit, the DCR had not yet formalized a plan for ensuring that the initial data collection and analysis efforts were completed in a timely fashion after a database for a particular unit was established within EMPRV.</p>	<p>could still meet the original schedule for this program (i.e., EMPRV completed by March 31, 2006, with data collection and reconciliation completed within a reasonable period [e.g., 4 to 5 months] thereafter).</p> <p>In the fourth Tier I audit report (issued March 3, 2006), ABS Consulting concluded that the DCR had addressed concerns identified in the third Tier I audit and was again making substantial progress toward complying with the Tier I applicable requirements for this action.</p> <p>In the fifth Tier I audit report (issued September 11, 2006), ABS Consulting concluded that the DCR had substantially complied with the Tier I applicable requirements for this action.</p> <p>Based on the results of the previous Tier I audits and this final Tier I audit, it is ABS Consulting's opinion that the DCR is compliant with the Tier I applicable requirements for this action.</p>

BUSINESS CONFIDENTIAL

Table 1 Mechanical Integrity Consent Order Audit Results (cont'd)

Consent Order Tier I Applicable Requirements	Observations/Basis for Audit Conclusions	Audit Conclusions
	<p>During the fourth Tier I audit, ABS Consulting found that the DCR had made significant progress on the piping inspection reviews, by completing piping inspection reviews on six units. The piping inspection reviews for four other units (i.e., utilities and pipe rack, butamer, ether, and gasification) remained to be completed and the EMPRV team had made significant progress on three of these units.</p> <p>Based on this progress, ABS Consulting found that the piping inspection reviews were back on schedule. The DCR had corrected the schedule slippage found during the third Tier I audit by increasing EMPRV team resources. In addition, the DCR had resolved the contractual issues with the corrosion consultant (i.e., Shell) and contracted with another corrosion consultant so that the missing/incomplete CCDs could be completed and issued.</p> <p>ABS Consulting also reviewed the DCR's actions in response to the issue previously documented regarding the piping inspection programs for some units being developed without the benefit of completed CCDs. ABS Consulting found that the DCR had reviewed the CCDs for 12 units and had updated them with missing inspection strategy information. The EMPRV team then (1) reviewed the CCDs and inspection strategies in EMPRV to determine if changes in the EMPRV were needed and (2) made any necessary changes in EMPRV. ABS Consulting spot checked these corrections and found that they had been implemented.</p> <p>Also during the fourth Tier I audit, DCR and ABS Consulting personnel discussed the DCR's schedule for collecting initial piping inspection data. ABS Consulting found that the DCR had completed initial data collection on seven units and had made progress on a number of other units. Based on the rate of progress found at that the time of the fourth Tier I audit, the DCR was targeting to complete initial piping inspection data collection by the end of October 2006, which was 7 months after the piping inspection reviews were scheduled to be completed. In addition, the DCR had begun to establish a system and reports for routine management of piping inspections.</p> <p>Finally, ABS Consulting again reviewed the piping inspection data for anomalous data by reviewing the inspection intervals for the seven units reported as complete and finding that there were no (1) negative inspection intervals or (2) cases where no inspection interval had been calculated. In addition, ABS Consulting reviewed the piping inspection data for the two units that had a significant number of negative inspection intervals during the third Tier I audit and found that further progress in entering inspection data into EMPRV for these units had significantly reduced the number of negative inspection intervals.</p> <p>During the fifth Tier I audit, ABS Consulting found that the DCR had completed all piping inspection reviews for the refinery processes, having completed piping inspection reviews for the last three refinery units. In addition, the DCR had (1) completed the remaining CCDs for</p>	

BUSINESS CONFIDENTIAL

Table 1 Mechanical Integrity Consent Order Audit Results (cont'd)

Consent Order Tier I Applicable Requirements	Observations/Basis for Audit Conclusions	Audit Conclusions
	<p>all the units and (2) incorporated information from the CCDs into the units' piping inspection programs.</p> <p>ABS Consulting personnel reviewed the status of DCR's initial piping inspection data collection efforts and found that the DCR had made remarkable progress in collecting inspection data, including the completion of all API 570 external inspections (that were due). The number of CMLs remaining to be inspected had been reduced to less than 40. Based on the demonstrated rate of progress, the DCR was targeting to complete initial piping inspection data collection by the end of August 2006, which was 2 months ahead of the DCR's schedule.</p> <p>During the fifth Tier I audit, ABS Consulting again reviewed all units for anomalous piping inspection data and found that no negative inspection intervals existed.</p> <p>Finally, DCR and ABS Consulting personnel discussed DCR's planned process for ongoing monitoring of the piping inspection program. Based on interviews with three DCR inspectors, ABS Consulting found that the inspectors were now routinely managing piping inspections for their assigned units. In addition, ABS Consulting found that the FED had plans to routinely publish status reports that would indicate the number of past-due CMLs (if any) and the CMLs due for inspection in the upcoming 12 months.</p> <p>During this final Tier I audit, ABS Consulting reviewed the status of the piping inspection program and found that the DCR had continued to make improvements. One notable improvement is the new EMPRV CML report. This new report provides the inspector with near-term CML due dates along with the percent evaluation requirement factor (PERF), which helps identify the need to inspect additional CMLs to ensure that a representative sample of the circuit is inspected. This new report has helped improve the efficiency of piping inspections.</p> <p>Next, ABS Consulting inquired about the ongoing monitoring of the piping inspection program. Currently, the FED is compiling and issuing a monthly piping inspection report. This report is issued on the second Monday of each month and is distributed to Maintenance, Operations, and Technical directors, FED personnel, Operating Area and Unit superintendents, maintenance team leaders, maintenance shift team leaders, and the compliance supervisor. At the start of the final Tier I audit, 58 CMLs (out of 37,792) were past due. This represents a past-due percentage of less than 0.2%. Plant management affirmed that the goal is zero past-due CMLs. To demonstrate this commitment, the DCR subsequently provided ABS Consulting with the January month-end piping inspection report that indicated zero past-due CMLs.</p>	

BUSINESS CONFIDENTIAL

Table 1 Mechanical Integrity Consent Order Audit Results (cont'd)

Consent Order Tier I Applicable Requirements	Observations/Basis for Audit Conclusions	Audit Conclusions
	<p>In addition, during the final Tier I audit ABS Consulting again reviewed piping inspection data for anomalous data points and did not identify any negative inspection intervals. Since the DCR has completed the development of the piping inspection program, the refinery is currently adjusting contract inspection resources needed to meet the ongoing inspection demand. At the time of this audit, the DCR was planning on using six contract NDT personnel.</p>	
<p>43. Piping and Pressure Vessel External Protection and Painting Programs</p>		
<p>a. Within six (6) months of the Approval Date, Motiva shall develop a process of systematic reviews for piping and pressure vessel external conditions relating to (i) impact of utility service leaks, (ii) temporary insulation, and (iii) damaged insulation. This process shall include identification of issues and a timeline for resolving any associated issues (the "Piping/Pressure Vessel External Protection Program").</p>	<p>As noted in the first Tier I report (issued September 9, 2004), the DCR issued a new standing instruction number 5.3.3, <i>DCR Piping/Pressure Vessel External Protection Program</i>, on July 9, 2004.</p> <p>The procedure required the systematic review of the FERRET database, inspection reports, and work orders entered into the computerized maintenance management system (CMMS) to identify items potentially affecting the external integrity of pressure equipment due to (1) utility service leaks, (2) temporary insulation, or (3) damaged insulation. Backlog lists of required repairs were maintained for each process unit.</p> <p>The ongoing implementation of the program is addressed in 43.b.</p>	<p>As noted in the first Tier I report (issued September 9, 2004), the Tier I applicable requirements for this action item have been completed.</p> <p>Item 43.b addresses the continuing implementation of this program.</p>
<p>b. ABSG will audit the DCR's actual piping and pressure vessel external protection review and repair progress against the Piping/Pressure Vessel External Protection Program during each subsequent Semi-Annual Audit.</p>	<p>As noted in the first Tier I report (issued September 9, 2004), a review of the piping and pressure vessel external protection program indicated that the program had been initiated as described in the new standing instruction. A team of four pipefitters and two insulators had been formed and dedicated to address these repairs, and a schedule had been developed for routing this team through the various refinery units on a cyclical basis. The priority order for the various units on the schedule was based, in part, upon the size and significance of the FERRET backlog in the various units, as well as the logistical issues related to the movement of required equipment from area to area across the refinery.</p> <p>However, the second Tier I audit (report issued March 14, 2005) determined that, at the time of the audit, the piping and pressure vessel external protection program was not being implemented in a fashion consistent with that previously observed and documented. The program coordinator had been reassigned to other responsibilities and no one was performing the function of surveying the operating units to identify insulation and leak repair needs, and then establishing a forward-looking work plan. The previously dedicated crew of pipefitters and insulators had been reassigned to a more general "winterization" initiative.</p>	<p>In the first Tier I audit report (issued September 9, 2004), ABS Consulting concluded that the DCR was, at that time, compliant with the Tier I applicable requirements for this action item.</p> <p>In the second Tier I audit report (issued March 14, 2005), ABS Consulting concluded that the DCR was not, at the time of the audit, in compliance with the Tier I applicable requirements for this requirement, but concurred with the remedial plans that the DCR</p>

BUSINESS CONFIDENTIAL

Table 1 Mechanical Integrity Consent Order Audit Results (cont'd)

Consent Order Tier I Applicable Requirements	Observations/Basis for Audit Conclusions	Audit Conclusions
	<p>Prior to the second audit, the DCR had recognized the need for, but had not yet implemented, a remedial plan for the piping and pressure vessel external protection program, which called for:</p> <ul style="list-style-type: none"> • Contracting with another contract maintenance firm (Madison), which would operate separately and independently of the primary maintenance contractor; • Procuring from Madison essentially all of the craft skills needed to constitute a self-sufficient work group (e.g., scaffold builders, pipefitters, insulators); • Excluding Madison from any routine maintenance functions not related to the piping and pressure vessel external protection program and the related painting program (see 43.c.); and • Assigning responsibility to a Madison supervisor for reviewing work requests, scheduling, and coordinating work. <p>By the time of the third Tier I audit (reference audit report issued September 9, 2005), the DCR had fully implemented its remedial plan. Madison's role subsequently grew as the DCR elected to use Madison for other regulatory compliance work in addition to the piping and pressure vessel external protection program and the related painting program (the painting was done by another contractor, but Madison provided support services such as scaffold building).</p> <p>DCR continued its practice of rotating the Madison crew through the refinery with the intention that the crew would service each unit once annually. A walkthrough inspection of a number of refinery units revealed that notable progress has been made since the inception of the CO in addressing the piping and pressure vessel external protection program backlog. However, an appreciable amount of work often remained uncompleted when the time came for the crew to move to the next unit, and ABS Consulting noted that there was no process for confirming that the remaining work could safely be deferred pending the return of the Madison crew nearly a year later. In response, the DCR committed to implementing controls to ensure that work that was not completed would be analyzed for potential MI significance to ensure that a deferral of approximately 12 months (until the crew next returned to that unit) was not inappropriate.</p> <p>Between the third and fourth Tier I audits (reference audit report issued March 3, 2006), the DCR continued to use the dedicated Madison team to address compliance-related issues such as the piping and pressure vessel external protection program and painting programs. A walkthrough inspection revealed that the program continued to make visible improvements within the refinery.</p> <p>As noted above, in the third audit report, ABS Consulting had expressed concern that there was no formalized deferral process for determining whether it was appropriate from an MI</p>	<p>had already been formulated for the program.</p> <p>In the third Tier I audit report (issued September 9, 2005), it was ABS Consulting's opinion, based on the corrective actions that had been implemented since the second Tier I audit, that the DCR had substantively addressed the issues identified in the prior audit, and was, at that time, compliant with the Tier I applicable requirements for this action.</p> <p>In the fourth Tier I audit report (issued March 3, 2006) and the fifth Tier I audit report (issued September 11, 2006), ABS Consulting again concluded that the DCR was compliant with the Tier I applicable requirements for this action.</p> <p>Based on the results of the previous Tier I audits and this final Tier I audit, it is ABS Consulting's opinion that the DCR is compliant with the Tier I applicable requirements for this action.</p>

BUSINESS CONFIDENTIAL

Table 1 Mechanical Integrity Consent Order Audit Results (cont'd)

Consent Order Tier I Applicable Requirements	Observations/Basis for Audit Conclusions	Audit Conclusions
	<p>perspective to delay a particular repair for another 12 months when the Madison crew left an area with work undone. In January 2006, the DCR prepared and implemented a new procedure FED-3H, <i>Piping & Pressure Vessel External Protection & Painting (EPP) Program Deferral Process</i>. This procedure prescribed a process to evaluate the deferral of such repairs.</p> <p>The use of the special Madison crew was intended as a temporary measure that would remain in place until the EPP backlog had been reduced to the point that the routine maintenance function could reassume responsibility for maintaining a new status quo (defined by a significant decrease in the incidence of missing, damaged, or temporary insulation, deteriorated or missing painting, and steam and utility leaks). During the third Tier I audit, ABS Consulting raised the issue that no mechanism existed for (1) identifying the backlog of work to be accomplished or (2) determining a reasonable expectation of when the EPP initiative should have reduced this backlog to the point that the special Madison team could be phased out. Discussions during the fourth audit identified the following approach to answering these two questions:</p> <ul style="list-style-type: none"> • Through implementation of the vessel and piping inspection program, external piping and vessel inspections would be scheduled and completed in accordance with API 510, <i>Pressure Vessel Inspection Code</i>, and API 570, <i>Piping Inspection Code</i>. These inspections would identify (for all units) the external corrosion, painting and insulation needs, and utility leaks that needed to be targeted by the EPP program. • Inspection report recommendations for correcting these EPP issues, along with their due dates, would be entered into FERRET. These due dates would be based upon the consideration of sound MI principles. For example: Is missing insulation on a vessel causing a corrosion problem? What is the corrosion rate? How quickly should the insulation be repaired to avoid excessive corrosion? • FED inspectors would write the repair work orders associated with inspection recommendations at the time the IR was written. • This sequence of events would ensure (1) that all needed repairs were identified, scoped, and scheduled to meet MI requirements and (2) compliance with the schedules established in FERRET. This would allow back calculation of the resources that must be devoted to the EPP program to meet the established schedules. <p>Between the fourth and fifth Tier I audits (reference audit report issued September 11, 2006), the DCR continued to use the dedicated Madison team. A walkthrough inspection again confirmed that the EPP program continued to make visible improvements within the refinery.</p> <p>As described above, conditions posing a potential threat to process material containment (e.g., service leaks onto piping and vessels, piping and equipment in need of painting, missing or</p>	

BUSINESS CONFIDENTIAL

Table 1 Mechanical Integrity Consent Order Audit Results (cont'd)

Consent Order Tier I Applicable Requirements	Observations/Basis for Audit Conclusions	Audit Conclusions
	<p>damaged insulation) continued to be identified by FED inspectors during the implementation of the vessel and piping inspection program. These inspections, conducted in accordance with API 510 and API 570, were essentially current at the time of the fifth audit.</p> <p>FED inspectors continued to assume responsibility for writing the repair work orders associated with inspection recommendations. Although the refinery had converted to SAP for its new CMMS subsequent to the prior audit, the new system had been successfully implemented, and an estimated 95% of the FERRET-related work orders had been planned (planning the work order allows determination of the labor hours that a particular job adds to the backlog). Staffing of the compliance (Madison) work crew and work priorities were being determined in response to the maintenance backlog with the objective of having no overdue EPP-related FERRET items.</p> <p>ABS Consulting noted that the piping and vessel inspections that were driving the EPP initiative are periodic in nature (with a given inspection being repeated at intervals ranging from approximately 5 to 10 years), and that diligence on the part of unit personnel would be required to ensure that conditions (such as insulation failures) occurring between inspections are identified and properly addressed. For example, it was observed that temporary insulation batts (which absorb water and can lead to excessive corrosion under the insulation) continued to be applied in the units in lieu of properly installed permanent insulation. ABS Consulting shared its concerns with refinery management regarding this practice, and the refinery subsequently procured suitable insulation materials for use in making temporary repairs.</p> <p>During this last Tier I audit, ABS Consulting learned that the DCR was no longer using the dedicated Madison crew for compliance-related activities. This was due, in part, to the fact that the refinery had worked off the backlog of overdue FERRET items (including compliance-related items) and was seeking to transition to a situation where the routine maintenance function was staying current with the workload.</p> <p>EPP work (including the painting program discussed in 43.c) is being bundled and funded by major authorization for expenditure (AFE) activities. For example, a major steam leak repair and winterization AFE had covered EPP-related activities (utility leaks impinging on equipment, insulation repairs, etc) from the middle of November to the time of this audit. While much of this work was inspection-based items from the FERRET database, the AFE funding was sufficient to require supplementing the work list with a significant contribution of unit-generated work orders.</p> <p>While the crew addressing EPP items is staffed by the new routine maintenance contractor (J. J. White), the crew was, at the time of the audit, staffed independent of any maintenance group</p>	

BUSINESS CONFIDENTIAL

Table 1 Mechanical Integrity Consent Order Audit Results (cont'd)

Consent Order Tier I Applicable Requirements	Observations/Basis for Audit Conclusions	Audit Conclusions
	<p>head count restrictions, and the DCR was using a contract maintenance team leader (MTL) to ensure that adequate staffing was available for planning and coordinating the work.</p> <p>As discussed in the third audit report, the success of the current system in addressing EPP-related issues is driven by the (1) robustness of the vessel and piping inspection program, (2) establishment of technically sound due dates for MI-related maintenance issues identified within those inspections, and (3) completion of the identified work according to the schedules tracked within the FERRET system. The implementation of the piping inspection program was described in 42.b. While not explicitly addressed by the CO requirements in 42.b, the vessel external inspection program has also been integrated into this EMPRV-based system, and is similarly implemented. The continued implementation of the FERRET system, and the DCR's continued emphasis on no overdue FERRET items, was discussed in 41.d. Improvements in the quality of inspection reports and report recommendations were discussed in 39.b. The continued success of these constituent activities provides the basis for confidence that improvements in EPP-related matters will continue to be made.</p> <p>A facility tour conducted during this last audit revealed continued improvement in the condition of the refinery. Work remains to be done; however, the current system, if it continues to be implemented as described above, should lessen the potential for MI-related incidents. As note previously, however, the inspection program can be only a partial driver for addressing EPP issues. Continued initiative by Operations personnel to identify deteriorated equipment and insulation and to submit work requests to address such conditions, will be required.</p>	
<p>c. Within six (6) months of the Approval Date, Motiva will develop a twelve (12) month painting program, which program thereafter shall be updated every six (6) months during the term of this Consent Order (the "Painting Program").</p>	<p>The DCR provided initial and updated paint schedules, as required prior to each of the six semiannual audits. Specific observations regarding the progress of the painting program from each audit report follow.</p> <p>As noted in the first Tier I report (issued September 9, 2004), the DCR issued a new standing instruction number 5.3.2, <i>DCR Painting Program</i>, on July 9, 2004. The procedure required the systematic review of the FERRET database, inspection reports, and work orders entered into the CMMS to identify painting required to be completed in support of the MI program. Backlog lists of required painting were developed by process unit to support the ongoing 12-month schedule, which had been developed and published. A dedicated team of four painters had been formed to address this work.</p> <p>As noted in the second Tier I report (issued March 14, 2005), the DCR had added two more painters to the dedicated painting crew, on a temporary basis. This, coupled with milder than anticipated fall weather, allowed the DCR to aggressively move ahead of its established painting schedule.</p>	<p>The consent order only required that the DCR develop a 12-month painting schedule, and update this schedule prior to each semiannual audit. As noted in each of the prior audit reports, and in this final audit, ABS Consulting concluded that the DCR was compliant with the Tier I applicable requirements for this action.</p> <p>Beyond the literal requirements of the CO, however, it should be noted that the DCR has aggressively pursued this painting program, taking advantage of several years of temperate winters</p>

BUSINESS CONFIDENTIAL

Table 1 Mechanical Integrity Consent Order Audit Results (cont'd)

Consent Order Tier I Applicable Requirements	Observations/Basis for Audit Conclusions	Audit Conclusions
	<p>As noted in the third Tier I audit (reference audit report issued September 9, 2005), the DCR was maintaining a crew of six painters devoted to this task. A walkthrough inspection of a number of refinery units revealed that notable progress had been made since the inception of the CO in addressing the painting backlog.</p> <p>Between the third and fourth Tier I audits (reference audit report issued March 3, 2006), significant progress had been made due to good weather and the productivity of the painting crew. The DCR was about 9 months ahead of the previously documented schedule and had to redo the schedule to establish a new supplemental work scope for the subject period.</p> <p>While not explicitly mentioned in the fifth Tier I audit report (reference audit report issued September 11, 2006), a walkthrough inspection again confirmed that the painting program continued to make visible improvements within the refinery.</p> <p>Observations on the painting program made during this final Tier I audit parallel those for the EPP program, as detailed in 43.b. A contract painting crew continues to work in the refinery, addressing primarily inspection-identified work tracked within the FERRET system. A facility tour conducted during this last audit revealed continued improvement in the condition of the refinery.</p>	<p>to extend the length of the painting season and accelerate the progress.</p>
<p>d. ABSG will Audit the DCR's painting performance against the Painting Program nineteen (19) months and thirty-one (31) months, respectively, after the Approval Date.</p>	<p>See 43.c for the details of ABS Consulting's periodic evaluations of the progress of the painting program.</p>	<p>ABS Consulting did not explicitly address this requirement in the third Tier I audit (issued September 9, 2005). However, the DCR has consistently met or exceeded its established painting schedule.</p> <p>In the fifth Tier I audit report (issued September 11, 2006), ABS Consulting concluded that the DCR had complied with the Tier I applicable requirements for this action.</p> <p>Based on the results of the previous Tier I audits and this final Tier I audit, it is ABS Consulting's opinion that the DCR is compliant with the Tier I applicable requirements for this action.</p>

BUSINESS CONFIDENTIAL

Table 1 Mechanical Integrity Consent Order Audit Results (cont'd)

Consent Order Tier I Applicable Requirements	Observations/Basis for Audit Conclusions	Audit Conclusions
44. Mechanical Integrity Protective Instrumentation System ("PIS") Procedure and Training		
<p>a. Within six (6) months of the Approval Date, Motiva shall develop and implement a formalized, written PIS testing procedure at the DCR. Implementation of such procedure shall include associated training of appropriate Motiva craftsmen and process unit operators in the requirements and procedures commensurate with their respective responsibilities.</p>	<p>During the first Tier I audit, ABS Consulting found that the DCR had issued a new standing instruction number 2.9.19, <i>Management of Safety Instrumented Systems</i>, on June 22, 2004. This new standing instruction covered the overall administration of the safety instrumented systems (SISs), including general requirements for SIS classification, SIS inspection and testing, and training of operators and technicians in the requirements and procedures commensurate with their respective responsibilities. *</p> <p>During the final Tier I audit, ABS Consulting reviewed the status and implementation of standing instruction 2.9.19. This standing instruction is still in use and was revised in December 2005. The major change associated with this revision included revising the risk matrix used in the layer of protection analysis to reflect Valero's corporate risk matrix and SIS safety integrity level (SIL) criteria.</p>	<p>As noted in the first Tier I audit, (issued September 9, 2004), ABS Consulting concluded that the Tier I applicable requirements for this action item had been completed.</p> <p>The current audit indicated that the DCR continues to implement standing instruction number 2.9.19, satisfying the intent underlying this action item.</p>
<p>b. ABSG shall Audit the DCR to confirm that the PIS testing procedure has been developed and implemented, and that the required training has been provided to appropriate Motiva craftsmen and process unit operators during the next Semi-Annual Audit.</p>	<p>During the first Tier I audit, ABS Consulting found that more detailed loop-specific SIS testing procedures were being developed consistent with general requirements of standing instruction 2.9.19. A refinerywide schedule had been developed for the completion of the procedure development.</p> <p>Also, at the time of the first Tier I audit, ABS Consulting found that initial training of operators and technicians on their respective responsibilities for meeting the general requirements of the SIS program had been completed.</p> <p>During the final Tier I audit, ABS Consulting reviewed the continuing implementation of standing instruction 2.9.19. This review began with an understanding of the implementation process, which is briefly described below:</p> <ul style="list-style-type: none"> • Review each unit to identify SISs • Perform a cursory evaluation of SISs to determine SILs. (Note: These cursory evaluations did not include formal layer of protection analyses [LOPAs], but were based on engineering judgment) • Identify test frequencies for SISs, based on generalized testing frequency requirements in the standing instruction • Develop specific SIS test procedures. (Note: ABS Consulting randomly selected 	<p>The CO required auditing the implementation of the standing instruction during the first semiannual audit – shortly after the procedure was written. As noted in the first Tier I audit, (issued September 9, 2004), ABS Consulting concluded that the DCR was compliant with the Tier I applicable requirements for this action at that time.</p> <p>Based on the results of the final Tier I audit, it is ABS Consulting's opinion that the DCR had developed a PIS testing procedure (i.e., standing instruction 2.9.19) and had provided the required training to appropriate craftsmen and process unit operators.</p>

* Note that the term SIS, currently used by the DCR, is synonymous with the term PIS used in the CO.

BUSINESS CONFIDENTIAL

Table 1 Mechanical Integrity Consent Order Audit Results (cont'd)

Consent Order Tier I Applicable Requirements	Observations/Basis for Audit Conclusions	Audit Conclusions
	<p>several SISs and found that specific test procedures had been developed)</p> <ul style="list-style-type: none"> • Perform and document SIS tests <p>Currently, the DCR is performing formal LOPA studies as part of the PHA revalidations to validate/modify the preliminary SIL determinations.</p> <p>The training for technicians and unit process operators consisted of computer-based training (CBT) on the requirements and responsibilities in standing instruction 2.9.19. ABS Consulting reviewed training records for maintenance instrument technicians and process unit operators and determined that personnel had been trained in 2004 and 2005. A review of the training materials for maintenance instrument technicians and process unit operators found that these materials included the applicable requirements in the standing instruction. Also, understanding of the training was verified via testing. The DCR plans on repeating the CBT every 3 years. The training on specific SIS test procedures is accomplished via on-the-job training.</p> <p>ABS Consulting also randomly selected SIS testing documentation to verify that technicians and process unit operators involved in the SIS tests had received training. This review found that all personnel involved in the SIS tests reviewed had received required training.</p> <p>Next, ABS Consulting reviewed the overall implementation of the requirements in standing instruction 2.9.19. In reviewing standing instruction 2.9.19, ABS Consulting found that the standing instruction describes practices that meet the requirements in applicable SIS standards (e.g., ANSI/ISA-84.01) and includes some practices that exceed the practices in other refinery SIS programs that ABS Consulting has audited in the last several years. In addition, ABS Consulting found that the DCR has implemented many of the requirements in the standing instruction; however, the following requirements of the standing instruction had not been completely implemented at the time of this audit:</p> <ul style="list-style-type: none"> • Training of engineering disciplines, as required in Section 4.7 • Developing a procedure for incident notification and for conducting SIS incident investigations, as required in Section 4.9 • Implementing Operations responsibility to initiate a test deferral request (including documentation of the deferral on the form in Appendix B), as required in Section 6.1.3 • Testing of SIL 1, 2, and 3 SISs at the required test frequencies defined in Section 6.2.2.4 (see additional discussion on SIS testing below) • Compiling and reporting on SIS performance indicators on a quarterly basis, as required in Section 6.3.1 <p>As part of the review of the implementation of this standing instruction, ABS Consulting</p>	<p>However, the DCR's incomplete implementation of some portions of the PIS testing procedure warrants a conclusion that the DCR has not fully complied with this applicable Tier I requirement for this action item.</p> <p>After the initial onsite activities, the DCR began addressing the implementation deficiencies associated with this action item. These corrective actions included (1) revising the standing instruction 2.9.19 to address some of the implementation difficulties, (2) developing a corrective action plan for completing testing of SISs for which documentation of testing was not available during this audit, and (3) developing and documenting an overall SIS device testing schedule. While these corrective actions appear to address the implementation deficiencies identified during this audit, the DCR has not yet had an opportunity to fully implement these corrective actions. Therefore, ABS Consulting recommends that additional follow-up audits be performed to evaluate the subsequent implementation and effectiveness of these corrective actions.</p>

BUSINESS CONFIDENTIAL

Table 1 Mechanical Integrity Consent Order Audit Results (cont'd)

Consent Order Tier I Applicable Requirements	Observations/Basis for Audit Conclusions	Audit Conclusions
	<p>inquired about the status of SIS testing and the schedule for testing. The following summarizes the results of this inquiry at the time of the final Tier I audit:</p> <ul style="list-style-type: none"> • The DCR had identified a total of 540 SIS tests in 15 different refinery units • The DCR had not developed and documented an overall schedule for SIS testing • The DCR had completed 429 SIS tests, leaving 111 SIS tests remaining to be performed • Nine refinery units had one or more SIS tests that needed to be performed • No SIS tests had been performed for three other refinery units <p>In addition, it was found during this audit that the turnarounds (TAs) for at least two refinery units (i.e., crude unit 21 and tetra unit 32) had been deferred without completion of the SIS deferral form (i.e., the form in Appendix B of the standing instruction). Based on interviews with refinery personnel, ABS Consulting concluded that the existence of the SIS deferral process was not widely known and not commonly used.</p> <p>In response to ABS Consulting’s observations during the final Tier I audit, the DCR has developed and provided ABS Consulting with a partial plan to correct the SIS testing deficiencies. The following summarizes this plan as of this report’s date of issue:</p> <ul style="list-style-type: none"> • 100 of the 111 of the remaining SIS tests will be completed by the end of September 2007 • 11 of the 111 of the remaining SIS tests will be completed during the 2008 TAs for units 21 and 36 <p>Based on the results of this final Tier I audit, it is ABS Consulting’s opinion that the DCR’s implementation of the standing instruction does not warrant a conclusion that the DCR has complied with all applicable Tier I requirements. ABS Consulting suggests the following improvements are needed:</p> <ul style="list-style-type: none"> • Training on standing instruction 2.9.19 needs to include the engineering disciplines required to be trained by the standing instruction • An overall schedule needs to be developed to establish the routine test date for each SIS. • All other standing instruction requirements identified above, especially the SIS deferral process, need to be implemented <p>While not an explicit requirement of this CO, ABS Consulting also suggests that the DCR consider developing and implementing a training program for other affected DCR personnel. Such personnel would include instrument & electrical and distributed control system engineering personnel, who are required to receive training per Section 4.7 of the standing instruction (but were not explicitly required to receive training as part of this CO action item), and refinery managers who are key participants in SIS program decisions. The intent of this</p>	

BUSINESS CONFIDENTIAL

Table 1 Mechanical Integrity Consent Order Audit Results (cont'd)

Consent Order Tier I Applicable Requirements	Observations/Basis for Audit Conclusions	Audit Conclusions
	<p>recommendation is to ensure that all affected personnel understand their responsibilities within the SIS testing system (e.g., including the Operations responsibility to initiate a test deferral request when SISs cannot be tested according to schedule). (Note: These observations and suggestions did not have a bearing on ABS Consulting's conclusion that the DCR had not yet complied with all applicable Tier I requirements.)</p>	
<p>45. Common Instrumentation Database</p>		
<p>a. Within six (6) months of the Approval Date, Motiva shall consolidate the various DCR instrumentation index databases into a single system.</p>	<p>As noted in the first Tier I report (issued September 9, 2004), the DCR had consolidated 34 individual instrument databases into the common INtools[®] database application. This was completed on February 10, 2003.</p>	<p>In the first Tier I report (issued September 9, 2004), ABS Consulting concluded that the Tier I applicable requirements for this action item had been completed.</p> <p>Continuing implementation of the database is discussed in 45.b.</p>
<p>b. ABSG shall Audit the DCR to confirm that a common instrument index system has been created during the next Semi-Annual Audit.</p>	<p>As noted in the first Tier I report (issued September 9, 2004), the DCR had, in response to a prior suggestion by ABS Consulting, implemented an INtools[®] feature that allows tracking of database update activities. This was intended to allow subsequent monitoring to determine the degree to which the database was being maintained. A review of the activity log at that time confirmed continuing efforts to update the database.</p> <p>During the final Tier I audit, ABS Consulting reviewed the continuing implementation of this common database. System records logging maintenance accesses to the database were reviewed. Also, several recent engineering projects were selected to determine if associated instrumentation had been entered into the database. This instrumentation was either found in the database or, in the case of one recent, large project, the engineering contractor had compiled the necessary information on a CD, which was awaiting the database contractor to upload. An interview with the database custodian indicated that refinery staff has found the consolidated database to be a real benefit.</p>	<p>In the first Tier I report (issued September 9, 2004), ABS Consulting concluded that the DCR had satisfied the Tier I applicable requirements for this action item.</p> <p>Based on the results of the final Tier I audit, it is ABS Consulting's opinion that the DCR continues to maintain the database, in compliance with the intent underlying this action item.</p>

BUSINESS CONFIDENTIAL

Table 1 Mechanical Integrity Consent Order Audit Results (cont'd)

Consent Order Tier I Applicable Requirements	Observations/Basis for Audit Conclusions	Audit Conclusions
46. Temporary Repairs to Pressure Equipment		
a. Motiva shall implement a formalized, written procedure for Temporary Repairs to Pressure Equipment.	The consent order did not establish a deadline for completing this task. As noted in the second Tier I report (issued March 14, 2005), standing instruction 5.1.4, <i>Temporary Repairs to Pressure Equipment</i> , had been issued by the DCR on August 7, 2002, and subsequently revised on December 1, 2004.	In the second Tier I report (issued March 14, 2005), ABS Consulting concluded that the Tier I applicable requirements for this action item had been completed. Continuing implementation of the procedure is discussed in 46.b.
b. Thirteen (13) months after the Approval Date, ABSG shall Audit the DCR's performance under the Temporary Repairs to Pressure Equipment procedure, by reviewing a representative sample of the temporary repairs generated at the DCR during the previous twelve (12) month period.	<p>Standing Instruction 5.1.4, <i>Temporary Repairs to Pressure Equipment</i>, establishes the requirements for implementation of the Temporary Repair (TR) procedure.</p> <p>As noted in the second Tier I report (issued March 14, 2005), records for approximately 20 TRs were reviewed, revealing a number of issues with respect to the DCR's compliance with the requirements of 5.1.4:</p> <ul style="list-style-type: none"> • Design drawings were not in the FED file for four temporary repairs (subsequent inquiry revealed that the drawings for three TRs were in the possession of the unit engineer). • Necessary information or approvals were missing from six TR approval forms. • Vendor-supplied design drawings typically did not specify the sealant material to be used. • The vendor-supplied design drawings reviewed often did not state the weight of the clamp (including sealant), and the documentation associated with the TR typically did not indicate whether the weight of the clamp was considered in determining if the clamp should be installed. • Design calculations commonly did not include references to the source of the equations used. • TR forms and/or related documentation were not available for three repairs. • The TR log had not been updated in a timely fashion to reflect the removal of three temporary repairs. • The TR log indicated that three TRs remained in place beyond their approved durations without reauthorization (the status of two of these was later resolved, but the original observation still points to a documentation lapse). • Four TRs remained in place with discrepancies between the required removal dates established by the inspection reports and the required removal date recorded in the TR log (DCR staff agreed that the dates in the log were inaccurate). 	<p>In the second Tier I report (issued March 14, 2005), ABS Consulting concluded that the DCR was not, at the time of the audit, in compliance with the Tier I applicable requirements for this requirement.</p> <p>In the third Tier I audit (issued September 9, 2005), it was ABS Consulting's opinion, based on the corrective actions that had been implemented since the second semiannual audit, that the DCR had substantively addressed the issues identified in the prior audit, and was, at that time, compliant with the Tier I applicable requirements for this action.</p> <p>Based on the results of this final Tier I audit, it is ABS Consulting's opinion that the DCR is compliant with the Tier I applicable requirements for this action.</p> <p>As part of the continuing efforts to improve documentation, ABS Consulting suggests that IRs</p>

BUSINESS CONFIDENTIAL

Table 1 Mechanical Integrity Consent Order Audit Results (cont'd)

Consent Order Tier I Applicable Requirements	Observations/Basis for Audit Conclusions	Audit Conclusions
	<ul style="list-style-type: none"> • The FED records were missing documentation of some TRs that had been in service for as long as 12 months. <p>Based upon the cited information, it was ABS Consulting’s opinion that the DCR was not, at the time of the January 2005 audit, in compliance with the Tier I applicable requirements for this item. ABS Consulting recommended that this Tier I requirement be audited again during the next semiannual audit (even though such an audit was not addressed by the CO).</p> <p>As noted in the third Tier I audit report (issued September 9, 2005), approximately 20 TR forms executed since the previous audit were reviewed. The observations made during this audit indicated that the DCR had made significant strides in addressing the concerns identified in the January 2005 audit. For example:</p> <ul style="list-style-type: none"> • Extensive effort had been made to reconcile the physical inventory of TRs against the TR log. • TRs remaining in service after their original expiration date had been inspected by the FED inspector and the reliability engineer and appropriately extended. • Records (such as supporting calculations or design drawings) that had previously been filed in diverse locations (such as an engineer’s personal files) had been consolidated in the FED records. • Information that was often previously omitted from the vendor drawings (such as the identity of the specific sealant to be used and the weight of the clamp as installed) was commonly included in the information package provided by the vendor. <p>Occasional information discrepancies continued, but did not illustrate consistent patterns or trends. It was noted that while continuing diligent effort would be required to ensure that accurate, detailed records of TR program implementation are maintained, significant improvements in the mechanical integrity of TRs were implemented. It was ABS Consulting’s opinion that the DCR was compliant with the Tier I applicable requirements for this action at the time of the July 2005 audit.</p> <p>For this final Tier I audit, ABS Consulting reviewed in detail 15 TR approval forms, out of the 54 forms that were executed in 2006, and the records in the TR log for TRs implemented subsequent to July 2005 (to properly evaluate any improvements in TR program performance subsequent to the July 2005 audit).</p> <p>Observations regarding the implementation of the TR program included:</p> <ul style="list-style-type: none"> • The TR log was not up to date when the audit began, but was brought up to date during the audit. It is recognized that the log is expected to be in constant change as items are created, updated, and closed out over time, but some of the discrepancies were old enough to suggest that more timely updating of the log is warranted. 	<p>always be used to document the physical inspections and analyses made to justify extensions to the service life of installed TRs.</p>

BUSINESS CONFIDENTIAL

Table 1 Mechanical Integrity Consent Order Audit Results (cont'd)

Consent Order Tier I Applicable Requirements	Observations/Basis for Audit Conclusions	Audit Conclusions
	<ul style="list-style-type: none"> • Due dates for removal of TRs often do not reflect the duration of TAs (i.e., the due date for removal is set at the anticipated TA start [oil-out] date, but the TR removal occurs at a later date during the TA). This creates the appearance that the TRs were delinquent for removal. However, there is no MI concern since the affected equipment was out of service for the TA. Several “apparently late” TR removals were only resolved by confirming that they had been removed before the oil-in dates at the end of the associated TAs. • Other TR log entries contained dates with typographical errors that made it appear that the removal had been delinquent. For example: 05-42-TR-027 and 04-37-TR-058. • Four TRs were removed past their required removal dates. Two (05-24-TR-015 and 05-24-TR-024) had been reviewed by the FED inspector who gave verbal approval for the extension. Two others (05-15-TR-030 and 05-15-TR-031) were removed only 4 days beyond the requirement. While neither situation (i.e., verbal extension or ‘slightly overdue’ removal) posed any MI concern, both represented variances from the standing instruction requirement that TRs may remain in place beyond the scheduled removal date only if they are “reapproved and redocumented.” • A fifth TR, 04-25-TR-040, was overdue for removal and had neither been extended nor listed on the current TA deferral list for its unit. • A number of other documentation deficiencies were detected during the records review. These were generally “one-of-a-kind” situations, and did not demonstrate a trend of consistent problems. Each of these was reviewed with FED staff and resolved. <p>None of these observations related to a direct concern for compromised mechanical integrity. They do, however, point to a need for closer review of the TR records, which FED management has committed to providing.</p> <p>Discussions between ABS Consulting and FED staff determined that a number of the issues observed during this final audit could be addressed if IRs were always used to document the physical inspections and analyses made to justify extensions to the service life of installed TRs.</p> <p>The TR procedure specifies that the clamp vendor will specify the sealant and submit this information to the Reliability Engineer for review and approval prior to installation. However, as the second Tier I report noted, the DCR has previously lacked the information about the suitability of the various sealants necessary to perform an informed review for a particular installation (i.e., in consideration of the process chemicals and service temperature and pressure). During the current audit, ABS Consulting confirmed that the DCR had obtained a</p>	

BUSINESS CONFIDENTIAL

Table 1 Mechanical Integrity Consent Order Audit Results (cont'd)

Consent Order Tier I Applicable Requirements	Observations/Basis for Audit Conclusions	Audit Conclusions
	<p>suitable material compatibility matrix for use in the review of the vendor's specified sealant. One additional observation from the audit related to possible confusion regarding the requirement in the standing instruction that hoop stress calculations be provided for those situations where a flange is wrapped with wire to stop a leak. It was ABS Consulting's observation that such calculations were typically not provided. In response to our inquiries, the DCR has researched industry practice and will revise the standing instruction to clarify that such calculations are only required when the system pressure exceeds 250 psig.</p>	
<p>47. Triangle of Prevention ("TOP") Incident Investigation Reports</p>		
<p>a. Within six (6) months of the Approval Date, Motiva shall develop a formalized, written procedure for the review of TOP incident investigation reports to identify and resolve outstanding action items ("TOP Review Program"). The TOP Review Program shall include (i) steps to inform affected Motiva employees and contractors in a timely manner of any on-going safe work practice issues, (ii) a process for the on-going review of the implementation status of the outstanding action items until such matters are resolved, and (iii) a process to review systemic recommendation trends from incident investigations and to establish relevant follow-up actions. In the event that Motiva is no longer authorized to use the TOP Review Program, it shall implement a program at the DCR that is equivalent to the TOP Review Program.</p>	<p>As noted in the first Tier I report (issued September 9, 2004), the DCR revised standing instruction number 2.1.9, <i>Incident Investigation</i>, on June 10, 2004, to incorporate the changes necessary to address the CO requirements. The revised procedure included instructions addressing (1) informing employees and contractors of the lessons learned from incident investigations, (2) tracking investigation recommendations through to their resolution, and (3) reviewing incident investigation lessons learned to identify trends requiring special follow-up actions.</p> <p>For this final Tier I audit, ABS Consulting confirmed that the standing instruction was still in use and learned that it had been revised several times during the term of the CO to better meet the objectives of the CO.</p>	<p>In the first Tier I report (issued September 9, 2004), ABS Consulting concluded that the Tier I applicable requirements for this action item had been completed.</p> <p>The current audit indicated that the DCR continues to follow the standing instruction, satisfying the intent underlying this action item.</p>

BUSINESS CONFIDENTIAL

Table 1 Mechanical Integrity Consent Order Audit Results (cont'd)

Consent Order Tier I Applicable Requirements	Observations/Basis for Audit Conclusions	Audit Conclusions
<p>b. During the term of this Consent Order, Motiva shall implement the TOP Review Program. ABSG shall Audit a representative sample of the TOP Investigation Reports to determine if the DCR has substantially complied with the TOP Review Program nineteen (19) months and thirty-one (31) months, respectively after the Approval Date.</p>	<p>As noted in the third Tier I audit report (issued September 9, 2005) ABS Consulting reviewed the implementation of the TOP Review Program and specifically addressed the three aspects of the program cited in 47.a. Observations relevant at the time of the audit were:</p> <p>(1) <i>Steps to inform affected DCR employees and contractors in a timely manner of any ongoing safe work practice issues:</i> In addition to posting all completed TOP reports on the site intranet, the DCR typically shared learnings from incident investigations via safety meetings, often in the form of written training packages. However, several Type 2 (TOP) investigations were noted as having been completed, yet the investigation reports were not listed as being available on the site intranet.</p> <p>(2) <i>Ongoing review of the implementation status of the outstanding action items until such matters are resolved:</i> Incident investigation report recommendations (action items) were entered into the FERRET system and tracked to resolution. At the time of the audit, 20 out of the 284 recommendations sampled were overdue, and 2 recommendations did not have a due date established in the FERRET database. ABS Consulting noted that the DCR had reduced the number of overdue incident recommendations in the FERRET database by about 60% during the prior 6 months, but was concerned that newly delinquent items were accumulating in the FERRET, even as the DCR worked to resolve the backlog of FERRET items.</p> <p>(3) <i>Process to review systemic recommendation trends from incident investigations and to establish relevant follow-up actions:</i> Completed investigation reports were reviewed each month to develop the safety statistics presented at the EHS review meeting. A survey of reports prepared for this meeting indicated that the trending focused on (1) conventional worker safety issues (e.g., body part injured and nature of injury) and (2) general root cause categories from the TOP procedure (e.g., “Design & Engineering” or “Training & Procedures”). A review of recent TOP investigation reports indicated that there were other process-related or MI-related themes that may be appropriate for trending. For example, two incident reports described events involving the infiltration of flammable or corrosive vapors into buildings that should have had positive pressure ventilation systems functioning to prevent the ingress of such atmospheres. Another example was the frequency of piping and other equipment failures resulting from inadequate implementation of winterization programs.</p> <p>ABSG Consulting suggested that the DCR broaden its thinking with respect to incident trending to include topics beyond conventional worker safety issues. The intent would be to focus on event trends that may point to the potential for significant loss of containment events and other MI-related consequences.</p> <p>The CO requires that “[i]n the event that Motiva is no longer authorized to use the TOP Review Program, it shall implement a program at the DCR that is equivalent to the TOP</p>	<p>In the third Tier I audit report (issued September 9, 2005) and in the fifth Tier I report (issued September 11, 2006), ABS Consulting concluded that the DCR was in compliance with the Tier I applicable requirements for this action item.</p> <p>Based on the results of this final Tier I audit, it is ABS Consulting’s opinion that the DCR is compliant with the Tier I applicable requirements for this action.</p>

BUSINESS CONFIDENTIAL

Table 1 Mechanical Integrity Consent Order Audit Results (cont'd)

Consent Order Tier I Applicable Requirements	Observations/Basis for Audit Conclusions	Audit Conclusions
	<p>Review Program.” ABS Consulting noted that there was a period late in 2004 (duration of at least 3 months) during which the TOP investigation program was effectively curtailed by the inability to find sufficient numbers of represented employees to serve on the investigation teams. In fact, there were no TOP investigation reports issued in the fourth quarter of 2004, in contrast to the 10 investigations per quarter that would be more typically representative of the last 3 years. ABS Consulting was informed that programs had been put into place to facilitate the future availability of represented employee investigators.</p> <p>As noted in the fifth Tier I audit report (issued September 11, 2006) ABS Consulting reviewed approximately 20 incident investigation reports and noted improvements in the quality and timeliness of the investigations relative to the observations made during the audit conducted in July 2005.</p> <p>During this final Tier I audit, ABS Consulting reviewed 13 incident investigation reports and noted continued improvements in the quality of the investigations. A number of completed investigations were reviewed, and it was confirmed that all recommendations had been properly entered into the FERRET system.</p>	