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Docket Number 50-346  
License Number NPF-3  
Serial Number 1-1502  
September 17, 2007

Mr. James L. Caldwell, Administrator  
United States Nuclear Regulatory Commission, Region III  
2443 Warrenville Road, Suite 210  
Lisle, IL 60532-4352

Subject: Submittal of Independent Assessment Report of the Corrective Action Program  
Implementation for the Davis-Besse Nuclear Power Station - Year 2007

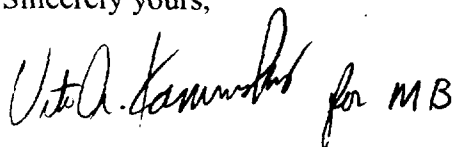
Dear Mr. Caldwell:

The purpose of this letter is to submit the assessment report for the 2007 Independent Assessment of the Corrective Action Program (CAP) Implementation for the Davis-Besse Nuclear Power Station (DBNPS). This submittal is in accordance with the Nuclear Regulatory Commission (NRC) letter, dated March 8, 2004, "Approval to Restart the Davis-Besse Nuclear Power Station, Closure of Confirmatory Action Letter, and Issuance of Confirmatory Order," which requires submittal of the assessment results within forty-five (45) days of the completion of the assessment.

The on-site activities of the CAP Implementation Independent Assessment were conducted from July 9, 2007 to July 20, 2007, in accordance with the Assessment Plan, Revision 1, submitted via DBNPS letter Serial Number 1-1496, dated June 11, 2007. The final debrief of the assessment results was presented to DBNPS management on August 3, 2007, marking the end of the assessment. The enclosed report contains the results of the Independent Assessment. No issues rising to the level of an Area for Improvement were identified in the Independent Assessment; therefore, no action plans are included to address areas for improvement.

If you have any questions or require further information, please contact Mr. Raymond A. Hruby, Jr., Manager - Regulatory Compliance, at (419) 321-8000.

Sincerely yours,

Handwritten signature of Mark B. Bezilla in black ink, with the initials "for MB" written to the right of the signature.

Mark B. Bezilla

JCS

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Docket Number 50-346  
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Page 2 of 2

Enclosures:

- 1) Commitment List
- 2) Independent Assessment of the Corrective Action Program Implementation at Davis-Besse Nuclear Power Station

cc: USNRC Document Control Desk  
DB-1 NRC/NRR Project Manager  
DB-1 NRC Senior Resident Inspector  
Utility Radiological Safety Board

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Serial Number 1-1502  
Enclosure 1

### COMMITMENT LIST

The following list identifies those actions committed to by FirstEnergy Nuclear Operating Company's (FENOC) Davis-Besse Nuclear Power Station (DBNPS) in this document. Any other actions discussed in the submittal represent intended or planned actions by the DBNPS. They are described only for information and are not regulatory commitments. Please notify the Manager - Regulatory Compliance at (419) 321-8000 with any questions regarding this document or associated regulatory commitments.

| <u>COMMITMENTS</u> | <u>DUE DATE</u> |
|--------------------|-----------------|
| None               | N/A             |

Docket Number 50-346  
License Number NPF-3  
Serial Number 1-1502  
Enclosure 2

INDEPENDENT ASSESSMENT  
OF THE  
CORRECTIVE ACTION PROGRAM IMPLEMENTATION AT  
DAVIS-BESSE NUCLEAR POWER STATION

(82 pages follow)

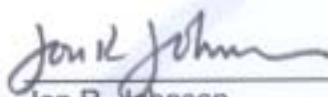
# Independent Assessment of the Corrective Action Program Implementation at Davis-Besse Nuclear Power Station

COIA-CAP-2007  
July 9 to July 20, 2007

## Team Members:

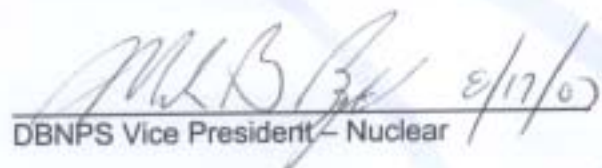
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## Submitted By:

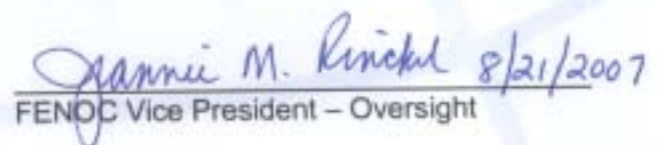


Jon R. Johnson  
August 9, 2007

## Reviewed and Accepted By:



DBNPS Vice President - Nuclear



FENOC Vice President - Oversight

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## ACRONYMS

|        |   |
|--------|---|
| ACE    | Apparent Cause Evaluation                       |
| AFI    | Area for Improvement                            |
| AFPT   | Auxiliary feed water pump turbine               |
| AFW    | Auxiliary feed water                            |
| ANA    | Area in Need of Attention                       |
| ANI    | Authorized Nuclear Inspector                    |
| AOV    | Air-operated valve                              |
| ASME   | American Society of Mechanical Engineers        |
| <br>   |   |
| BWST   | Borated Water Storage Tank                      |
| <br>   |   |
| CA     | Corrective Action                               |
| CAP    | Corrective Action Program                       |
| CAPI   | Corrective Action Program Implementation        |
| CAQ    | Condition Adverse to Quality                    |
| CAQ-CA | Condition Adverse to Quality – Apparent Cause   |
| CAQ-CB | Condition Adverse to Quality – Basic Cause      |
| CAQ-CC | Condition Adverse to Quality – Closed           |
| CAQ-CF | Condition Adverse to Quality – Fix              |
| CAQ-CR | Condition Adverse to Quality – Root Cause       |
| CARB   | Corrective Action Review Board                  |
| CATI   | Corrective Action Program Team Inspection       |
| CCW    | Component cooling water                         |
| CHT    | Component Health and Trending                   |
| CNRB   | Company Nuclear Review Board                    |
| COIA   | Confirmatory Order Independent Assessment       |
| CR     | Condition Report                                |
| CRC    | Curriculum Review Committee                     |
| CREST  | Condition Report Evaluation and Status Tracking |
| CRPA   | Condition Report Process Administrator          |
| CST    | Condensate storage tank                         |
| <br>   |   |
| DBBP   | Davis-Besse Business Practice                   |
| DBE    | Design Basis Engineering                        |
| DH     | Decay heat                                      |
| DHR    | Decay heat removal                              |
| DLF    | Dynamic load factor                             |
| <br>   |   |
| EAL    | Emergency Action Level                          |
| ECP    | Employee Concerns Program                       |
| ECR    | Engineering Change Request                      |
| EDG    | Emergency diesel generator                      |
| EHC    | Electro-hydraulic control                       |
| EPRI   | Electric Power Research Institute               |
| ER     | Effectiveness Review                            |
| EWR    | Engineering Work Request                        |



|       |   |
|-------|---|
| FAC   | Flow Accelerated Corrosion (Program)  |
| FACE  | Full Apparent Cause Evaluation  |
| FENOC | First Energy Nuclear Operating Company  |
| FME   | Foreign material exclusion  |
| GE    | General Electric Company  |
| HEAT  | Human Performance Evaluation and Assessment Team  |
| HELB  | High Energy Line Break  |
| HPI   | High Pressure Injection   |
| HRA   | High-radiation area   |
| IL    | Identified leakage  |
| IN    | Information Notice  |
| INPO  | Institute of Nuclear Power Operations   |
| IP    | Inspection Procedure (NRC)  |
| IPA   | Integrated Performance Assessment   |
| IV    | Independent verification  |
| LACE  | Limited Apparent Cause Evaluation   |
| LAR   | License Amendment Request   |
| LOCA  | Loss of coolant accident  |
| LVSGR | Low voltage switchgear room   |
| MAOM  | Management Alignment and Ownership Meeting  |
| MIC   | Microbiologically influenced corrosion  |
| MOV   | Motor-operated valve  |
| MR    | Maintenance Rule  |
| MRB   | Management Review Board   |
| MSPI  | Mitigating System Performance Index   |
| MSR   | Moisture Separator Reheater   |
| MTSV  | Master trip solenoid valve  |
| MU    | Make-up   |
| NACE  | NACE International – The Corrosion Society (formerly National Association of Corrosion Engineers) |
| NCV   | Non-cited violations  |
| NEIL  | Nuclear Electric Insurance Limited  |
| NF    | Not a Condition Adverse to Quality – Fix  |
| NOBP  | Nuclear Operations Business Practice  |
| NOP   | Nuclear Operating Procedure   |
| NPDES | National Pollutant Discharge Elimination System   |
| NRC   | U.S. Nuclear Regulatory Commission  |
| OE    | Operating Experience  |
| OEM   | Original equipment manufacturer   |
| OPS   | Operations Section  |
| PCR   | Procedure Change Request  |
| PI    | Performance Indicator/Performance Improvement   |
| PM    | Preventive maintenance  |

|       |   |
|-------|---|
| PR    | Preventive Action                                     |
| PRA   | Probabilistic Risk Assessment                         |
| PSA   | Probabilistic Safety Assessment                       |
| QA    | Quality Assurance                                     |
| RCE   | Root Cause Evaluation                                 |
| RCP   | Reactor Coolant Pump                                  |
| RCS   | Reactor Coolant System                                |
| RP    | Radiation protection                                  |
| SAP   | Activity tracking database                            |
| SBODG | Station black-out diesel generator                    |
| SCAQ  | Significant Condition Adverse to Quality              |
| SCWE  | Safety Conscious Work Environment                     |
| SER   | Significant Event Report                              |
| SFAS  | Safety Features Actuation System                      |
| SOER  | Significant Operational Event Report                  |
| SPDS  | Safety Parameter Display System                       |
| SR    | Significant Condition Adverse to Quality – Root Cause |
| TR    | Technical Report                                      |
| TS    | Technical Specification                               |
| UPS   | Uninterruptible Power Source                          |
| USAR  | Updated Safety Analysis Report                        |
| UT    | Ultrasonic test                                       |

## EXECUTIVE SUMMARY

This is a report of the Independent Assessment of the Corrective Action Program (CAP) at the Davis-Besse Nuclear Power Station.

The assessment was conducted on-site during a 2-week period in July 2007 by a team of three consultants and three peer evaluators.

### Overall Program

Based on the definitions in Davis-Besse Business Plan Practice DBBP-VP-0009, "Management Plan for Confirmatory Order Independent Assessments," the Team assigned Davis-Besse's implementation of the CAP an overall rating of **EFFECTIVE**. This rating is based on interviews, document reviews, and observations.

### Assessment Areas

The following summarizes the rating of each assessment area. Additional details are found in the body of this report.

| Area | Title   | Team Finding     |
|------|---|------------------|
| 1    | Identification, Classification, and Categorization of Conditions Adverse to Quality   | HIGHLY EFFECTIVE |
| 2    | Evaluation and Resolution of Problems   | EFFECTIVE        |
| 3    | Corrective Action Implementation and Effectiveness  | EFFECTIVE        |
| 4    | Trending Program Implementation and Effectiveness   | EFFECTIVE        |
| 5    | Effect of Program Backlogs  | EFFECTIVE        |
| 6    | Effectiveness of Internal Assessment Activities   | HIGHLY EFFECTIVE |
| 7    | Implementation of the Corrective Action Program by Engineering  | EFFECTIVE        |
| 8    | Evaluation of Open Corrective Actions Taken in Response to the NRC Special Team Inspection – Corrective Action Program Implementation Team Inspection (CATI) – Report Number 05000346/2003010 | EFFECTIVE        |
| 9    | Status of Corrective Actions from Previous Independent Assessments of the Davis-Besse Corrective Action Program   | EFFECTIVE        |

**Area 1: The Identification, Classification, and Categorization of Conditions Adverse to Quality** was rated as **HIGHLY EFFECTIVE**. Interviews with Davis-Besse staff members at every level reveal strong commitment to the CAP program. The Condition Reports (CRs) are clearly written and their classification and categorization are accurate. The initial steps of writing timely, accurate CRs are a program *Strength*; as is the reporting of operational experience to the industry.

**Area 2: The Evaluation and Resolution of Problems** was rated as **EFFECTIVE** based on the organization demonstrating a very good understanding of evaluation methodology and assignment of Corrective Actions (CAs) which should address the problems in a manner commensurate with significance. Some attention-to-detail problems implementing CAP requirements were identified as *Areas in Need of Attention*, (i.e., eliminating the practice of transferring elements of cause evaluations and analyses to CAs, and the inappropriate tracking of significant corrective actions outside of the CAP).

**Area 3: The Corrective Action Implementation and Effectiveness** was rated as **EFFECTIVE**. The Team determined that the responses to completed CRs provide an appropriate level of detailed discussion.

The site has significantly reduced the backlog of open conditions. The level of justification documentation for the extension of some CAs simply referred to a work order priority. Site personnel exhibited a great level of institutional knowledge; however, the Team noted that reliance on the institutional knowledge may adversely impact plant performance should the personnel leave the site. The Team determined that repeat events are being captured in the Condition Report Evaluation and Status Tracking (CREST) program and no CAP weaknesses were identified in the repetitive CRs reviewed. Corrective Action Review Board (CARB) activities were thorough and critical, providing clear value added to the CAP. The Operating Experience Program was effectively implemented with improved timeliness of evaluations. When reviewing approved corrective actions due date extension requests, the Team noted that corrective actions tracking completion of work orders just referenced the work management process Order priority in the corrective action extension risk evaluation (i.e., no detailed documentation of the risk). This is an *Area in Need of Attention*.

**Area 4: The Trending Program Implementation and Effectiveness** was rated as EFFECTIVE. The trending program has been strengthened by management attention and staff efforts. Roll-ups of issues and trends at the unit and Fleets levels are identifying emerging trends that may not be evident at the section level. Component trending is a notable exception to the high level of performance in other trending areas; this program has not yet resulted in a completed report and so its effectiveness cannot be judged, and is an *Area in Need of Attention*. The IPA process continues as a program *Strength*.

**Area 5: The Effect of Program Backlogs** was rated as EFFECTIVE. The Davis-Besse *Open Condition Report GAP Closure Plan* is effectively working the aged CAP backlog and closing older issues to establish an environment where Davis-Besse is working more on resolving today's problems today. The numerical backlog and average age of all CRs indicate significant improvement. There is good Management support in reducing the CR backlog, and overall ownership of the CAP has improved.

**Area 6: The Effectiveness of Internal Assessment Activities** was rated as HIGHLY EFFECTIVE. The Team reviewed the effectiveness of Davis-Besse's internal assessment of the CAP, including oversight audits, self-assessments, and Company Nuclear Review Board (CNRB) meetings. The Team concluded that Davis-Besse is effectively identifying and resolving CAP issues that are identified during audits and assessments. The Team considers the self-assessment process a significant contributor to achieving excellence at Davis-Besse and thus, is an area of *Strength*.

**Area 7: The Implementation of the CAP by Engineering** was rated as EFFECTIVE because the Engineering Department implementation of the CAP was similar to the rest of the site for most areas reviewed. The concentration of attention-to-detail related errors in Engineering, although potentially related to the high level of involvement in the CAP process, merits further assessment by Davis-Besse.

**Area 8: The Open Corrective Actions Taken in Response to the NRC Special Team Inspection** [refers to the U.S. Nuclear Regulatory Commission (NRC) Special Team Inspection - Corrective Action Program Implementation (CAPI) - Report Number 05000346/2003010] was rated as EFFECTIVE because two items tracked as NRC non-cited violations (NCVs) remained open, but were scheduled to be completed by the end of 2007. The remaining open CAPI actions were tracked by Notifications since they were considered enhancements.

**Area 9: The Corrective Actions Taken in Response to the "Areas for Improvement" and "Areas in Need of Attention" Identified in Previous Independent Assessments** was rated as EFFECTIVE because Davis-Besse made sufficient progress on the remaining open issues to close all but two of the prior issues. The open issues pertain to the longstanding concern with equipment trending and the closure of significant corrective actions to SAP [activity tracking database] items.

## **Overall Conclusion**

The Independent Corrective Action Program Assessment Team concluded that the Davis-Besse site had a strong commitment to the CAP, which is being effectively implemented. Several findings were highlighted as *Areas in Need of Attention* and several other findings were discussed as observations. Most of these Team findings were of the “attention to detail” nature. One observation, regarding the number of older open CRs, was considered a “benchmark” for the Davis-Besse staff. Continued attention to completing action on these older items will allow the site to focus on more recent issues.

## 1.0 INTRODUCTION

This Independent Assessment of the Davis-Besse Corrective Action Program (CAP) was conducted at the request of the Vice President, Fleet Oversight. The Team used the general guidance of NOBP-LP-2001 Rev 09, "FENOC Focused Self-Assessment/Benchmarking;" NRC Inspection Procedure IP 71152, "Identification and Resolution of Problems;" NRC IP 40500, "Effectiveness of Licensee Process to Identify, Resolve, and Prevent Problems;" Nuclear Operating Procedure NOP-LP-2001 Rev 15, "Corrective Action Program;" and DBBP-LP-0009 Rev 03, "Management Plan for Confirmatory Order Independent Assessment," to evaluate the effectiveness of the implementation of the CAP.

## 2.0 SCOPE OF ASSESSMENT

The Team evaluated the following areas associated with the Corrective Action Program (CAP) implementation:

1. Identification, Classification, and Categorization of Conditions Adverse to Quality
2. Evaluation and Resolution of Problems
3. Corrective Action Implementation and Effectiveness
4. Trending Program Implementation and Effectiveness
5. Effect of Program Backlogs
6. Effectiveness of Internal Assessment Activities
7. Implementation of the Corrective Action Program by Engineering
8. Evaluation of Open Corrective Actions Taken in Response to the NRC Special Team Inspection – Corrective Action Program Implementation Team Inspection (CATI) – Report Number 05000346/2003010
9. Status of Corrective Actions from Previous Independent Assessments of the Davis-Besse Corrective Action Program

This section reports the Team's evaluation of each of these areas.

### 2.1 Identification, Classification, and Categorization of Conditions Adverse to Quality

The Team evaluated the following aspects of the Davis-Besse CAP:

- a. Review and evaluate the identification, classification, and categorization of at least 25 selected Condition Reports (CRs) categorized after Management Review Board (MRB) review;
- b. Review a sampling of SAP [activity tracking database] non-maintenance notifications initiated since the 2006 Independent Assessment of the Davis-Besse Corrective Action Program (August 26, 2006) to determine if the conditions were properly categorized, and analyze these notifications for issues which should have been identified as Conditions Adverse to Quality (CAQ), but were not or were only partially identified;
- c. Interview at least 10 individuals from various parts of the Davis-Besse Nuclear Power Station's management and staff, and ascertain the Davis-Besse Nuclear Power Station staff's commitment

- to the CAP, the extent of their understanding of the Davis-Besse Nuclear Power Station's problem identification process, and their willingness to report problems; and
- d. Evaluate the adequacy of the Davis-Besse Nuclear Power Station's identification, classification, and categorization of a minimum of 20 corrective actions (CAs) for sharing operational experience feedback with the industry.

### **2.1.1 Evaluation of the Identification, Classification, and Categorization of Condition Reports Categorized as Adverse Conditions**

#### **CR 06-03386, RCS Identified Leakage (IL) Reaches Action Level 1 Based Upon Rate Of Change**

This CR documents entry into ACTION LEVEL 1 based upon rate of change of Reactor Coolant System (RCS) IL. The RCS Integrated Leakage Program requires that a CR be written whenever an ACTION LEVEL trigger is reached. On 9/3/06, the rate of change of IL exceeded 0.04 gpm/month and on 9/5/06, the rate of IL change increased to a rate of 0.056 gpm/month.

The Team found that (1) this CR was documented for trending purposes and (2) the evaluation method was appropriate.

#### **CR 06-06129, Safety Concern when Using Davit Arms for Lifting**

Refer to Chapter 2.3.4 for discussion.

#### **CR 06-6626, AOV Component Level Calculation Input Errors**

This CR was categorized as a Condition Adverse to Quality – Fix (CAQ-CF) to document the correction of incorrect effective diaphragm area data input into air-operated valve (AOV) capability calculations. Davis-Besse had picked the wrong data values from vendor information. At the time of initiation of the CR, the population of AOVs affected, the resulting valve operating margin changes, and the basis for operability for one valve with negative margin was already determined. Based on this information, the categorization and evaluation method were acceptable.

The Team consensus was that normal industry practice would have generated the CR earlier when the nonconservative error in calculation inputs was identified or when the first negative margin AOV was identified. At that point, the CR process would be used to drive the operability determination and extent of condition, using an apparent cause evaluation. The Team discussed this observation with Davis-Besse personnel, who stated that the time frame of reference from identification of the data error to initiation of the CR was 1-2 days. The Team concluded that for this instance, the delay in initiation was inconsequential.

#### **CR 06-06998, Boric Acid Deposits Found on Packing Gland of CF13**

Boric acid deposits were found around the packing gland of valve CF13. The boric acid was dry, white in color, and approximately 1/2 tsp contained to the packing. No corrosion or degradation was found. The review in Condition Report Evaluation and Status Tracking (CREST) indicated the condition was appropriately identified and classified as a CAQ-CF.

The Team found that (1) the description was clear, (2) the categorization was appropriate, and (3) the evaluation method was appropriate.

#### **CR 06-08304, Missed ANI Review and Resolution of CR 04-04122**

CR 04-04122 describes a problem where American Society of Mechanical Engineers (ASME) Section III, Class 2, pressure relief valve SP17A9 lifted outside the ASME OM Code allowable tolerance. An Authorized Nuclear Inspector (ANI) review is required as part of the CAP and the ASME *Quality Assurance Manual* for repair (rework disposition) of ASME Section I, III, and VIII pressure relief valves. The review in CREST indicated the condition was appropriately identified and classified as a Condition Adverse to Quality – Apparent Cause (CAQ-CA).

The Team found that (1) the description was clear, (2) the categorization was appropriate, and (3) the evaluation method was appropriate.

#### **CR 06-9544, Program Health Report for Flow Accelerated Corrosion Program Not Effective**

This CR was categorized as a CAQ-CF and documented a view that the Program Health Report for the Flow Accelerated Corrosion (FAC) Program as an indicator is not effective enough to raise the attention level on the performance of the FAC Program. The CR included a review of the effect of production on other programs and concluded that the supervisor has the responsibility to adjust the program rating downward when a significant event occurs that the program should have prevented.

The Team found that (1) the description was somewhat confusing, (2) the categorization was appropriate, and (3) the evaluation method was appropriate.

#### **CR 06-09656, Violation of Procedure IS-DP-00504 Section 6.11.8**

This CR documents a First Energy Nuclear Operating Company (FENOC) visitor being processed into the Protected Area without the proper approval signature on the Visitor Work Permit. A review of the visitor work permits identified there was no written approval by the Supervisor of Access Control or Designee on the visitor work permit. The review in CREST indicated the condition was appropriately identified and classified as a CAQ-CF.

The Team found that (1) the description was clear, (2) immediate corrective actions were taken, and (3) the event was properly categorized.

#### **CR 06-10332, Damaged FME Bag in Mechanical Penetration Room**

A damaged foreign material exclusion (FME) bag containing fittings was found in the mechanical penetration room #4. The bag appeared to have burn holes in the bottom of the bag. The damaged FME bag had been replaced. The review in CREST indicated the condition was appropriately identified and classified as a Condition Adverse to Quality – Closed (CAQ-CC).

The Team found that (1) the description was clear, (2) the categorization was appropriate, and (3) the evaluation method was appropriate.

#### **CR 06-10490, Valve SP9A6B Packing Leak**

This CR was categorized as a CAQ-CF to document the correction of packing leakage on valve SP9A6B. The packing was tightened successfully under work order 20207536. The CR was processed for trending purposes.

The Team found that (1) the description was clear, (2) the categorization was appropriate, and (3) the evaluation method was appropriate.



### **CR 06-10550, SAF-T-CLIMB Notched-Rail Fall Protection System Defect**

Refer to Chapter 2.3.4 for discussion.

### **CR 06-10623, 2006 DB Safety Culture/ SCWE Survey Results for Chemistry; Red Pillars**

This CR identifies two areas with resultant Red Pillars based upon negative response percentages in the Safety Culture Survey: Pillar 1, "Willingness to Raise Concerns," and Pillar 2, "Normal Problem Resolution Process." A Limited Apparent Cause Evaluation (LACE) was performed that included a detailed action plan to improve managerial methods.

The assessment team found that (1) the description was clear, (2) the categorization was appropriate, (3) the evaluation method was appropriate, and (4) the investigation was comprehensive.

### **CR 06-10648, Red Pillar in Plant Engineering 2006 SCWE Survey**

This CR was categorized as a CAQ-Limited Apparent Cause to document evaluation of a Red pillar in the Plant Engineering Section identified during the 2006 Safety Conscious Work Environment (SCWE) survey of plant employees. The Red pillar related to willingness to raise concerns, with 11.4% of personnel responding negatively.

The Team found that (1) the description was clear, (2) the categorization was appropriate, and (3) the evaluation method was appropriate.

### **CR 06-11157, CST Usable Volume Criteria Not Updated in 3 Systems Descriptions**

This CR was a CAQ-CF dated 12/8/06, concerning the three condensate storage tank (CST) system descriptions. In these descriptions, the tank's usable volume had not been changed to reflect new calculations (C-ME-037.01-003 and C-ICE-037.01-001, completed 4/27/06). These calculations considered vortexing concerns and instrument inaccuracies that reduced the useable volume. Previous to these calculations, it was assumed that one CST could meet the Technical Specification (TS) usable volume requirement of 250,000 gallons. The calculations concluded that less than 225,000 gallons of water is usable in each CST.

Priority 600 Notifications 600352432, 600352453, and 600352455 were written to remove the reference to one CST having a minimum usable volume of 250,000 gallons, and replace the statement with "the Condensate Storage System needs to contain 250,000 gallons." The Team and the notification author discussed the need for changing the wording to "the Condensate Storage System needs to contain a minimum of 250,000 usable gallons." The notification author made the appropriate changes to the notifications. The notification author stated that the notifications are scheduled to be closed, in combination with other changes, in the fall.

The Team found that (1) the description was clear, (2) the categorization was appropriate, and (3) the evaluation method was appropriate.

### **CR 06-11482, Analysis of Hydrogen Concentration in the RCS**

This CR was categorized as CAQ-CF to document recent RCS hydrogen concentration sampling results at or above the 50 cc/kg operational limit. The Davis-Besse Chemistry Operational Limit Procedure specified to take Action Level 1 to return the parameter to specification within 7 days. The CR documents a return to 44 cc/kg, satisfying this action.

The Team found that (1) the description was clear, (2) the categorization was appropriate, and (3) the evaluation was appropriate.

### **CR 07-12586, Impact of Unavailability EIAC Modification on S&IA Performance Criteria**

This CR was categorized as CAQ-CC. It was administrative in nature to document the Maintenance Rule (MR) expert panel's decision not to count the system's unavailability against its performance criteria.

The Team found that (1) the description was clear, (2) the categorization was appropriate, and (3) the evaluation was appropriate.

### **CR 07-13188, Unsat Observation of NLO Continuing Training CRC Meeting**

This CR was categorized as a CAQ-CF to document the correction of an unsatisfactory training observation of the 1/19/07, Non-Licensed Operator Continuing Training Curriculum Review Committee (CRC) Meeting. Several instances of not meeting the expectations for CRC meeting content (described in business practice NOBP-TR-1117) were addressed. Six SAP actions were created to track remediation of the underlying causes.

The Team found that (1) the description was clear, (2) the categorization was appropriate, and (3) the evaluation method was appropriate.

### **CR 07-13478, K5-1 #3 Cylinder - Fuel Injector Leaked Exhaust Gas During The Test Start**

This CR identified the fuel injector for #3 cylinder leaked exhaust gas during the test run from around the cylinder head to injector seating surfaces. The review in CREST indicated the condition was appropriately identified and classified as a CAQ-CF.

The Team found that (1) the description was clear, (2) the corrective actions were appropriate, and (3) the event was properly categorized.

### **CR 07-14554, Cooling Tower Freeze Protection Drawing Discrepancies**

This CR was a CAQ-CC where significant differences between the drawings and as-built locations of cooling tower freeze protection junction boxes and conduit runs were discovered on 2/14/07. These discrepancies appear to have existed since the original construction.

The circuits are functioning correctly; however, a Priority 600 Notification 6003366017 was generated assigning Design Electrical to revise the affected drawings. A detailed walk down of the system was conducted and the drawings corrected. The notification was closed on 03/06/07.

The Team found that (1) the description was clear, (2) the categorization was appropriate, and (3) the evaluation method was appropriate.

### **CR 07-17279, Momentary Computer Failure**

This CR was a CA where a control room annunciator was received indicating plant computer failure at 2334 on 3/30/07. Within 2 minutes, the computer had rebooted itself and returned to normal. The CR investigator determined that similar events took place at the same time on March 2 (CR 07-16411) and March 16 (CR 07-16411) or exactly every 2 weeks. Further analysis found that the uninterruptible power source (UPS), a Smart UPS 1400, does a self-test every 2 weeks and that its battery was degraded to the point where the few milliseconds it takes for test completion was enough to cause the computer failure. It was also determined that other similar UPS's are being used at Davis-Besse. All of these UPS's are run-to-failure and none were being used on any critical plant equipment.

Corrective Action 07-16411-2 was created to replace the UPS batteries in the Smart UPS in cabinet C5772B as a result of the March 16 event. Reference to the subject CR was added to the CA 07-16411-2

per Nuclear Operating Procedure NOP-LP-2001, step 4.10.2.10. That CA was completed on 4/17/07. Refurbishment of all power supplies in all the plant computers system multiplexers are planned to be completed by December 2008.

The Team found that (1) the description was clear, (2) the categorization was appropriate, and (3) the evaluation method was appropriate.

#### **CR 07-17600, Nuclear Electric Insurance Limited (NEIL) – 6 Question Responses**

This CR was categorized as a CAQ-CF to document the responses to questions received from NEIL dated 2/23/07. The questions involve a 12/15/06 technical report FENOC received from Exponent Failure Analysis Associates regarding possible higher reactor vessel head corrosion rates than previously analyzed. This report was sponsored by the corporate office as part of a commercial litigation. This CR references two earlier CRs (07-15077 and 07-17452) that address the same report. CR 07-15077, NEIL Letter Identifies Potential Concern, was categorized as a CAQ-CF to document the evaluation of the potential concerns raised in the NEIL letter. This CR was initiated on 2/23/07, and directs that any degraded or nonconforming condition determined by this evaluation shall be documented in a new CR. CR 07-17452, Exponent Failure Analysis Report of the DB RPV Head Discovered March 2002, was categorized as a CAQ-CF to re-evaluate the Root Cause Evaluation (RCE) of the 2002 event in light of the findings of this new report. This CR was initiated on 4/3/07, when a U.S. Nuclear Regulatory Commission (NRC) letter to FENOC requested Davis-Besse's perspective on this matter.

The Team found that (1) the descriptions of the event were clear and (2) the categorizations were adequate. The initiation of CR 07-17452, nearly 4 months after receipt by FENOC, appeared to be untimely. Discussion with Davis-Besse personnel revealed that this concern was the subject of ongoing communication between FENOC and the NRC. A commitment has been made in a Davis-Besse letter, dated 6/13/07, to develop a formal process to review similar reports prepared as a part of commercial matters to assure timely review for potential safety/regulatory issues. The Team had no further questions on this matter.

#### **CR 07-18042, Shift Engineer Qualification Status**

This CR was categorized as a CA and was written due to the discovery that a Shift Engineer had assumed the official role of a Shift Engineer and had not met the requirements of the Davis-Besse Business Practice. The individual was notified of his inactive status, the qualification matrix was updated, and a qualified Shift Engineer immediately assumed the duties. The review concluded that at all times, a Shift Technical Advisor qualified staff was on site as required by the TS for the minimum shift crew composition. An Apparent Cause was assigned by the MRB.

The Team found that (1) the description was appropriate, (2) the categorization was appropriate, and (3) the evaluation was appropriate.

#### **CR 07-19089, DB Emergency Action Level (EAL) Review**

This CR identifies Changes to Emergency Action Levels (EALs) have been made that may be a decrease in effectiveness under 10CFR50.54 q. This was determined to be an administrative issue which has no effect on the operability of any structures, systems, or components. The review in CREST indicated the condition was appropriately identified and classified as a CAQ-CF.

The Team found that (1) description was clear, (2) corrective actions were appropriate, and (3) the investigation was detailed and comprehensive.

### **CR 07-19548, RCP 2-1 Vibrations**

The pump vibrations were noted above the alarm limit and below the maximum limit. No further actions were taken. The review in CREST indicated the condition was appropriately identified and classified as a CAQ-CC.

The Team found that (1) the description was clear, (2) the categorization was appropriate, and (3) the evaluation method was appropriate.

### **CR 07-19909, 2007 Operations 1ST Quarter Cognitive Binning Trend for Poor Program Performance**

This CR was a CAQ-CF to follow-up on an emerging trend showing possible poor program performance. The 1<sup>st</sup> Quarter Cognitive Binning identified eight CRs as program non-compliance and five CRs as procedure non-compliance. These CRs were reviewed by the plant investigator for any trend concerning a specific department, procedure, or commonality; none were found. As cognitive binning is a relatively new trend statistic, there were discussions with Performance Improvement on the possibility of new bin categories. However, no additional CAs beyond those already determined for the individual CRs reviewed were established.

The Team found that (1) the description was clear, (2) the categorization was appropriate, and (3) the evaluation method was appropriate.

### **CR 07-20358, Gas Void Detected in Piping Downstream of MU208**

This CR was categorized as CAQ-CF and documented the results of a follow-up ultrasonic test (UT) inspection performed on the make-up (MU) flow test line in response to the identification of the lack of a vent valve at the highest elevation in the test line. A void was detected and evaluated by Engineering as not significant. Actions were scheduled for Operations to re-vent the line, and for the refueling test to be inactivated until resolution of this CR. No TS equipment was affected.

The Team found that (1) the description was appropriate, (2) the categorization was appropriate, and (3) the evaluation was appropriate.

## **2.1.2 Review of SAP Non-Maintenance Notifications**

The Team reviewed SAP non-maintenance notifications to determine if adverse conditions have been inadvertently entered as a Notification without reference to a CR. This relates to the concern that such actions have not undergone adequate management and peer oversight.

All SAP non-maintenance notifications entered between 7/6/07 and 7/12/07 were reviewed, totaling 68 notifications. Fifty-one were concerned with documentation upgrades, five concerned procedure modifications, five concerned equipment or system modifications of non-safety systems, and three were clearly identified as related to CRs.

One notification appeared to involve a CAQ involving the turbine master trip solenoid valve (MTSV) which had trip and reset circuit issues. Plant personnel reviewed this notification and determined it was related to ongoing problems related to the MTSV and associated CRs (06-02570, 06-02645, and 07-19588). The notification details MTSV electrical drawings that appear to be incomplete. This work is in support of decision making concerning how to deal with the issue. CAs have not been written for these CRs, and are awaiting a complete evaluation. The Team observed that a valuable improvement would be the cross-referencing between CRs, notifications, and orders that are associated with a CAQ.

Currently, four experienced staff members are assigned to screen all non-maintenance notifications to assure they are not adverse conditions. Based on personnel interviews at the outset of the SAP screening effort, some adverse conditions were found each week; but as the effort moved forward, the number of items found has significantly declined. The screeners use the adverse condition definition and supplemental guidance appearing in NOP-LP-2001 and NOBP-LP-2019. The Team observed that the experience gained by these screeners in identifying potential CAQ notifications is not being captured and documented; also, the current adverse condition guidance does not include the need for a more critical adverse condition determination when the notification involves a safety significant system defined by the Updated Safety Analysis Report (USAR) or Probabilistic Safety Assessment (PSA).

### **2.1.3 Results of Interviews with Davis-Besse Nuclear Power Station Personnel**

The Team interviewed a cross-section of site and corporate personnel from various management and staff organizations. These interviews were conducted in order to determine the staff commitment to the CAP, the extent of their understanding of the Davis-Besse station's problem identification process, and their willingness to report problems.

The Team did not identify any staff member who was not willing to report safety problems. The personnel interviewed indicated a working knowledge of the process to write a CR, and they thought that the CR process was a constructive one. There were no issues mentioned which they felt were not responded to by station management; however, a few issues were described as slow or lagging in resolution.

Staff in the Security section indicated the common practice of officers informing their supervision of their issue, then the supervisor would fill out the CR; but the majority knew how to use the CREST system to enter problem reports. The Team discussed this observed practice with Davis-Besse management (who confirmed the general observation). The NOP for the CAP, NOP-LP-2001, states that the originator may obtain assistance in initiating and entering data. Davis-Besse should determine whether this practice meets program expectations.

The Team interviewed the Davis-Besse Employee Concerns Program (ECP) coordinator on site and discussed the experience, in general, of the ECP program and the relationship with the Davis-Besse CAP and any receipt of NRC allegations. From the information reviewed, it appears that the Davis-Besse employees feel free to report problems in the CR process as well as the ECP.

### **2.1.4 Evaluation of Davis-Besse Corrective Actions Shared with Industry**

The Team evaluated the adequacy of the Davis-Besse Nuclear Power Station's identification, classification, and categorization of 20 CRs that were assessed by plant personnel for possible feedback to the nuclear industry through the Institute of Nuclear Power Operations' (INPO's) Operating Experience Program.

Davis-Besse uses NOP-LP-2100, "Operating Experience Program," to determine if a CR requires an Operating Experience (OE) report to be generated. Appendix 6 of this procedure provides screening criteria for this purpose. The Team determined that these criteria were used in every CR evaluated for the need to generate an OE report. Fourteen of the 20 CRs were evaluated as not needing an OE; the Team agreed with these evaluations. The six that were identified as requiring an OE report were evaluated as exceeding one or more of the screening criteria; the Team agreed with these evaluations. The OE reports are required by Section 4.8.3 of NOP-LP-2100 to be issued within 50 days of the CR's date. All the OE reports reviewed, except one, met this criterion, with the majority of delivery dates being less than 30 days. The one exceeding the requirement was related to a prior preliminary OE report, and provided

further clarification of the event. Section 4.8.3 allows such late OE reports when they are associated with an earlier OE report.

Based on INPO data, the industry-wide 1-year rolling average is currently 25 reported events per year. Davis-Besse was very close to this average for years 2005 and 2006, and appears to be reporting at the same rate for 2007. INPO bins the events in three classes, Significant, Noteworthy, and Not Significant. A Significant event is rare, and no Davis-Besse OE has been classified Significant since 2002. Since then, about 2/3s of the OE reports are classed Noteworthy and 1/3 Not Significant.

The Team found that Davis-Besse's OE screening procedure for reporting to industry is working well. OE events are being properly identified and reported by Davis-Besse and the resulting INPO OE reports are being received by industry in a timely fashion.

### **2.1.5 Summary**

Interviews with Davis-Besse staff members at every level reveal strong commitment to the CAP program. The CRs are clearly written, and their classification and categorization are accurate. The initial steps of writing timely, accurate CRs are a program strength; as is the reporting of operational experience to the industry. The Team's review of SAP non-maintenance notifications did not reveal any notifications that involve adverse conditions, not already associated with a CR.

#### **Areas of Strength**

Team interviews with Davis-Besse staff members indicated no hesitation to report problems via the CAP system. CR classification and categorization continue to be error-free. These findings are considered program strengths.

The reporting of operating experience to industry was also a strength, with a well run program that screens events, selects those believed to be of interest to the industry, and issues reports in a timely fashion.

#### **Areas in Need of Attention**

None

#### **Areas for Improvement**

None

#### **Conclusion**

The Team rated the Identification, Classification, and Categorization of Conditions Adverse to Quality as HIGHLY EFFECTIVE.

## **2.2 Evaluation and Resolution of Problems**

The Assessment Team performed an analysis of at least five selected issues or problems that have gone through the entire applicable CAP process to identify strengths and weaknesses in their evaluation and resolution. The analysis included:

- An analysis of the Apparent Cause Evaluation (ACE) or RCE of at least five selected CRs;
- An analysis of the problems selected above;
- An evaluation of the Davis-Besse Nuclear Power Station's effectiveness in implementing the CAP; and
- An identification and discussion of any strengths and/or weaknesses or slow response identified during the detailed analysis above.

To address these issues, the Team reviewed approximately 15 CR evaluations, including a minimum of nine RCEs and six ACEs. The Team reviewed these documents to determine whether (1) the analytical tools used (event and causal factor charting, failure mode analysis, change analysis, barrier analysis, task analysis, etc.) were appropriate, (2) the stand-alone document was clear and follows the procedure, and (3) whether the depth of the investigation was appropriate.

## **2.2.1 Root Cause Evaluations**

### **CR 06-6003, Manual Reactor Trip Due to Lowering Condenser Vacuum**

This CR involves a reactor manual trip on 9/6/06. A rapidly rising condenser pressure was responded to by lowering reactor power and finally a manual trip from 45% power.

This was a reportable event and all report requirements were satisfied. The initiating event was a break in one of the four Turbine Waste Oil and Water Drain (Slop Drains) lines. These lines lead through the high and low pressure condensers from the turbine bearings to a floor drain in the East Condenser Pit. The break was inside the condenser, allowing a high rate of air in-leakage to the condenser, requiring eventual reactor shutdown.

Temporary Modification 06-0023 was completed the next day, which capped and stabilized the broken pipe, allowing plant start-up.

The root cause analysis focused on (1) determination of the failure mode of the drain pipe, (2) an analysis of the industry experience with slop drain failures, and (3) why this experience was not acted upon at Davis-Besse. This analysis also included a review of the Fleet OE program performance to see if it contributed to failure to act. These analyses were supported by a piping failure mode analysis and event and causal charting. The root cause analysis shows the Probable Cause for the slop drain piping failure was pipe fatigue. Several Contributing Causes involved a number of times (19 incidents) where plant and Fleet personnel could have, but did not, flag industry operating experience involving slop drain failure inside condensers as important to Davis-Besse.

Eighteen CAs were written; six involve remedial actions (RAs) including capping the failed line for restart; three involve CAs including removal of all four drain lines from the condenser; and nine other actions required to close out the CR, including a final meeting with the Corrective Action Review Board (CARB) to review effectiveness of all actions. Five corrective actions remain open. The removal of the four slop drain lines must await the next refueling outage, as does collecting metallurgical samples of the failed pipe inside the condenser. The apparent cause can then be confirmed, a final OE report issued, and an effectiveness evaluation completed. Full closure is scheduled for May 2008.

The Team found that (1) the above initial responses to the event were effective and timely, (2) the root cause analysis was detailed and thorough, (3) the analysis results were complete, and (4) the corrective actions were adequate.

## **CR 06-6048, NPDES Limit Exceeded Due to Circ Water Chlorination Not Secured After Plant Trip**

A National Pollutant Discharge Elimination System (NPDES) limit was exceeded when circulating water chlorination was not secured after a plant Trip. The root causes were accurately attributed to inadequate procedure content and a knowledge gap associated with performance of the procedurally prescribed system evaluation after a plant trip. Even though strict compliance with the procedure words would have prevented the event as it occurred, the lack of procedure guidance could have resulted in the same event after the required evaluation.

The investigation correctly separated the extent of condition and extent of cause, and appropriately bounded each. In the case of extent of cause, the knowledge gap was connected to a previous event (CR 02-00686) and corrective actions for that investigation tailored to address both. A CA was generated to determine the knowledge gap involved with the procedure compliance issue.

The Team determined that, although the investigation does recognize that compliance with the procedure as written would have prevented the event, the associated CA takes the form of “providing additional training to Chemistry personnel on the requirements and expectations for procedure compliance.” Using training as a corrective action for this causal factor implies, although the investigation analysis does not say so, that there is a lack of knowledge of existing expectations for procedure compliance. If the personnel chose to not comply with the procedure requirement because they felt the requirement was inappropriate or ambiguous, then the decision to not comply was inappropriate and would indicate another direction for the corresponding corrective action. In either case, the investigation did not provide analysis of the reasons for not complying with the procedure, and therefore, there is a causal gap between the inappropriate act and the CA.

The approved investigation report states that the corrective action for Root Cause 2 is to “Perform a Performance Gap Analysis to analyze Chemistry personnel’s understanding of chlorination systems and related plant systems, including responses to post trip conditions and changes in system configuration. The product of this analysis will be reviewed with the Chemistry Curriculum Review Committee for implementation by the Chemistry Section.” The root cause investigation should definitively determine if a knowledge gap exists, and what action should be taken to close that gap. Moving this evaluation into a CA constitutes a de facto extension of the investigation into corrective action space and results in a variable in which the gap analysis may conclude that there is no need for training. This would result in no CA for a stated root cause. Although that was not the case in this CR, the practice of writing a CA to evaluate the need for a CA is considered a weakness. The Team considers the programmatic allowance of this practice as an **Area in Need of Attention**. A similar finding is discussed in CR 06-2588, below.

Following discussions with Davis-Besse personnel, the Team determined that the practice of assigning training gap analyses to CAs has been changed and is not done any more. The stated practice is to have a Training section representative on the root cause teams to provide that evaluation/insight during the RCE.

## **CR 06-2649, Failure to Enter TS 3.3.3.5.2 When Unprotected Appendix R Circuit Identified in 2005**

The issue revolved around inappropriate Shift Engineer application of TS’s for the 2005 identified condition of a missing switch that enables electrical separation of a circuit from the cable spread room and the control room for fire hazards analysis purposes. The stated root cause was that information and resources were not properly used in the decision making process, in that the Shift Engineer was consciously unfamiliar with application of TS 3.3.3.5.2, yet did not solicit help in making the determination.



The associated CAs to preclude recurrence were to revise a Fire Protection procedure to give specific information about T/S 3.3.3.5.2 and to revise a Regulatory Compliance document to require a review for Limiting Condition for Operation applicability during reportability reviews. Additional CAs included reinforcement to all licensed operators of expectations to obtain help when unfamiliar circumstances arise, and to provide training to licensed operators, regulatory compliance, and design engineers on T/S 3.3.3.5.2.

The Team concluded that the root cause of this event was clearly identified during the investigation phase and was supported by facts. The analysis was thorough, performed in a timely manner, and CAs were appropriate to preclude recurrence as well as to address the extent of cause.

#### **CR 06-2588, 'B' Turbine Trip Solenoid Failed to Indicate Valve Tripped During Periodic Test**

This investigation was in progress during the 2006 Confirmatory Order Independent Assessment (COIA) and was reviewed via attendance at the 8/14/06 CARB review of the draft investigation. As noted in the 2006 COIA, the CARB approved closure of the investigation without determination of a root cause and with no determination of extent of condition or extent of cause. The investigation concluded that failure modes associated with Local Foreign Material Exclusion, residual Fuller's Earth metal soaps, and varnishing remained plausible, and that mechanical binding of the valve (although unlikely) could not be disproved. Internal valve alignment was also neither proved nor disproved. The CARB directed the addition of a CA to perform a chemical flush of the electro-hydraulic control (EHC) supply line. In addition to these analysis weaknesses, the 2006 COIA concluded that the CARB had missed their opportunity to correct these weaknesses prior to approval of this evaluation. The 2007 COIA follow up of the CARB performance concern is documented in Section 2.9 of this report.

Subsequent to completion of the investigation, additional CAs were initiated to continue the analysis by:

- Sending EHC fluid samples to an external laboratory for analysis;
- Sending the EHC filter elements removed from the system to an external laboratory for analysis; and
- Sending the failed master trip solenoid valve assembly to two external entities for analysis.

Actions associated with the above included Engineering review of the results and a determination of the need for additional actions based on those results.

In the case of the EHC fluid samples, two analyses were performed by Eaton Hydraulics Fluid Analysis Service, one on 7/5/06 and the second on 11/13/06. Both reports indicated high levels of large, medium, and small particulate in the form of oxidized metal, silica, and fiber. The 7/5/06 sample analysis characterized the particulate in the 5 µm category as "immediate action required." The 11/13/06 sample analysis characterized the particulate in the 5 and 15 µm sizes as "immediate action required." Both analyses indicated that the samples contained contamination that exceeded the ISO 11171/4406 standards for cleanliness. The Engineering review of these results focused primarily on the differences between the EHC fluid samples from Davis-Besse and Perry plants, and characterized the particulate counts as "slightly elevated" with no direct correlation to the Turbine Trip Solenoid Valve failure.

The Engineering review of the Eaton EHC fluid sample analysis results continues with an explanation of the history of EHC particulate where the General Electric Company (GE) specification was exceeded between 1998 and 2000, but that the counts decreased as a result of the EHC fluid replacement in 2000 and the installation of the Pall Purification skid in 2002. The review adds that the current EHC fluid particulate is above the INPO Operation & Maintenance Requirements guideline, but is consistently meeting the GE specification, and states that this implies that the Turbine Trip Solenoid Valve failures are

not associated with the elevated particulate since the failures started after the time in which fluid particulate levels started to improve. The Engineering review concludes that the fluid analysis does not point to a fluid quality issue causing the failures of the Turbine Trip Solenoid Valve, and recommended no further corrective action.

For the EHC filter analysis, the Pall Corporation report indicated that the filter element was plugged with particulate contaminants that appear to be mostly metallic. Worthy of note was that there were no indications of the presence of gelatinous material that could serve to refute the failure mode associated with residual Fuller's Earth soaps.

The actions associated with Beta Laboratories/Eaton failure analysis of the Turbine Trip Solenoid Valve, and the Engineering review of the results, were reviewed. Although component measurements and functional tests were all within specifications, there was one anomaly noted on the Bravo valve spool piece (photo #10 of the Beta Laboratories test report) that could support the failure mode associated with mechanical binding internal to the valve. The Engineering review of the test reports did not address this. The Engineering review concluded that the tests by Beta and Eaton were inconclusive and that no further action will determine the cause of the solenoid valve failure.

The CA to perform a system flush of the EHC system (CA #14) was subject to an additional CARB review on 4/23/07, where the case was made by Engineering that there is no need to perform the flush of the EHC system based on:

- Replacement of the servo strainers in 14RFO;
- Rebuilding of 14 actuators;
- Inspection of the EHC reservoir with no evidence of a "bathtub ring" or significant amounts of debris in the bottom;
- Monthly EHC fluid sampling and testing with results that meet original equipment manufacturer (OEM) specifications; and
- Few recent resetting or tripping failures of the Turbine Trip Solenoid Valve.

The recommendation was to instead perform an FME inspection of the pipe run from the reservoir to the front standard to address the possibility that foreign material in this section of tubing is the cause of the Turbine Trip Solenoid Valve failures. CARB minutes from 4/23/07 indicate that "The CARB concurred with not implementing this corrective action and instead performing an FME inspection of the pipe run from the reservoir to the front standard." The response to CA #14 indicates that the FME inspection is being tracked via Order 200252001 and Notification 600365587; no open corrective actions remain for CR 06-02588.

The Team found that the root cause evaluation was clearly documented for the progress made at closure of the evaluation and/or CA(s). However, transferring some analyses needed for the cause determination and development of preventive actions to future CAs is another example of the **Area in Need of Attention** cited in CR 06-6048 above. From CR 06-02588, the sole CA that has the potential to remove the source of system contaminants that may have led to the event will be to perform an FME inspection of the EHC pipe run from the reservoir to the front standard in the next refueling outage. This action is being tracked via a Notification vs. within the CAP. Tracking of CAs for significant CRs in processes outside of the CAP, such as the Work Management process, can result in reduced prioritization and visibility that adversely impacts completion timeliness. This is also contrary to guidance in Section 4.10.4 of NOBP-LP-2019. The Team considers the tracking of this action outside of CAP as an **Area in Need of Attention**. Another example of tracking outside the CAP is discussed in Section 2.9 of this report.

### **CR 06-6990, Unanticipated Loss of Power to Security Equipment**

This CR documents the unanticipated loss of power to Security equipment while performing preventive maintenance on the Miscellaneous Diesel Generator Auto Transfer Switch. Loss of the Safeguards related equipment resulted in a Security Reportable Event Log entry due to unanticipated loss of equipment. The root cause analysis (via Event and Causal Factor analysis and Management Oversight & Risk Tree analysis) identified that appropriate process controls were lacking in that no document defined the relationship between equipment being removed from service and potential impacts on Security equipment.

CAs included providing a checklist to the Work Week Manager of equipment by functional location that has the potential for impacting non-safeguards security equipment, and creating another checklist for Safeguards equipment that will be used by Security staff to review the work schedule to identify work that could impact Safeguards equipment.

The CARB accepted the Root Cause Analysis on 10/30/06, with seven comments that were incorporated by Revision 1 of the Root Cause Analysis, dated 11/1/06.

The CARB review appropriately identified the need to document in the investigation the interim compensatory measures put in place to prevent recurrence pending completion of longer term CAs. These measures were included in Revision 1 to the Root Cause Report.

The Team concluded that the root cause of this event was clearly identified during the investigation phase and was supported by facts. The analysis was thorough, performed in a timely manner, and CAs were appropriate to prevent recurrence for the determined cause. The investigation was extensive and generic implications did not identify any similar occurrences at any other nuclear facilities.

### **CR 06-8128, FAC Program Deficiency Evaluation**

This CR was written and categorized on 10/16/06. The CR was generated based on discussion with the CNRB and station management that a RCE should be performed based upon an earlier event.

On 9/13/06, a steam leak was discovered on Moisture Separator Reheater (MSR) 1 First Stage Reheat Drain line to High Pressure Feed water Heater 1-5, and resulted in a power reduction and repair. The cause of the steam leak was a through-wall defect due to wall thinning on the MSR drain line. An earlier event was reported on CR 06-6322, which was categorized as CAQ-CF. It had been downgraded from CAQ-CR to a CAQ-CF due to the issue being evaluated in an additional CR 06-8128. The 1 and 2 MSR drain lines were repaired.

The RCE was tasked with determining the barriers that failed to prevent proper modeling, the program improvements needed to improve rigor of inputs, why the program health report did not indicate pending issues, and the applicability to other programs.

The evaluation also reviewed internal and external operating experience including OE from INPO, which included internal events involving problems with FAC programs and the rupture of a condensate system pipe at Mihama Unit 3 in Japan and the killing of 5 people.

The evaluation determined that the software model used, CHECKWORKS, contained modeling data errors and that these were due to a "failure of the organization to establish a proper level of verification to ensure the quality of an engineering tool commensurate with ensuring the safety of plant personnel and generation reliability." A contributing cause was also the "level of verification contained in the FAC program procedures. The preparers, reviewers, and approvers of EN-DP-01301 and NOP-ER-2005 did

not recognize that a formal second level of verification was needed to ensure a quality software model to ensure the safety of station personnel and generation reliability.”

The CAs included having an independent horizontal review of the modeling data contained within the software package used by the Davis-Besse FAC program. Additional missing data entries were found for six additional lines and a recommendation for inspection of 11 additional areas was made. These were subsequently inspected and no additional thinning was found.

The Team noted that funding for conversion of CHECKWORKS version 1.0G to SFA 2.1, and an independent horizontal validation of the model was “sought after by Fleet but was delayed until 2006 due to budgeting issues.”

The Team reviewed Davis-Besse follow-up of OE 18895 describing the 8-9-94 Mihama event which caused several deaths. Davis-Besse determined that this OE was applicable to the Davis-Besse plant and wrote CR 04-05569 to follow-up. It was categorized as Not a Condition Adverse to Quality – Fix (NF) and the site added several inspection locations to review during the next outage. These inspection points revealed non-excessive wall thinning. However, the cause of the Mihama event was that the pipe locations were not included in their inspection location information. This was a similar cause to the Davis-Besse case although in a different location and for a different reason.

The Team interviewed the Davis-Besse Staff Nuclear Engineer and discussed the details of the CR previously written to identify the out-of-date Electric Power Research Institute (EPRI) model and the need for independent validation, and specifically, whether or not this requested action would have prevented the leak. The action was extended but requested to be completed by the end of 2006 since EPRI planned to stop support for the old program by then.

The Team determined that this RCE was effective and resulted in a more thorough FAC model review and plan for CAs. The extent of condition and extent of cause were comprehensive. The Team also observed that assessment of earlier external OE (SER 5-06, SEN 164) and internal OE (CR 05-02570 and 05-00246 requests for procedure and model upgrades) by the Davis-Besse staff had the opportunity to, but did not, prevent the through-wall leak.

#### **CR 06-11269, EDG Vent Dampers May Not Be Structurally Adequate**

During an evaluation of Heating Ventilation & Air Conditioning systems, it was discovered that some emergency diesel generator (EDG) ventilation dampers would be structurally overstressed by a design tornado depressurization of 3.0 psid. This CR was evaluated at the significant root cause level because the overstress condition could prevent operation of the dampers. The extent of condition review found dampers in the component cooling water (CCW) and low voltage switchgear (LVSGR) systems had similar design deficiencies. The evaluation found that the dampers would actually have operated because the specified design conditions were very conservative. Compensatory actions were implemented to assure operation under the existing design depressurization (3.0 psid) specification. Subsequently, the compensatory actions were removed when a reduced depressurization specification (1.6 psid) was found to be acceptable for this plant.

The evaluation concluded that the cause of this event was latent design issues, and that existing Davis-Besse Latent Design Issue Programs are sufficient to prevent recurrence (provide timely identification of future latent design issues). CAs were implemented to add the ability to withstand tornado depressurization in the *Davis-Besse Design Criteria Manual* and the Design Interface Review Checklist.

The Team found the investigation tools used were adequate and the RCE comprehensive. The Team questioned why the scope of the 13RFO Latent Issues Review of the EDG and CCW systems had not uncovered this discrepancy. It was determined that lack of design consideration of tornado

depressurization at the component level was a recent industry (generic) finding, and site response to this operating experience resulted in the identification of this event. The Team found this RCE acceptable, although the documentation of the justification for no preventive actions should have been clearer.

#### **CR 06-15275, Loose Connections Found in Cabinet 3618**

This CR was initially categorized as a Significant Condition Adverse to Quality – Root Cause (SR) and subsequently, downgraded to Condition Adverse to Quality – Root Cause (CAQ-CR) as it identified that while performing PM 0715 under order 200173733, loose connections were found in the C3618, rectifier cabinet. Eight wires were found to be loose. They were as follows: Wire B84 on K1X relay, wire B11 and B11A on RA1 resistor, wire B106 on K18, and wire B131 on relay CR3. Wires B16 and B19 were found loose on transformer "TBW." Wires B17 and B17A were also found loose on transformer "CTA." All wires found to be loose were retightened. After that, a 100% inspection for connection tightness was conducted with no other loose connections found.

The Team found that the (1) description was clear, (2) the categorization was appropriate, (3) the evaluation method was appropriate, and (4) the actions assigned to address the root cause were appropriate and timely.

#### **CR 03-03937, Seismic Analysis of Masonry Walls**

This CR was categorized as SR as it identified that during the review of the masonry wall calculations for CR 03-01132, Tornado Differential Pressure, discrepancies have been identified with the seismic analyses of these walls. The discrepancies include; no dynamic load factor (DLF) was applied for the pipe break pressure loading, incorrect material increase factors, and potentially non-conservative adjustment factors for seismic and boundary conditions. The existing masonry wall calculations may contain previously un-quantified conservatisms that would offset some the discrepancies identified above. These "un-quantified conservatisms" include the modeling methods used in the analysis (i.e., single wythe vs. multi-wythe wall), potential use of a finite element analysis, and development of DLF's based on the actual pipe break time history.

The Team found that the (1) description was clear, (2) the categorization was appropriate, (3) the evaluation method was appropriate, and (4) the actions assigned to address the root cause were appropriate.

The remaining open action (CA #6) was assigned to track that CA 03-02910-03 will track the completion of the necessary calculation revisions for the masonry wall issues. If any plant modifications are required, Design Engineering shall prepare and issue the necessary Engineering Change Request (ECR) packages. This is a generic CA to track the need for additional ECR's if such need is determined to exist in the calculation revision results. Specific additional CA's are expected to be initiated to prepare the ECR and implement the ECR as the need for ECR's is identified.

The Team noted this action had been extended four times, with the most recent extension documenting the following in the reason and justification sections for the extension.

Reason:

- This corrective action tracks the implementation of any required modifications to the plant masonry walls. The implementation of the required modifications will not be complete by the current due date. The calculations for these walls were completed in July of 2006, and the required masonry wall ECRs are forecast to be issued by 6/30/07. Therefore, an extension of the due date for this CA is requested.

Justification:

- The masonry walls are functional as documented in Operability Evaluation 03-0015.

The Team interviews noted the calculations had been completed, and the ECRs were completed as well. This final action was remaining open to track and document that the field work implementing the ECRs was completed.

The Team observed that, while the documentation in the CR for the present status of the issue was not complete, the responsible owner was aware (communicated during the interviews) of the status of the action. The interview also revealed the owner was aware of the expected due date, and the issue was discussed periodically at the Management Alignment and Ownership Meeting (MAOM). In short, the team noted that while the “institutional knowledge” of the issue was appropriate, this same level of status was not duplicated in the open action of the CR. The Team observed the CR extension process provides an opportunity to capture this information. Documenting the “awareness” in the CAP reduces the potential to lose the issue should the “individual’s awareness” be lost, thereby reducing the reliance on institutional knowledge (personnel knowledge) to ensure the status of the issue is known.

## **2.2.2 Apparent Cause Evaluations**

### **CR 07-13331, Make-up Flow Control Valve MU32 Failure to Close on Demand**

This event involved a make-up flow control valve MU32 failure to close on demand. After plant personnel observed that three of the four hex cap screws attaching the valve diaphragm base to the yoke were broken, metallurgical analysis of the broken bolts was appropriately pursued and resulted in identification of the wrong bolting material having been used in the past. Failure Modes and Effects Analysis was utilized in analysis of the data. The Operating experience review was performed as part of the evaluation and resulted in an analysis of susceptibility for another failure mode that did not lead to this event. Subsequent actions were categorized as enhancements.

The Team determined that the evaluation arrived at a reasonable apparent cause based on factual data and established appropriate CAs. Extent of condition was appropriately considered and CAs established to address other potentially susceptible components.

### **CR 06-10623, 2006 DB Safety Culture/Safety Conscious Work Environment Survey Results for Chemistry; Red Pillars**

This CR was designated CA and contains the results of two areas with resultant Red Pillars based upon negative response percentages in the 2006 Safety Culture Survey.

The Davis-Besse SCWE Survey was conducted in September 2006. The results of the survey for the Chemistry Section identified two areas with Red Pillars in the areas of Pillar 1, “Willingness to Raise Concerns,” and Pillar 2, “Normal Problem Resolution Process.”

The Davis-Besse 14<sup>th</sup> refueling outage was completed behind schedule and over budget. In retrospect, this was attributed to ineffective outage planning, the late introduction of significant modifications, and less than effective control of supplemental personnel and integrated contract resources. In response to the poor performance, the Site Management reaffirmed the need to assure improved outage execution in the future and clearly communicated the significant contribution of the failure to meet expectations on personal performance. As such, many of the Davis-Besse 2006 mid-year Performance Reviews reflected a rating of PARTIALLY EFFECTIVE.

It was determined that the mid-year performance process had a significant influence on responses in the survey area of "Willingness to Raise Concerns." Many felt that the trust between supervision and management had been damaged by this action. This impact from the recent employee performance reviews was further validated by the 2006 COIA of Nuclear Safety Culture/SCWE whose results were presented in 12/21/06. This report identified an Area for Improvement in the attribute "Performance reviews, financial rewards, promotions, personnel recognition, and personnel sanctions foster and reinforce attitudes and behaviors that are consistent with a strong Nuclear Safety Culture." This area was rated as NOT EFFECTIVE by the assessment team.

Results for Pillar 2, "Normal Problem Resolution Process," were less negative. Here, issues of long-standing equipment concerns and confidence in the work management process continue to be identified, although overall improvement in this area was seen when compared to the 2005 Survey results. Despite efforts in Chemistry to identify the key equipment and process issues and work to bring more timely closure to them, many other issues still linger. In discussions with the Chemistry Human Performance Evaluation and Assessment Team (HEAT) team, some of the more pressing include the need to address instrumentation performance issues, both from the standpoint of instrument health and reliability, and program ownership.

A Limited Apparent Cause determined for Pillar 1 that Management failed to clearly establish individual performance goals and objectives associated with the 14<sup>th</sup> refueling outage. Subsequently, poor outage performance was assigned collectively to the organization, including Chemistry, without clear delineation of specific individual attributes and Areas for Improvement. Additionally, the Davis-Besse Management team failed to recognize that the method selected for reflecting mid-year performance would have an adverse impact on SCWE by driving the perception that outage duration and cost took precedence over its safe and quality completion. The Chemistry Section did establish specific performance goals for the December Shutdown in accordance with CA06-6563-01 as an interim action to close this process gap.

The evaluation for Pillar 2, "Normal Problem Resolution Process," identified that this condition, although indicated as Red by the survey results, shows an improving trend from previous surveys. Several CAs are in-progress and being monitored. Chemistry maintains a list of Chemistry Equipment Issues and Burdens, which is reported to the Management Team monthly. Overall, response to the discussion has been good, with many of the longer term items being closed. Continued focus and re-prioritizing of items on the list is required to maintain its effectiveness. For this reason, no cause code was assigned to this condition.

The Team determined that CAs have been put in place and were subsequently closed in April of 2007 to address the conditions identified for Management Expectations not Communicated or Worker Accountability not at Desired Level. The Manager of Site Chemistry has developed, in cooperation with the select Chemistry Supervisors and Technical Staff, specific performance objectives, goals, and metrics (as applicable) for outage-related performance to ensure that subsequent reviews are accomplished in a consistent and effective manner, establishing clear accountability and eliminating subjectivity. These objectives are expected to be integrated into the individual's performance management plan.

The Team determined that the evaluation and CAs were adequately performed to address the problem.

#### **CR 06-10648, Red Pillar in Plant Engineering 2006 SCWE Survey**

This CR was categorized as a CAQ-Limited Apparent Cause to document evaluation of a Red pillar in the Plant Engineering Section identified during the 2006 SCWE survey of plant employees. The Red pillar related to willingness to raise concerns with 11.4% of personnel responding negatively.

The CR determined that the most probable apparent cause for the SCWE survey results was low employee morale. Contributing causes included low staffing levels, understanding of retaliation, and lack of knowledge about the ECP. CAs were generated for training the Section on the ECP and retaliation. Although the Data Analysis describes progress to date in resolving the Section staffing vacancies, the CAs do not address the low staffing level cause.

The Team determined that (1) the investigation tools were appropriate, (2) the analysis was comprehensive, and (3) the evaluation was clear. The Team discussed current staffing with the Section Manager and determined that full staffing has been achieved.

#### **CR 06-03252, Instrument Valves Out of Position Prior to CS Pump 2 Quarterly Test**

This CR was categorized as a CAQ-Limited Apparent Cause to evaluate the discovery of two spray header pressure isolation valves out of position. Some normally isolated piping would have been subjected to spray system pressure as a result. The evaluation found that the subject piping was capable of handling the pressure and seismic loading. The most probable cause was found to be mispositioning during the previous quarterly test. However, the analysis does not discuss a review of the prior performance of the quarterly test or interviews of those who implemented it. A recent CR (06-02670) addressed continuing configuration control events. Since this event likely occurred prior to the actions implemented for the prior adverse trend, this instance was added to the continuing component configuration discussions at Shift Manager meetings.

The Team confirmed that conduct of the previous test was investigated, but the result was inconclusive. Also, a prior corrective action, CA 05-05650-07, had re-evaluated the need for independent verification (IV) in plant procedures and concluded that this test procedure was not among those requiring IV. The Team determined that (1) the investigation tools were appropriate and (2) the analysis was comprehensive. The analysis discussion was deficient because the above considerations were not documented.

#### **CR 06-8192, AFW Unavailability Discrepancies Identified During NRC MSPI Review**

This CR was written (in October 2006) to document the identification of errors in the auxiliary feed water (AFW) train unavailability for October 2004 and December 2004, which had been reported to the NRC for the Safety System Performance Indicator. The error consisted of assigning an extra hour for train 1 due to daylight savings time, to train 2, and a .2 hour error in the December data for Mitigating System Performance Index (MSPI) basis.

The ACE documented an acceptable description of the problem and interviewed individuals involved. These interviews did not provide any information regarding the cause of the error; therefore, the apparent causes were determined to be inadequate self and peer checker actions and poor workmanship. CAs included correcting the data (done by submitting new information earlier for the MSPI), revising the MSPI basis, and evaluating the applicability of a clock reset. There was no significant result of this error since the total system unavailability and the NRC color, as well as INPO, World Association of Nuclear Operators, and MR reporting were correct.

The Team determined that (1) the ACE investigation was adequate and (2) the records sufficient.

#### **CR 07-14436, Less Than Adequate RP Technician Response to HRA Violation**

This CR was categorized as a CAQ-Full Apparent Cause to evaluate the discovery that a high radiation area violation had been witnessed by 2 radiation protection (RP) technicians, but the event was not reported to supervision nor was a CR generated. The high-radiation area (HRA) violation was evaluated in a separate CR. The apparent cause of the RP technician error was failure to follow procedure, and a



contributing element involved technician misunderstanding of management expectations. CAs included remediation of the individuals involved and enhancement of the continuing training program for RP technicians. CARB review on 4/23/07 and 6/18/07 appropriately inverted the original apparent and contributing causes and clarified the basis of the training improvements.

The Team determined that (1) the investigation tools were appropriate, (2) the analysis was comprehensive, and (3) the final documentation was acceptable.

### **2.2.3 Summary**

The Team determined that Davis-Besse demonstrated a very good understanding of evaluation and problem resolution methodologies; and the assignment of CAs, which should address the problems in a manner, was appropriate and commensurate with significance.

#### **Areas of Strength**

None

#### **Areas in Need of Attention**

The Team identified two Areas in Need of Attention in the area of CR evaluation and resolution of problems:

1. The Team determined that the practice of transferring elements of cause evaluations and analyses to CAs is an Area Needing Attention. For CR 06-6048, NPDES Limit Exceeded Due to Circ Water Chlorination Not Secured After Plant Trip, the Team considers the practice of writing a CA to perform a performance training gap analysis to determine the need for training represents a risk that no corrective action could be taken for a stated cause. For CR 06-2588, Turbine Trip Solenoid Valve failure to trip, chemical and hardware failure analyses needed for the root cause determination were transferred to CAs scheduled for completion after the root cause analysis was approved with no follow-up review to determine if the chemical and hardware failure analysis affected the root cause evaluation.
2. The Team determined that tracking of significant corrective actions outside of the CAP is inappropriate. For CR 06-02588, Turbine Trip Solenoid Valve failure to trip, the team concluded that the sole CA that has the potential to remove the source of system contaminants that may have led to the event is being tracked via a Notification vs. within the CAP. A second example of the concern is discussed in Section 2.9 of this report.

#### **Areas for Improvement**

None

#### **Conclusion**

The Team rated the Evaluation and Resolution of Problems as EFFECTIVE.

### **2.3 Corrective Action Implementation & Effectiveness**

The Team performed an analysis of the implementation and effectiveness of CA's for CAQs. The analysis consisted of:

- An evaluation of the timeliness of CAs for at least 20 CRs;
- A review of the number of repeat CRs and CAs, and evaluation of the effectiveness of the CAs;
- An evaluation of the adequacy of the Davis-Besse Nuclear Power Station's implementation of actions for operational experience feedback; and
- A review of the activities of the CARB and evaluation of the effectiveness of the CARB.

### 2.3.1 Timeliness of Corrective Actions

During the course of the Assessment, the Team reviewed several dozen CRs and their associated CAs. The Team determined that in general, the action was either completed as intended or, if alternate action was performed, the applicable requirements of procedure NOP-LP-2001 were documented in the responses.

The Team reviewed the 20 oldest open CRs noting their origination dates were all prior to 2003 (one was from 2001). The Team noted that of all the open CAs for the 20 oldest open CRs at Davis-Besse, only one of them had been classified as a Significant Condition Adverse to Quality (SCAQ). This issue was a marked improvement over the last COIA. This CR had one remaining open action, which was tracking activities to be completed in the 15RFO. The remaining 19 conditions were either classified as CAQ-CC, or CAQ-CF. The Team noted that a few of these aged open actions had been extended at least once; one of which had been extended 13 times. Several of the open actions were duplicate tracking items captured in the SAP process as orders. The Team reviewed the approved extension requests, noting a few had extensions approved with the simple justification that since the Order was assigned the priority 600, then extensions were acceptable. These weak CR extensions are detailed in Section 2.5 of this report. The Team noted that capturing only the priority of the work order to document the impact on operations was an **Area in Need of Attention**, as conditions for the issue may have a greater potential impact on the plant when the issue has been in place for an extended period of time.

The Team noted that while Davis-Besse has a high level of institutional knowledge and awareness of the open CAs, the amount of documentation within the extensions for the older items did not reflect the same detailed level of information. While the institutional knowledge may ensure the issues are resolved and the monitoring of the issues assists in keeping focus on the issues, there is the potential for loss of the institutional knowledge should personnel change. The Team noted the extension process should be used to a greater extent to document the challenges to complete the issues that remain open.

The Team then performed a benchmark against industry data (Entergy) for a comparison of aged items. The comparison revealed that the Davis-Besse quantity of CRs were greater than each of the Entergy sites (Dual and Single unit sites). To further compare, the team noted Davis-Besse had 32 condition reports which predate 2003, while the Entergy Fleet collectively (10 sites, 12 plants, and 2 corporate offices) had only 37.

The Team also noted a delay in closing CRs after all CAs had been completed. NOP-LP-2001, Rev 15, "Corrective Action Program," documents in section 4.17.1.1 the expectation that "the CRPA should ensure that assigned CRs are statused as "complete" within 30 days of completion of all required actions associated with the CR." Contrary to this procedure reference, the team found several CRs in a "ReviewFin" status in CREST, even though all CAs had been closed for greater than 30 days. From discussions with Davis-Besse personnel, the "ReviewFin" status is applied to the CR to indicate the CR is ready for review of closure by the Condition Report Process Administrator (CRPA) in preparation for the transfer to records. From a backlog perspective, discussions revealed that these items are not counted in the open backlog as this final review is administrative in nature, and should a review determine the issue needed additional action, a new CR would be initiated. Further, Davis-Besse had action assigned to move

more "ReviewFin" status CRs to "closed." The Team observed that this effort is needed restore performance to the CAP expectations.

### **2.3.2 Review of Repeat Condition Reports**

The Team noted that Davis-Besse had completed actions to improve the trending performed within the CREST program to identify repeat events. The Team noted that the CREST program has a specific numeric code applied in the trending portion of the system, which captured the repeat tracking of the issue. The Team reviewed a sample of the events coded as "Repeat Event" and concluded that the classifications and actions performed to address the repeat events seemed appropriate.

### **2.3.3 Review of the activities of the Corrective Action Review Board (CARB)**

#### **Attendance at CARB meeting on July 9, 2007**

The CARB reviewed three OE and Information Notice (IN) evaluations (IN 2007-09, IN 2007-14, and IN-2005-25). The board was challenging to the presenter's and provided value added comments and actions to enhance all three of the evaluations. OE Document Evaluation Review Checklists were utilized to ensure the evaluations met management expectations. The CARB Chairman also prompted the presenter of IN-2007-14 to write a CR to document the need to perform a 10CFR50.59 evaluation for tracking purposes.

SAP is the method being utilized for tracking actions for incoming OE reviews. There are instances when SAP is not being utilized to track follow up actions on items other than CRs [OEs, Technical Reports (TRs), INs, etc.] that require resubmittal to the CARB Chairman. When actions are promptly resolved and resubmitted to the CARB Chairman for approval, no entry is made in the SAP. The INs reviewed in the 7/9/07 CARB meeting are examples. The Team recommends SAP be utilized for ALL evaluations that are not CRs to ensure approval by the CARB Chairman is tracked to completion.

#### **Attendance at CARB meeting on July 16, 2007**

The CARB agenda was issued on 7/12/07 and included two full apparent cause CRs to review as well as CAP performance indicators. The CARB quorum and training requirements were checked and detailed discussion of CR 07-21258 took place. The second CR was not discussed due to unavailability of staff as well as pre-CARB comments.

CR 07-21258, NRC Identified Issue of Procedural NON-Compliance during Instrumentation & Control Testing, involved inadequate independent verification of testing as required by the FENOC procedure NOBP-LP-2603.

The CARB challenged the presenters to assure that adequate CAs were assigned for each apparent cause. In addition, the board made sure that actions were assigned to provide feedback to all site management observers who had previously determined that the practice of independent verification was acceptable—in error. CAs were being tracked in CREST. The extent of condition regarding all affected site organizations was discussed and the post-discussion CR evaluation check list was graded.

The CARB included a discussion of CR evaluation timeliness and open CRs. Of specific note was a related discussion of the status of the *Open Condition Report GAP Closure Plan*. The indicators showed that progress is being made in closing the open CRs as of December 2006 while at the same time, keeping up with the rate of generating new CRs. For example, Engineering had 385 open CRs in December 2006 and of those, 180 remaining as of June 2007. During this period, Engineering was able to also keep the

total additional open CRs relatively constant at about 200. This progress was also typical of the overall site performance with a goal to reduce the total open CRs from 920 in December 2006 to 500 in December 2007. As of June 2007, there were 627 open CRs showing good progress.

#### **Review of CARB Meeting Minutes for May 9, 2007**

The agenda included review of the OE evaluations for three NRC INs. One evaluation was accepted, and two were accepted with comments.

The Team reviewed the OE evaluation of one of the INs (IN 2006-21) that is recorded as SAP action 600342807. IN 2006-21, dated 9/21/06, discusses several instances where plants have introduced potential air entrainment paths into the suctions of safety-related pumps. In particular, the rigor of engineering/design reviews was not sufficient to preclude these events. This evaluation was a detailed treatment of the three cited instances as well as the underlying engineering rigor causation. The particulars were either not applicable or precluded by other Davis-Besse design and process features. CR 07-16971 was written to formally evaluate the sensitivity of seat leakage to changes in containment sump isolation valve operator settings. CARB approval on 5/9/07 added a comment to strengthen the discussion of the rigor of the design review activity. This action was tracked and closed in the SAP action file. The Team found this evaluation comprehensive; however, the 60-day guideline for OE evaluation completion was not met.

#### **Review of CARB Meeting Minutes for April 23, 2007**

The agenda included review of one significant CR CA, a trend CR Evaluation, a CR Effectiveness Review (ER), a LACE, and a full ACE.

The CARB reviewed CA 06-2588-14 to perform a system flush of the EHC system. This was an action directed to be added by the CARB in their review of the root cause investigation in 2006. In this presentation, Engineering made the case that the flush was not appropriate based on:

- Replacement of the servo strainers in 14RFO;
- Rebuilding of 14 actuators;
- Inspection of the EHC reservoir with no evidence of a “bathtub ring” or significant amounts of debris in the bottom;
- Monthly EHC fluid sampling and testing with results that meet OEM specifications; and
- Few recent resetting or tripping failures of the Turbine Trip Solenoid Valve.

The recommendation was to instead, perform an FME inspection of the pipe run from the reservoir to the front standard to address the possibility that foreign material in this section of tubing is the cause of the Turbine Trip Solenoid Valve failures. The CARB minutes from 4/23/07 indicate that “The CARB concurred with not implementing this corrective action and instead performing an FME inspection of the pipe run from the reservoir to the front standard.”

The Team considered CARB review of the other items reviewed to be sufficiently critical and challenging based on documented comments and required follow-up actions. Further Team review of the implementation of CA 06-2588-14 is detailed in Section 2.9 of this report.

#### **Review of CARB Meeting Minutes for March 26, 2007**

This CARB meeting reviewed the evaluation, and CAs assigned for three CRs and one Industry OE item. The records indicated that a quorum was met and the results of CARB decisions were documented

adequately for each item reviewed. The CARB accepted two of the apparent cause presentations with comment, and rejected the remaining apparent cause. The CARB requested a follow-up discussion with additional information to ensure the impact of the OE item on Davis-Besse performance.

#### **Review of CARB Meeting Minutes for February 19, 2007**

The CARB approved ERs for two CRs (06-19963 and 03-0007) with comments and two evaluations on CRs (06-02824 and 07-12064) with comments, including an evaluation of IN 2005-20 that was accepted for a second time with comments.

IN 2005-20, Electrical Distribution System Failures Affecting Security, had been previously accepted with comments at the 12/11/06 CARB meeting, with the direction to initiate order operations to track completion of Notifications 600347626 and 600268207. Plant Engineering presented at the current 2/19/07 CARB that the actions were not needed to support the evaluation and therefore, did not need to be tracked to completion. The CARB disagreed and identified further actions as a result of the discussion. Responses to these actions require a third evaluation be performed by the CARB.

CR 03-00007, AFPT Check Valves Failed Reverse Flow Testing, was accepted with actions to identify in the response that the testing program identified the check valve failures and that there were no other failures identified. The revision is expected to be brought back to the CARB chairman to determine satisfactory completion of the required actions.

CR 07-12064, Plant Process Computer Failure with Backup CPU Failing to Pickup, was accepted with actions to delete the last sentence from the generic implication question #1. Revision to this CR will require review by the CARB Chairman to determine satisfactory completion of required actions.

CRs 06-01963 and 06-2824 were accepted as written without comments.

Three of the five evaluations submitted to the CARB during this meeting required additional information and re-submittal to the CARB or CARB chairman to determine satisfactory completion of required actions.

#### **Review of CARB Meeting Minutes for January 8, 2007**

This CARB meeting reviewed the evaluation, ERs, and CAs for eleven CRs. The records indicated that a quorum was met and the results of CARB decisions were documented adequately for each CR. One CR was pulled from the agenda due to excessive pre-CARB comments; the rest were approved with or without comments.

#### **Review of CARB Meeting Minutes for December 18, 2006**

This CARB meeting reviewed the evaluations, ERs and CAs for 14 CRs. The records indicated that a quorum was met and the results of CARB decisions were documented adequately for each condition report. Three ACEs and 10 ER reports were accepted. The remaining CR issue was to reclassify the CA type for corrective actions #26 and #27 of CR 02-06178, which was approved by the CARB.

#### **Review of CARB Meeting Minutes for November 13, 2006**

This CARB meeting reviewed the evaluation, and CAs assigned for six CRs. The records indicate a quorum was met and the results of the CARB decisions were documented adequately for each CR. Three of the CRs were accepted with comments and three were rejected to be returned to CARB review after revision.

## **Review of CARB Meeting Minutes for October 30, 2006**

The CARB meeting minutes documented that CARB accepted with seven comments the Root Cause Analysis for CR 06-6990. Revision 1 of the Root Cause was resubmitted to the CARB to ensure concurrence with the Actions that were incorporated. Responses to these CARB comments were accepted and documented in CR 06-6990 (Root Cause) by someone other than the CARB Chairman. The current process does not provide evidence the CARB Chairman is actually performing the approvals. Team interviews confirmed that responses to CARB comments for Root Cause CR 06-6990 were not submitted to the CARB Chairman for approval. As a result of this observation, Davis-Besse generated CR 07-23306.

### *Conclusion*

The Team determined that the CARB was thorough in performing technical reviews and were challenging and critical in directing necessary changes. Several of the evaluations submitted to the CARB during the attended meeting and the meeting minutes reviewed required additional information and re-submittal to the CARB or CARB chairman to determine satisfactory completion of required actions. The Team determined that while the documentation of CARB actions were captured with detail within the CREST program (these items involve CRs), there are instances when SAP is not being utilized to track follow up actions on items other than CRs (OEs, TRs, INs, etc.) that require submittal to the CARB Chairman. The Team noted that when these non-adverse condition CARB actions are promptly resolved and resubmitted to the CARB Chairman for approval, no entry is made in the SAP. The Team observed that a tracking system was not utilized for all evaluations that are not CRs to ensure approval by CARB Chairman is tracked to completion.

## **2.3.4 Evaluation of Operational Experience Feedback**

Nuclear Operating Experience Business Practice NOBP-LP-2100, "FENOC Operating Experience Program," contains guidance on the review, evaluation, and use of OE feedback. The Team reviewed CRs/SAP notifications developed in response to OEs and spoke to Davis-Besse staff and management on their use of OE notices from FENOC and other nuclear sites. Davis-Besse has transitioned to the use of notifications to track initial screening and evaluation of OE.

The Team reviewed a sample of OE and feedback captured in the CR/SAP notification process. The items sampled are listed below:

### **CR 03-01167, SOER 99-01A, Loss of Grid (Periodic Review)**

This CR is dated 2/12/03 and is an ER of Davis-Besse action in response to INPO SOER 99-1. The Significant Operational Event Report (SOER) had been previously evaluated.

The Davis-Besse staff checked the computer program of the grid operator and verified that Davis-Besse would be notified when the "next event" (trip of Davis-Besse) voltage at the Davis-Besse switchyard reaches the proper set point. These actions took until late in 2005 to complete. The CR actions have been transferred to the Notification Order system under number 200173167. Actions that remain include revising the response to the SOER and getting supervisory review.

### **CR 06-10550, SAF-T-CLIMB Notched-Rail Fall Protection System Defect**

This CR was categorized as a CAQ-CF as it identified that the manufacturer of the fall protection system has identified certain conditions where Saf-T-Lok Sleeves or Rail may not perform properly during a fall. Under these conditions, a climber may fall farther than intended.

The Team found that (1) the description was clear, (2) the categorization was appropriate, (3) the evaluation method was appropriate, and (4) the action to resolve the issue was appropriate in that the potentially affected components were removed from service. The OE CR was initiated on 11/24/06, and closed on 12/14/06, which meets the timeliness expectations per the Davis-Besse procedure.

#### **CR 06-06129, Safety Concern when Using Davit Arms for Lifting**

This CR was categorized as a CAQ-CF as it identified that the threaded hooks attached to davit arms on the de-aerator heaters were tensioned slightly. This was noticed during the forced shutdown. The tension on these threaded hooks may be different during the normal run cycle. The point is that these should not be tensioned at all when not in use. These should also be inspected before use.

The Team found that (1) the description was clear, (2) the categorization was appropriate, (3) the evaluation method was appropriate, and (4) the action to resolve the issue was appropriate in that the issue was corrected and actions [preventative maintenance (PM) revision] established to minimize a repeat issue. The CR was initiated on 9/9/06, and closed 10/23/06, which meets the timeliness expectations per the Davis-Besse procedure.

#### **CR 07-17562, Potential for Exposure to Personnel in Trailers/Buildings near Rad Storage Facility**

This CR was categorized as a CAQ-CF as it identified the need to address/evaluate/move where trailers used during outages are placed since not only are the trailers closer than the Personnel Shop Facility, but also higher radiation levels are present due to equipment movement for refueling activities in and out of building and cells in buildings.

The location of trailers should be addressed not only at RadWaste Facilities, but also at the area near Auxiliary Buildings and near the Borated Water Storage Tank (BWST).

#### **OE18895, 19368**

The Davis-Besse Plant Engineering staff entered the receipt of INPO Operating Experience Report OE 18895 and OE 19368, describing the pipe rupture at a Japanese NPP (Mihama Unit 3), killing five people in 8/9/04, into the CAP in CR 04-05569.

The CR was written to track the investigation, determine applicability to Davis-Besse, and decide upon appropriate actions. The evaluation concluded that the Mihama event was applicable to Davis-Besse. The staff reviewed previous UT thickness measurements for similar areas and also determined that the Davis-Besse condensate and feed water piping had similar thermal hydraulic conditions and contained the flow elements as Mihama.

Although a review of previous inspections indicated no problem with wall thinning in these locations, four specific locations were added to the 14RFO inspection plan.

#### **EPRI TR 1009599**

Upon receipt of EPRI TR 1009599 regarding CHECKWORKS steam/feed water application, the staff entered CR 05-00246 into the CAP to document receipt of the report and to request a review of the report from a Fleet perspective. An action was written and transferred to Activity Tracking 0004204 to incorporate the guidelines from EPRI into the NOP.

## **Benchmarking Trip**

Following a benchmarking trip, the Davis-Besse staff entered into the CAP a CR 05-02570 to document FAC enhancements in several areas. One CA was written to enter component data into CHECKWORKS for susceptible lines contained in FAC large bore susceptible non-modeled program lines and for a susceptible lines contained in FAC development of small bore lines. This action was also moved into the SAP program for tracking.

## **NRC IN 2007-11, Recent Operator Performance Issues**

The Team reviewed the in-process OE evaluation of IN 2007-11, Recent Operator Performance Issues, that is recorded as SAP action 600370986. IN 2007-11, dated 3/06/07, discusses several instances where reactor operators have caused reactivity events or configuration control problems, primarily due to failure to follow procedures. This draft evaluation concluded that similar events have occurred at Davis-Besse and that CAs in place have significantly reduced the recurrence of these types of events. No further actions were recommended. This OE evaluation is currently in the review chain with open SAP action due dates in June and July 2007.

The Team found this evaluation reasonable; however, the 60-day guideline for OE evaluation completion was not met.

### *Conclusion*

The Team concluded the actions performed to evaluate and address OE feedback were appropriate and generally, timely. Further, the Team noted the actions assigned to address the results of the evaluation were also completed as appropriate, with adequate documentation captured in the closed CA/CR or Notification. MAOM review of OE evaluations pending completion has contributed to the improvement in meeting the timeliness expectations for completing the evaluations, although some late evaluations were identified.

## **2.3.5 Summary**

The Team determined that the responses to completed CRs provide an appropriate level of detailed discussion. The site has significantly reduced the backlog of open conditions, and self-recognized that additional action is needed to improve the timeliness of moving CRs in CREST to a "closed" status once all actions are completed. The level of justification documentation for the extension of a few of the actions simply referred to the work order priority. Site personnel exhibited a great level of institutional knowledge; however, the Team noted that reliance on the institutional knowledge may adversely impact plant performance should the personnel leave the site. The Team determined that repeat events are being captured in CREST, and no CAP weaknesses were identified in the repetitive CRs reviewed. CARB activities were thorough and critical, providing clear value added to the CAP. The OE Program was effectively implemented with improved timeliness of evaluations.

### **Areas of Strength**

None

### **Areas in Need of Attention**

Corrective actions tracking completion of work orders only referenced the work management process work order priority in the corrective action extension risk evaluation without careful documentation of the evaluation of the risk of not completing the action, and not considering the need for Interim Action(s),



including the basis, if none are required. This practice was considered deficient because the effect of the issue may have a greater potential impact on the plant when the issue has been in place for an extended period of time.

### **Areas for Improvement**

None

### **Conclusion**

The Team rated Corrective Action Implementation & Effectiveness as EFFECTIVE.

## **2.4 Trending Program Implementation and Effectiveness**

The Team assessed the implementation of the Davis-Besse trending programs, which include:

- Integrated performance assessment/trending
  - Performance trending,
  - Cognitive trending;
- Plant Health Reports;
- Component Health Reports;
- Snapshot Self-Assessment Reports;
- Condition Report trending; and
- Other reports.

The Team results are reported in this section.

### **2.4.1 Assessment of the Integrated Performance Assessment/Trending Process**

This process integrates the data and insights from over a dozen performance improvement processes. It incorporates aspects of human, organizational, and program performance indicators. Section level insights are rolled-up to the site and Fleet levels to find issues requiring attention or closer observation. The process continues to be reviewed and modified as experience is gained in its use and as benchmarking with industry continues. A recent change is the Fleet-wide use of collegial meetings led by each plant's Senior Leadership Team to review all of the section Integrated Performance Assessments (IPAs) and to discuss results and identify ways to improve performance. Other Fleet-wide changes in the process include common report due dates and adjustments in data binning so that crosscutting program issues can be more easily identified. The two main inputs to the process are (1) the performance trending found in the section IPA reports issued bi-annually and (2) the cognitive trending section reports, also issued bi-annually (issued 3 months apart from the IPA reports, resulting in quarterly reviews by Management). Davis-Besse's business practice for this process is given in NOBP-LP-2018, "Integrated Performance Assessment/Trending."

#### **Assessment of Performance Trending**

These are bi-annual reports (IPAs) providing concise overviews of a section's performance. The main contents of the reports are as follows: emerging trends, adverse trends, comparison with past trends, section clock resets, oversight and external assessments, NRC correspondence, section specific concerns

and action items by the CNRB, self-assessments, CRs, and section performance indicators, which bin CRs and Observations in the following categories: human error, injury risk, programmatic, procedure, and supervision.

The site roll-up report contains summaries of all the section's IPAs and adds any site level trending analysis. These reports also provide charts of CRs and Observations by binning category to get a site-wide picture of the adverse conditions reported.

The Fleet-wide roll-up report summarizes adverse trends on a Fleet-wide basis. It provides additional graphics that include the section self-ratings for all three plants and provides a number of graphics involving the number of CR's and Observations Fleet-wide, binned in the categories of human error, injury risk, programmatic, procedure, and supervision.

### **Assessment of Cognitive Trending**

Each section writes a cognitive binning report twice a year. These reports allow the sections to provide an interim analysis of section performance halfway between IPA reports. They tend to be shorter reports that focus on issues of concern to the section. They include any adverse trends, analysis of CRs, and may contain interim statistics of interest.

#### *Conclusion*

In considering the overall results of the IPA process, the strong management support and oversight, the focus on improving the efficiency in collecting and analyzing the data and timely correction of its weaknesses, and the proactive identification and correction of emerging problems, the Team found that this process continues to be an Area of Strength.

### **2.4.2 Assessment of the Plant Health Reports**

The Team reviewed the Davis-Besse System Health Report 2007-3. This report contained the ratings for the various Plant Systems and the present MR classification as well. The report contains a color-coding scheme that categorizes system health for quick identification. Further, each system covered contains graphs to capture and trend any MR Functional Failure. The system performance concludes with documenting those actions needed to improve system performance to the next higher health rating, including those actions needing to be performed to maintain the items in the highest category. The categories for summary ratings are Green – Excellent, White – Acceptable, Yellow – Needs Improvement, Red – Unacceptable.

The Team noted the system health performance indicators are consistent with industry standards.

### **2.4.3 Assessment of the Component Health Report Process**

This process was initiated early in 2007. Its purpose is to monitor equipment performance in support of NOP-ER-1001, "Continuous Equipment Performance Improvement."

Nuclear Operating Business Practice (NOBP-ER-3916) Component Health and Trending (CHT) Process Rev 0, effective date 1/26/07, establishes the process. The Team noted this trending process combined equipment repair orders, and CR-identified issues collected by systems. The components are then to be "binned" into trending groups of like components for display and tracking.

This process responds to a 2006 COIA Team Area for Improvement concerning the need to improve trending of equipment problems across systems.

Though a new process, the Team observed the process is encompassing, detailed, and established, and is pending initial reporting. Templates have been created and are on the web, being populated with data. Data analysis for the 2<sup>nd</sup> quarter 2007 is underway.

The Team observed that the major program guidance for the component health process does not mention the relation between the process and the plant's probabilistic safety assessment. These are strongly related efforts and their coordination would be beneficial.

The Team verified completion of the actions for the previously identified COIA AFI; however, the program has not yet resulted in a completed report on equipment trends from which the effectiveness of this process can be judged. Therefore, the Team concluded this item is an **Area in Need of Attention**.

#### **2.4.4 Assessment of the Snapshot Self-Assessment Reports**

These reports allow plant staff to analyze and report on a specific issue in a timely manner. The subject matter of the reports reviewed was broad and the objective of the reports informational, analytical, or problem solving.

The Team selected FL-SA-07-021, "FENOC Integrated Performance Assessment Snapshot Assessment," for detailed review. This Fleet level report was a review of the IPA process completed in March 2007 for the period of July-December 2006.

The report highlights the strengths and weaknesses of the process and uses the experience gained from the collegial meetings at the three sites to identify improvements in the process.

Actions related to improving the section and core binning categories were defined, business practices were revised concerning who must participate, details on station roll-up were identified, and adding further Fleet report details and revising report templates and baseline meeting agenda items were assigned.

The Team noted that this snapshot, provides valuable information regarding the strengths and weaknesses of the IPA process as of March 2007, and several notifications and one CR were written to correct the identified weaknesses. All identified actions have been completed.

#### **2.4.5 Assessment of Corrective Action Program Indicators**

CAP indicators are part of the monthly performance report. Denoted as D-SPO-05A through D-SPO-05E, these datasheets provide an overview of CR production and closure. For instance, D-SPO-05A shows the number of SCAQs. The datasheet shows the number of SCAQs opened and closed and allows a determination of closure timeliness. The sheet also indicates whether a SCAQ analysis was rejected because of error or incompleteness and thus, provides a measure of SCAQ analysis quality. The other datasheets provide data on root and apparent cause analyses, total open CRs, and CRs open greater than 180 days.

The June datasheets show good performance for all the CAP measures except for one possible problem. There is a goal to reduce the number of open CRs to 500 or less by the end of the year. Though the current trend is good, there is some possibility that the target of 500 or less by year-end may not be met.

The Team found that the CAP indicator datasheets provide good insights concerning timeliness, quality, and closure of CRs. The Team noted that the CAP performance indicators are consistent with industry standards.

## **2.4.6 Other Reports**

### **Monthly Performance Reports**

The Team reviewed the Davis-Besse Nuclear Power Station Monthly Performance Report – May 2007. This report contained indicators at both the site and departmental level. The site level indicators were divided into four large categories, specifically, Safe Plant Operations, Reliable Plant Operations, Cost Effective Plant Operations, and People Processes & Procedures. The departmental trending was divided into seven areas, specifically, Chemistry, Engineering, Operations, Radiation Protection, Maintenance/Work Management, Human Performance, and Cost.

The Team noted the performance indicators contained both monthly data and year-to-date trends. The indicators also documented GAP Closure, those actions in place to address or change the direction of undesired trends. The Team noted the performance indicators were consistent with industry standards.

### **Design Basis Assessment Report**

The Team reviewed the Davis-Besse Nuclear Power Plant Design Basis Assessment Report – First Quarter 2007 and noted this document was of sufficient detail and an appropriate tool for the Design Engineering group to monitor design department work activities and performance health of design programs.

## **2.4.7 Summary**

The overall Davis-Besse Trending program has been strengthened by management attention and staff efforts. Roll-ups of issues and trends to the unit and Fleet levels have the potential for identifying emerging trends that may not be evident at the section level. The objective of making this program strongly proactive is within reach. The establishment of the collegial meetings where section managers present the section's IPA status with peers and top management present is an example of another move forward, increasing the likelihood of timely identification and CAs. Component trending is a notable exception to the high level of performance in other trending areas.

Concerning the use of trending programs as part of the Station's self-assessment efforts, refer to Section 2.6, Effectiveness of Internal Assessment Activities.

### **Areas of Strength**

The IPA process is strong and continues to be improved.

### **Areas in Need of Attention**

The Component Health Report process is in place, but awaits its first major product, 2007 2<sup>nd</sup> Quarter report, which requires management attention.

### **Areas for Improvement**

None

### **Conclusion**

The Team rated the Trending Program and Implementation and Effectiveness as EFFECTIVE.

## 2.5 Effect of Program Backlogs

The Assessment Team performed an analysis of the effect of program backlogs on organizational and operational effectiveness. The Team's assessment consisted of:

- A review of program backlogs and the trend of the backlogs; and
- An evaluation of the impact of the backlog and backlog trend on organizational and operational effectiveness.

The Team reviewed the status of the backlog of open and unresolved work items at Davis-Besse. This was conducted through a series of interviews with plant staff and a review of the Davis-Besse databases, reports, IPAs, and numeric summaries.

### 2.5.1 Program Backlogs and Backlog Trend

A Davis-Besse *Open Condition Report GAP Closure Plan* to tactically address CAP backlog and to achieve the performance targets was developed by the Performance Improvement department (CR 06-7801). This plan is currently being implemented to reduce a majority of the aged open CAs by 06/30/07. Those *Open Condition Report GAP Closure Plan* CAs that will exceed 06/30/07, plus subsequent due date extensions beyond mid-year, are periodically reviewed by the station Site Leadership Team. In the first 4 months of 2007, slightly over 50% of the plan CAs have either been completed or deleted from tracking in the CAP as a result of being enhancements or lower priority short-term field work. The current focus is being placed on working off the more aged, long-term CAs. Detailed performance indicators have been created that are regularly reviewed by station management to ensure the open CR targets are expected to be achieved by year-end.

The *Open Condition Report GAP Closure Plan* is designed to tactically address the aged CAP backlog while continuing to manage and focus resources on current CAP issues. The overall goal of the plan is to eliminate the older open issues and the total numbers of issues carried at any given time in the program to establish an environment where Davis-Besse is working on and resolving today's problems today.

Davis-Besse, along with the other FENOC plants, has established goals for the CAP. Davis-Besse's specific goals that will be facilitated by this Plan are:

- Reduce and maintain the total number of open site CRs to no greater than 500. This number includes CRs with both short-term and long-term CAs (re: MPR Performance Indicator D-SPO-05C). Current open CR backlog as of May 2007 is reported as 708 and is rated White.
- Plan target is to have no more than 40 CRs with short-term CAs open >180 days from CR initiation (re: MPR Performance Indicator D-SPO-05D). At present, the monthly indicator for May 2007 is White, with 216 short-term CRs >180 days old. This indicator continues to improve each month due to the station placing appropriate resources on managing the short term CAs. Interviews indicated that achieving the goal of having less than 40 of these CRs before 12/31/07 will be challenged due to resources being dedicated to 15RFO outage preparation, an upcoming INPO inspection, and a Component Design Basis Inspection that all occur prior to year's end.
- Long-term CR CAs are expected to be well-defined and schedules agreed to by the Senior Leadership Team. There is currently no Performance Indicator (PI) for tracking long-term CRs.

These goals are targeted for achievement on or before 12/31/07.

The Team found that the average age of open SCAQ CRs and backlog numbers during the 2007 COIA have shown significant improvement since approval and implementation of the *Open Condition Report GAP Closure Plan*.

### Age of Oldest SCAQ Condition Reports

|                              | 2004<br>Assessment | 2005<br>Assessment  | 2006<br>Assessment  | 2007 Assessment  |
|------------------------------|--------------------|---------------------|---------------------|--|
| Average Age of 10 Oldest CRs | 382 days           | 540 days            | 830 days            | 747 (8 CRs)  |
| Oldest Preventive Action     | 889 days           | 1,219 days (outage) | 1,610 days (outage) | 1,579 days (when complete, will be 862 days)             |
| Oldest Remedial Action       | 691 days           | 862                 | 1,224 days          | 1,450 days (outage, and when complete, will be 277 days) |

The Team reviewed the 20 oldest open CRs, noting only one of them was classified as a SR CR. The remaining action to resolve this open SR CR was scheduled for completion in the RFO15 outage.

As a benchmark, the team compared the Entergy Fleet oldest open CRs to the Davis-Besse oldest open CRs. This comparison revealed Davis-Besse has 32 open CRs which predate 2003, while the Entergy Fleet has 37. Arkansas Nuclear (a two-unit site) has the largest portion for the Fleet at 10.

The Team reviewed the 20 oldest items, noting that nine CAs have due dates in 2007. The Team noted via interviews, that Davis-Besse personnel were aware of both the issues and the actions in place to resolve same. The personnel interviewed expressed an awareness of the issues and the importance to drive the actions to completion.

## 2.5.2 Review of the Oldest Significant Root Condition Reports (SR CRs)

### CR 02-00502, Main Steam Safety Valve As-Found Test Results

This was an SR CR written due to the as-found setting found out of TS limits. The cause was attributed to bonding of the disc and seat over time due to similar materials. The CA was to replace the discs with pre-oxidized Inconel discs.

The Team concluded that this CR was still open because the licensee's plan to replace the discs on all 12 Safety Valves had not been completed yet. The licensee has scheduled replacement of the remaining discs in the next refueling outage 15RFO.

### CR 03-03937, Seismic Analysis of Masonry Walls

This CR was categorized as a SR, as it identified that during the review of the masonry wall calculations for CR 03-01132, Tornado Differential Pressure, discrepancies have been identified with the seismic analyses of these walls. The discrepancies include no DLF was applied for the pipe break pressure loading, incorrect material increase factors, and potentially un-conservative adjustment factors for seismic and boundary conditions. The existing masonry wall calculations may contain previously un-quantified conservatisms that would offset some the discrepancies identified above. These un-quantified conservatisms include the modeling methods used in the analysis (i.e., single wythe vs. multi-wythe wall), potential use of a finite element analysis, and development of DLF's based on the actual pipe break time history.

The remaining open action (CA #6) was assigned to track that CA 03-02910-03 will track the completion of the necessary calculation revisions for the masonry wall issues. If any plant modifications are required, Design Engineering shall prepare and issue the necessary ECR packages. This is a generic CA to track the need for additional ECR's if such need is determined to exist in the calculation revision results. Specific additional CA's are expected to be initiated to prepare the ECR and implement the ECR as the need for ECR's is identified.

The Team noted this action had been extended four times with the most recent extension documenting the following in the reason and justification sections for the extension.

Reason:

- This corrective action tracks the implementation of any required modifications to the plant masonry walls. The implementation of the required modifications will not be complete by the current due date. The calculations for these walls were completed in July of 2006 and the required masonry wall ECRs are forecast to be issued by 6/30/07. Therefore, an extension of the due date for this CA is requested.

Justification:

- The masonry walls are functional as documented in Operability Evaluation 03-0015.

The Team interviews noted the calculations had been completed, and the ECRs were completed as well. This final action was remaining open to track and document the field work implementing the ECRs were completed.

The Team also observed that, while the documentation in the CR for the present status of the issue was minimal, the responsible owner was aware (communicated during the interviews) of the status of the action. The interview also revealed the owner was aware of the expected due date, and the issue was discussed periodically at the MAOM. In short, the team noted that while the "institutional knowledge" of the issue was appropriate, this same level of status was not duplicated in the CREST CA. The Team observed the CR extension process provides an opportunity to capture this information. Documenting the "awareness" in the CAP reduces the potential to lose the issue should the "individual's awareness" be lost; thereby, reducing the reliance on institutional knowledge (personnel knowledge) to ensure the status of the issue is known.

#### **CR 05-00219, Loss of D1 Bus During Testing**

The loss of D1 bus was caused by incorrect connection of test lead jumpers during a surveillance test. The remaining open action is the installation of remote test connections to eliminate the need for jumper installation inside the cabinet. The CA was extended to 15RFO (late 2007) for alignment with the proper equipment train outage, long term plans, and priorities. This CA does not correct a Degraded/Non-conforming issue as defined by Generic Letter 91-18.

The Team noted that other CAs to procedures and training provide sufficient interim actions and the extended implementation was approved in accordance with the CAP process.

#### **CR 05-01642, Decay Heat Train 2 Suction Piping – Refilling/Restoration**

This CR was written due to the identification of a void in the decay heat suction piping while at power. This was following maintenance activity which had replaced the pump mechanical seal. Comprehensive CAs were directed, including venting the suction piping, UT confirmation of lack of voids, addition of

pipng to verify the piping was water solid, briefing of operators to assure an understanding of this potential condition , revising procedures, and the addition of vent valves.

The CR indicates that all CAs were completed by 12/31/06, with the exception of CA #11 for the installation of one of the two new vent valves. The first extension to December 2006 was to “align CREST due date with the order’s scheduled work week based on the order’s identified work management priority. Installation of the modification will be coordinated with the Decay Heat outage after the 14<sup>th</sup> Refueling Outage....The risk...has been evaluated through the work management process.” This was further extended to February 2007 for a system/train outage and then, to December 2007 due to unexpected high radiation levels following the planned mid-cycle outage to address the pressurized code safety leakage.

The Team determined that these extensions were reasonable with interim CAs taken. The Team also verified that the installation of the remaining vent valve, ECR 05-0159, is being tracked by Notification #600207497 and is scheduled to be completed by 11/4/07.

### **CR 06-6003, Manual Reactor Trip Due to Lowering Condenser Vacuum**

This CR involves a reactor manual trip on 9/6/06. A rapidly rising condenser pressure was responded to by lowering reactor power and finally a manual trip from 45% power. The initiating event was a break in one of the four Turbine Waste Oil and Water Drain (slop drain) lines. These lines are lead through the high and low pressure condensers from the turbine bearings to a floor drain in the East Condenser Pit. The break was inside the condenser, allowing a high rate of air in-leakage to the condenser, requiring eventual reactor shutdown.

Eighteen CAs were written; six involve remedial actions including capping the failed line for restart, three involve CAs including removal of all four slop drain lines from the condenser, and nine other actions closing out the CR including a final meeting with the CARB to review effectiveness of all actions. Five CAs remain open and are awaiting 15RFO to gain access to the turbine condenser. These actions include a metallurgical examination of the broken pipe to confirm the probable cause (fatigue failure), issuance of the final OE report, removal of the four slop drains, and close out the CR with a final CARB review. Longest due-date reported is 5/20/08 for completion of the metallurgical examination with expected close-out soon after.

### **CR 07-18003, Disabling Seismic Monitoring System Impacted Emergency**

Review of the CR in CREST indicates the event was identified on 4/9/07. CARB approved the investigation (with comments) on 5/25/07. CAs were assigned on 5/25/07, and final CARB Chair approval of comment incorporation was completed on 6/11/07. Thirteen CAs and one ER action were assigned in the database; seven are complete and seven are open with the longest due date being 9/20/07.

### **CR 07-18074, High Pressure Injection Discharge Piping Potential Air Intrusion**

Review of the CR in CREST indicates the event was identified on 4/10/07. CARB approved the investigation (with comments) on 5/10/07. CAs were assigned between 5/8/07 and 6/13/07, and final CARB Chair approval of comment incorporation was completed on 5/30/07. Twenty CAs and one ER action were assigned in the database; five are complete and the rest are open with the longest due date being 3/1/08.



### *Conclusion*

The Team found that the oldest SR CAs are scheduled for completion in the next refueling outage. The remaining SR CAs have reasonable due dates based on the original event date and the work required to complete the actions.

## **2.5.3 Review of the Twenty Oldest Condition Reports**

### **CR 01-0009, Barrier Penetration Inspections**

This CR was categorized CAQ-CF as it identified components which should be added to enhance the barrier inspection process. The originator noted that barriers, which were not specifically bounded by either the High Energy Line Break (HELB) or Fire Protection barrier inspection processes, may have degraded conditions.

The Team found that (1) the description was clear, (2) the categorization was appropriate, and (3) the evaluation method was appropriate. However, the team also noted three new actions were assigned in April 2007, which in part, mirrored the original action suggested by the CR author. One of the actions was to identify any additional barriers that need to be entered into the barrier inspection process. The Team noted the new due dates assigned for these later actions are scheduled in 2007. The responses to the earlier actions documented the reviews performed for HELB barriers, Fire Protection Barriers, Flooding Barriers, and barriers bounded by the MR, and were closed, indicating the action performed was not the same as the action assigned. The documentation was in accordance with the Davis-Besse expectations.

### **CR 02-00502, Main Steam Safety Valve As Found Test Results**

See details above.

### **CR 02-01590, Drawing Discrepancy**

This CR was categorized as a Condition Adverse to Quality – Basic Cause (CAQ-CB) as it identified a discrepancy between the field labeling for the pumps of the Containment Gas Analyzer System. The applicable procedures match the field labeling. The labeling does not match the Operations Section (OPS) Schematics or the Vendor Drawings. The CR requested the drawings be changed to match the plant.

The Team noted the responses to the CAs initially assigned documented the direction to change the field labels and procedures to reflect the parent drawing; however, this decision was later revisited noting a human factors potential issue and therefore, requested the drawings be revised to reflect the field condition. The remaining action was to revise the drawings, and this action was subsequently closed (6/29/07) to the Notification 600395220 process tracking per the present NOBP-LP-2019, "Corrective Action Program Expectations."

### **CR 02-02340, IPR: Cathodic Protection**

The CR was categorized as a CA as it identified, in part, the Cathodic Protection system needed to be repaired or permanently abandoned. The response to the CAs noted (via 50.59 screening completed and approved on 4/21/03) that the evaluation showed that the Cathodic Protection system was not completely "no longer functional" as earlier stated, but was in fact, still functional but with a decreased capability.

In addition to the 50.59 screening process action performed, actions were assigned to:

1. Enhancement corrective action: Change the CPS PM 4893 to record shift potentials in accordance with the NACE International – The Corrosion Society (formerly National Association of Corrosion Engineers) (NACE) Standards. The action was closed noting the Maintenance Plan 15566 (PM4893) currently has an approved revision (DB-Rev-04-0213) that will revise the Maintenance plan to current NACE standards.
2. Track completion of WO #02-003626-000. Schedule WR 02-001954 to survey, develop, and perform repair of cathodic protection anode string for restart. This action was subsequently closed to CA #4, which noted that instead of reworking the existing system, it is expected to be replaced under ECR 04-0052-00.
3. Implement ECR 04-0052-00 to replace the Cathodic Protection System lines and rectifier. Reference Notification 600124256 and Order 200075259. This final action was assigned in February of 2004 and remains open with a present due date in June of 2008.

The Team found that during the course of the implementation of the initially assigned CAs, the system repair plan had changed in scope from repair to replace. The replacement schedule was adequate.

#### **CR 02-02897, Boric Acid Buildup on Equipment in BAAT Rm**

The CR was categorized as a CA as it identified there is Boric Acid at the body to bonnet flange on MU 23 and boric acid in the flow element of FEMU41. The remaining action open, which was accepted in November of 2002, states to Rework valve MU23 per approved plant procedures and design drawings by replacing the body to bonnet gasket per procedure DB-MM-09194, and ensure bonnet nuts are the correct material per vendor drawing or approved engineering documents during re-assembly. This remaining action has a present due date of October 2007. The action was extended six times thus far and in each case, the extension request justification (risk) discussion documented simply “Risk associated with this corrective action order has been evaluated through the work management process. The order has been prioritized as 600 steady state routine maintenance.”

The Team found the practice of documenting that the justification (risk to plant operation) was “implied” by the priority assigned to the work order was a gap to excellence. The Team recognized the work order priority is established at the initial work order screening and while considered within the work control process, the CAP CA extension process provided the opportunity to document the challenges to work completion (i.e., need for extension) and the risk or regulatory significance imposed (if any) as a result of having to extend the completion date of the action.

#### **CR 02-02941, Operational Readiness Review Action Items**

The CR was categorized as a CAQ-CF as it identified the need to document concerns with the administration and tracking of action items identified during Operational Readiness Reviews. The remaining open action on this CR is number 250, which stated in part, “In order to complete ORR AI 2002-0066, the following action is required: Complete MOD 99-0058. Complete work no later than during Cycle 14. Transferred from DES to PES...” The initial due date assigned was March of 2004, and the present due date is (after processing 10 extensions) is in February 2008. The last extension request documented the reason for the extension and the justification (risk to plant operations) as follows:

Reason:

- The FENOC Cyber Security Project and the Davis-Besse Network Assessment has taken priority over completing the addition of this display into the Safety Parameter Display System (SPDS). The Cyber Security Project is scheduled for completion 12/28/07.

- The display has been developed. However, additional time is needed to incorporate the display into the new version of SPDS. Also, testing needs to be completed prior to installing the new SPDS.

Justification (Risk):

- There are no interim actions or increase in plant risk due to the delay in implementing this display.

The Team found that the present due date appears to exceed the original target plant condition assigned, which was to complete work no later than during Cycle 14. The present due date is after the RFO 15. The justification fails to explain why there is no increased plant risk from this delay.

#### **CR 02-03483, DH 2733. DH Pump 1 Suction (BWST or Emergency Sump) gasket leakage**

This CR was categorized as a CA as it identified valve DH 2733 contains a minor boric acid leak at the body to bonnet flange. Leakage appears to be old boric acid. Unable to tell if leakage is still active, this CR was written in accordance with NOP-ER-2001. The remaining open action (CA #4) stated: replace Body to Bonnet seal gasket on valve DH 2733 in accordance with procedure DB-MM-09051, and verify that body to bonnet bolting materials are correct per vendor drawing or approved engineering documents during reassembly. This action was extended twice with the most recent extension reason and justification (risk) noted below:

Reason:

- DH2733 is the suction valve for Decay Heat Train 1. This is a train 1 component which is aligned with the odd refueling outages. 14RFO is an Emergency Core Cooling System Train 2 outage. This extension is being written to align the Train 1 maintenance with 15RFO.

Justification (Risk):

- There are no interim actions or increase in plant risk due to the delay in implementing this display. This action was extended twice with the most recent extension justification (risk) documented. The CR investigation states "DH 2733 pressure boundary integrity is acceptable. Leakage is minor, no wetted areas are found. Bolting was found acceptable per the reference VT-3 examination and all bolting material was verified as boron corrosion resistant. Based upon this, DH2733 can be determined as operable." There is no risk to not completing this corrective action until 15RFO due to the minor nature of the leak. No interim actions are needed, based on this component being in a routinely toured area where any change in condition would be immediately identified.

The Team found that the extension justification and reason discussions were of sufficient depth, appropriate, and clear.

#### **CR 02-03972, Degradation of Service Water Supply Water Piping to Auxiliary Feed Water Piping**

This CR was categorized as a CA as it identified the Service Water supply piping/valves to the AFW pumps are manufactured of Carbon Steel. Plant and industry experience has found Carbon Steel is highly susceptible to microbiologically influenced corrosion (MIC), and a portion of the piping is normally isolated at SW1382 and SW1383 and has been virtually untreated for MIC prevention over the past 25 years of plant operation. It is suspected this piping is very likely to have pin hole leaks sometime over the next 10 years of plant operation.

The remaining open action for this condition stated “WO #02-006027-000; WR 02-003626 initiated for this work. Generate and implement Work Order to remove piping insulation and perform UT of service water piping to auxiliary feedwater piping 6”-HPD-22. UT inspection should cover selected accessible piping, accessible welds and associated heat affected zones, and back side of accessible elbows. See System Engineer for marked up drawing.”

The action has been extended six times, with the justification for the most recent extension documenting that the Risk associated with this CA order has been evaluated through the work management process. The orders have been prioritized as 600 steady state routine maintenance.

As noted above, the Team found that the practice of documenting the justification (risk to plant operation) was “implied” by the priority assigned to the work order was inappropriate. The Team noted the present due date of 7/18/07, reflects 5 years since the CR author identified that potential through wall leakage may occur within 10 years.

### **CR 02-04768, SHRR Walkdown – 13.8 and 4.16 KV SYSTEMS**

This CR was categorized as a CAQ-CF as it identified that during walkdown of the 13.8 and 4.16 kV Systems, the walkdown team identified a number of minor maintenance issues. The remaining open action (CA #21) was assigned to correct general corrosion around transformer BD (needs cleaned and/or painted), specifically noting two areas: (1) Neutral Resistor Bank rusted and (2) Cable Bus and transformer needs re-painted. The Team noted this remaining action had been extended three times, with the most recent extension documenting the reason and justification as follows:

Reason:

- Additional time is needed for Engineering to initiate paperwork to change out the Neutral Resistor Bank rather than repaint. The order 200005979 for completing this work is currently unscheduled pending anticipated voiding after Engineering starts the replacement order.

Justification (Risk):

- Risk associated with this corrective action order has been evaluated through the work management process. The order has been prioritized 600 steady state routine maintenance.
- This corrective action extension does not challenge personnel safety, nuclear safety, or increase risk to safe operation of the plant. No interim actions are necessary.

The Team noted the extension justification and reason discussions were adequate.

### **CR 02-04806, Generic Implications for CR 02-03027 Found Additional Condition**

This CR was categorized as a CA as it identified that during the extent of condition for CR 02-03027, EDG Jacket Cooling Water Heat Exchanger Erosion, another problem was identified. It could not be determined that the High Pressure Injection Pump Lube Oil System Heat Exchanger was not affected.

The remaining open action stated “WO #02-006346-000 Replace the HPI heat exchangers E198-1 and E198-2. Examine the removed heat exchanges to evaluate their condition. WR 02-004013 and WR 02-004015 have been written to perform this action. Schedule change request 13R-1479 has been submitted.” This action (CA #3) has been extended two times, with the reason and justification for the most recent extension being that the work order has a priority 600.

As noted above, the Team found that the practice of documenting the justification (risk to plant operation) was “implied” by the priority assigned to the work order was inappropriate. The Team also observed the tracking of the creation of a PM activity was closed to the notification tracking process.

#### **CR 02-04925, SHRR: 480VAC Substation Transformer issues**

This CR was categorized as a CA as it identified a number of minor maintenance actions on the 480VAC Substation transformers. The remaining open action (CA #1) to address the issues was assigned to track WR 02-005519, issued to track the resolution of a recurring oil leak on transformer XAF-3. With the exception of the initial extension, the remaining six extensions were performed to align the CA due date with new planned dates for the implementation of the order. The initial extension was performed capturing the resource focus on higher priority restart activities. The Team noted this remaining open action has been extended seven times, with the most recent extension documenting the justification that the work order has a priority 600.

As noted above, the Team found that the practice of documenting the justification (risk to plant operation) was “implied” by the priority assigned to the work order was inappropriate.

#### **CR 02-05032, SHRR DHR Train 2 Walkdown BA Residue in Aux Building**

This CR was categorized as a CA as it identified a few components which had indications of boric acid buildup observed during a walkdown of the decay heat removal (DHR) Train 2-identified components in the RRA Aux Bldg. The Team noted the remaining open action (CA #3) was assigned to rework by repacking valve DH52 per approved plant procedure DB-MM-09059, and verify correct packing bolting materials are used. All three extensions documented the reason for the extension was related to the planned implementation date of the notification changing. The Team noted that the most recent extension documented only that the work order has a priority 600.

As noted above, the Team found that the practice of documenting the justification (risk to plant operation) was “implied” by the priority assigned to the work order was inappropriate.

#### **CR 02-05039, LIR – EDG System does not meet IEEE-STD-387-1972 Requirements**

This CR was categorized as a CA as it identified both EDGs were not provided with automatic control of voltage, speed, or frequency. That is, regardless of the mode of operation (including paralleled operation to the grid during testing), the governor speed control does not automatically return the isochronous setpoint (via motor operated potentiometer) to 60 HZ nor the voltage regulator control (via motor operated potentiometer) to 4160V. In addition, the CR identified values documented in procedure DB-OP-06316 documented that if a Safety Features Actuation System (SFAS) Level 2 occurs with no LOOP, the EDG overload will reach approximately 3,300 to 3,500 KW. This value of load is unacceptable for the following reasons: (1) a load of 3,300 to 3,500 KW is more than 10% above the 30 minute rating of 3,035 KW and (2) there is no guarantee that EDG will be still available to meet its intended function during a loss of coolant accident (LOCA); if a LOCA occurs with no LOOP when the EDG is paralleled to the grid, this scenario may not meet the component single failure criterion committed under USAR Section 8.1.5 (Design Bases).

Three actions remain open (CA #7, #9, and #15), with the actions extended three times, four times, and one time, respectively.

CA #7 stated to issue Engineering Work Request EWR 01-0261-00 to add control circuitry to protect the EDG if a Level 2 ESFAS occurs when the EDG is paralleled to the grid. This modification is scheduled for 16RFO.

CA #9 stated upon completion of EWR 01-0261-00 and the analysis of the LOOP scenario as discussed in this CR, provide Operations with information to update Section 2.2.15 of DB-OP-06316 in regard to EDG overload.

CA #15 stated to implement EWR 01-0261-00, EDG breaker auto opening logic, (see CA#7 above).

The Team noted the information captured in all of the three remaining open actions for the reason and justification included the specific impact to plant operation.

#### **CR 02-05306, SHRR – Makeup System Walkdown – room 211 Boric Acid Residue on Manual Valves**

This CR was categorized as a CA as it identified several components that had indications for boric acid leaks. The Team noted the remaining action (CA #1) was assigned to address MU104, specifically to replace diaphragm and O-rings and reinstall in accordance with approved plant procedure DB-MM-09071, and verify that the correct parts are replaced in accordance with approved vendor drawings. The Team noted this open action was extended one time.

The Team noted the extension justification and reason discussions were of sufficient depth, appropriate, and clear.

#### **CR 02-05526, High Energy Line Break (HELB) Collective Significance Review**

This CR was categorized as a CAQ-CF as it identified documentation challenges associated with the LIR-AFW-HELB Collective Significance CR. The documentation issues needed to be addressed to improve existing Davis-Besse calculations containing errors, implying the determination of limits at Davis-Besse were inconsistent with industry available standards.

The Team noted the remaining action (CA #9) was assigned to revise Section I.D.4 of the *Design Criteria Manual* to correctly reflect the design and licensing basis for postulated piping failures, and for consistency with the piping evaluation methods of Section III.B.11; and provide guidance on the required level of documentation to be included in each stress problem to achieve a consistent approach to HELB documentation. One of the required enhancements to this *Design Criteria Manual* Section is the inclusion of a table of all postulated break locations and the associated design documents in which they are addressed. The assignment also included an update to Section III.B.11 to provide a requirement to address HELB issues and to cross-reference to Section I.D.4. The first item identified in the CA, revision to section I.D.4, HELB of the DCM, has been completed. The second part of the CA requires the revision to section III.B.11, *Piping Analysis of the Design Criteria Manual*. The following corrective actions also require changes to this *Design Criteria Manual* section, but have not been performed: CR 03-05757-1, CR 03-05872-2, CR 03-08953-3, and CR 05-05845-3.

The Team noted this open action was extended thirteen times. The Team also noted that while the quantity of extensions was high, the extension justification and reason discussions were of sufficient depth, appropriate, and clear.

#### **CR 02-5755, SHRR: Recommend SFAS MOD 00-0019 be Implemented prior to Restart**

This CR was categorized as a CA as it identified that the requirement to have SFAS Containment Radiation Monitoring indication and trips was deleted from the Davis-Besse Operating License in April 1998 by Amendment #221; however, the modification MOD 00-0019 initiated to permanently delete the portions of SFAS related to the Containment Radiation Monitors was not planned for implementation until Cycle 15, at least 4 years from now (2006). ECR 03-0138-00 to perform the roll back of the cables to the four containment radiation monitors was completed during 13RFO.

The Team noted the remaining action (CA #9) was assigned to track that the EWR is expected to complete the development of ECR 02-0633-00 and have the package available to implement during 14RFO. The Team noted this open action was extended six times. This EWR is currently scheduled for completion in 16RFO.

The Team found that the most recent extension discussion was focused on what the modification, when completed, will accomplish, without documenting the justification from an impact to plant operation for the delay in implementing the modification. The Team recognized the engineering work request priority is established based, in part, on the impact to plant operation; however, the CAP CA extension process should document the challenges to work completion (i.e., need for extension) and the risk or regulatory significance imposed (if any) as a result of having to extend the completion date of the action.

### **CR 02-06003, PR/CM: Procedure NG-EN-00307, Configuration Management is Lacking**

This CR was categorized as CAQ-CF as it identified that during the performance of the Program Readiness Baseline Assessment for the Configuration Management Program, the program procedure, NG-EN-00307, does not adequately address the full program scope and may not fully specify all of the requirements for the program. Also, there is no Program Guide that would appear to assist in promoting the use of and reason for the programs' existence. The Team noted the single assigned action (CA #1) remains open and was assigned to develop and implement NOP-CC-1001, "Configuration Management Program," and to address the issues identified in the Description of Condition of this CR.

The Team noted this open action was extended six times, with the most recent extension documenting the following reason and justification information.

#### **Reason:**

- Perry implemented the procedure on 6/8/07; Beaver Valley implemented the procedure on 6/13/07. Davis-Besse is remaining plant that must implement the procedure to close this CA. Due to problems encountered in the execution of the *Change Management Plan* to complete open items identified during field assessment of configuration issues related to close-out of old site specific procedure, Davis-Besse requires additional time to close these issues and implement NOP-CC-1001.

#### **Justification (Risk):**

- Each site currently controls by procedure the function of configuration management. The issuance of NOP-CC-1001, "Configuration Management Program," will adopt a common Fleet terminology across the three sites for configuration management. The common method will replace the current procedures at the sites. Currently, configuration management requirements are appropriately maintained through individual site procedures. Interim actions are not required until NOP-CC-1001 is implemented at the Fleet locations.

The Team noted the most recent extension discussion was focused on what the delay to implementing the new Fleet procedure, when completed, will accomplish, without documenting the justification from an impact to plant operation caused by the delay in implementing the new procedure. Further, other than the first extension performed, the remaining five extensions also did not discuss this impact on operations aspect of the delays. The Team found this to be another example where the CAP CA extension process did not document the challenges to work completion (i.e., need for extension) and the risk or significance imposed (if any) as a result of having to extend the completion date of the action.

#### **CR 02-06309, SHRR: RPS OE 12155 Review**

This CR was categorized as a CA as it identified that differential pressure transmitters are prone to a temperature effect when they are calibrated at one ambient temperature and operated at another. The temperature effect can contribute a significant amount to the Total Device Uncertainty of the transmitter which, in turn, can affect Total Loop Uncertainty.

The remaining open action (CA #8) was assigned to track and ensure that based on the information provided by Design Basis Engineering (DBE) in response to CA #10, Regulatory Affairs was to prepare a License Amendment Request (LAR), obtain FENOC review and approval of the LAR, submit the LAR to the NRC, obtain NRC approval of the LAR, and implement the resulting License Amendment.

Due to the completion of this CA depending on the DBE input from CA #10 and NRC review and approval of the LAR, the CA was scheduled for completion in 2005. This open action was extended three times. Subsequently, the action was rolled into the LAR for converting the current technical specifications to the Improved Standard Technical Specifications (Project GN-0000288-1-1). The current detailed project schedule provides for LAR submittal in July of 2007, and full implementation by August of 2008.

The Team noted that while the quantity of extensions was high, the extension justification and reason discussions were of sufficient depth, appropriate, and clear.

#### **CR 02-06686, Roll Up of Deep Drain Valves**

This CR was categorized as a CA as it identified several valves requiring expedited review by Containment Health to support the Deep Drain of the Reactor Vessel because the valves indicated either packing leaks (boron leak items) or corrosion conditions. The Team noted 18 of the 19 assigned actions had been closed. The remaining open action was assigned to capture the completion of the preparation of the surface and touchup coat for the yoke and retaining clamp on valve MU6422 in accordance with Specification A-024Q.

The Team noted this open action was extended three times (all three extensions were performed to align the CA with the new date for the completion of the work order). The order had been prioritized as 600 steady state routine maintenance.

As noted above, the Team found that the practice of documenting the justification (risk to plant operation) was "implied" by the priority assigned to the work order was inappropriate.

#### **CR 02-07047, SHRR: 4.16 Open PCRS Required for Restart**

This CR was categorized as a CAQ-CF as it identified several open Procedure Change Requests (PCRs) for DB-SC-04052 and DB-SC-04053, which needed to be incorporated. PCRs to DB-SC-04052 (02-0814, 02-0825, and 02-2374) and DB-SC-04053 (02-0762, 02-0810, 02-0815, and 02-2375) document various deficiencies with these procedures and should be incorporated into the applicable procedures. These procedures are used to test the lockout and transfer capability of the 4.16 kV busses.

The action (CA #1) was assigned to implement the following PCRs in the respective procedures prior to plant restart. PCRs 02-0814, 02-0825, and 02-2374 for procedure DB-SC-04052, Rev. 01; and PCRs 02-0762, 02-0810, 02-0815, and 02-2375 for procedure DB-SC-04053, Rev. 01, with an initial due date of 3/31/04. The open action was extended 10 times, with the most recent extension due date of 1/17/07. DB-SC-04052, effective on 3/24/06, incorporated this CA and DB-SC-04053 is currently in validation comment resolution and its next performance is 15RFO.



The Team noted the extension justification and reason discussions were of sufficient depth, appropriate, and clear.

### *Conclusion*

The Team noted that a few of these oldest open actions had been extended at least once; one of which had been extended 13 times. Several of the open actions were duplicate tracking items captured in the SAP process as orders. The Team reviewed the approved extension requests, noting a few had extensions approved with the simple justification that since the Order was assigned the priority 600, then extensions were acceptable. The Team noted that capturing only the priority of the work order to document the impact on operations was an **Area in Need of Attention**, as conditions for the issue may have a greater potential impact on the plant when the issue has been in place for an extended period of time. The finding was characterized in Section 2.3 of this report because it applies to the implementation and effectiveness of corrective actions.

#### **2.5.4 Probabilistic Risk Based Review of the Oldest Condition Reports Above**

The Team reviewed the above 20 oldest CRs, attempting to incorporate risk significance as a prioritization attribute. The PSA staff was interviewed and the draft PSA, Revision 4, system risk rankings were reviewed. It was noted that changes in several major risk contributors have caused a re-ranking of the risk significant systems.

The Team noted that the PSA, Revision 4, is close to approval and issuance and that the balance of the PSA products, such as the system notebooks, the safety monitor computer program, the risk significance component matrix, MR risk inputs, and the motor-operated valve (MOV) and AOV risk significance reports are planned to be updated to agree with the next revision.

Of the 20 oldest CRs, four (CR 02-00502, CR 02-03972, CR 02-04806, and CR 02-05439) were identified by the Team as relating to safety significant systems. Two of these CRs involve the emergency diesels, the system that is the highest ranking risk significant system according to the Revision 4 analysis.

The Team did not go further than get an overview understanding of risk significance of the open CAs of these four identified CRs. Further steps would require an understanding of the risk impact of the open CAs and how the resulting risk ranking compares with the risks of all current open items from a plant-wide perspective. When CAs are prioritized for closure and where long delays are expected, a risk perspective using PSA insights should be part of the decision making process.

#### **2.5.5 Evaluation of the Backlog Trend**

The Team found that the average age of open CRs and backlog numbers during the 2007 COIA have shown significant improvement since approval and implementation of the *Open Condition Report GAP Closure Plan*. The backlog continues to trend down in both SCAQ and short-term CAs.

#### **2.5.6 Summary**

The numerical backlog and average age of all condition reports indicate significant improvement since approval and implementation of the *Open Condition Report GAP Closure Plan*. This plan has allowed resources to focus attention on specific goals that may be challenging to achieve prior to 12/31/07. Interviews indicate good Management support in reducing the CR backlog and overall ownership of the CAP has improved.

### **Areas of Strength**

None

### **Areas in Need of Attention**

None

### **Areas for Improvement**

None

### **Conclusion**

The Team rated the Effect of Program Backlogs as EFFECTIVE.

## **2.6 Effectiveness of Internal Assessment Activities**

The Assessment Team evaluated the effectiveness of the Davis-Besse Nuclear Power Station's internal assessment activities associated with the implementation of the CAP. This assessment included:

- A review of the results of Davis-Besse audits/reviews conducted since the 2006 Independent Assessment of the CAP that evaluated the effectiveness of the implementation of the CAP;
- Interviews with individuals involved with the oversight/audit function to determine the effectiveness of these efforts and the responsiveness of Davis-Besse management and staff to the issues raised;
- An evaluation of the effectiveness of Davis-Besse's self-assessment capability with regard to the CAP, and the aggressiveness of the Davis-Besse management and staff in responding to self-assessment findings;
- A review of other internal assessment activities that focused on CAP performance; and
- An evaluation of the effectiveness of the Davis-Besse safety review committees' oversight of the implementation of the CAP.

### **2.6.1 Evaluation of Davis-Besse Oversight/Audits of the CAP**

To evaluate the effectiveness of the Davis-Besse oversight of the CAP, the Team reviewed the results of oversight audits/reviews conducted since the 2006 Independent Assessment that evaluated the effectiveness of the implementation of the CAP. This review was completed to determine if the audits/reviews were comprehensive and whether effective actions were taken to correct problems or weaknesses identified. The Team also interviewed at least five individuals involved with the Oversight/audit function, as well as the audited organization, to gain their insight on the effectiveness of oversight efforts and the responsiveness of Davis-Besse management and staff to the issues raised.

The Team reviewed three Oversight Quarterly Performance Reports completed since the last Independent Assessment (DB-C-06-03, DB-PA-06-04, and DB-PA-07-01). Focusing on the oversight of CAP implementation, the Team found that the reports covered a broad spectrum of CAP activities, and evaluation process included a 2-year reconciliation to assure that all CAP performance areas were assessed. These reports contained well-supported findings for individual areas audited with no cross-cutting issues noted. The Oversight report results were consistent with the Team's in the areas that were

observed. Most notable were improvements being recognized within the CAP relating to the implementation of a meaningful trending program, timely initiation of CRs, timely resolution of SCAQ CAs, and overall effectiveness of CAs. These reports also documented instances where Oversight had to prompt organizations to write CRs, or the Oversight group initiated the CRs when the line organization did not. Significant improvement was noted in the area of CR/CA backlog reduction and in providing generic implementation training for CR evaluators. The number of evaluation and CA responses rejected by Oversight has also decreased.

The Team noted CAP trending and analysis results for recurring issues documented two instances where personnel violated radiation work permits during the 1<sup>st</sup> quarter of 2007. Compliance with procedure requirements continue to be documented in the CAP. Thirty-five CRs were generated during the 1<sup>st</sup> quarter of 2007 related to procedure compliance issues, compared to 45 generated the previous quarter. Although considered a decrease in number, the overall trend remains high with increased emphasis required. Oversight identified challenges to station Management that included changing the start date of the 15th Refueling outage from February 2008 to December 2007, which could potentially challenge milestones from being completed in a quality manner.

The Team also interviewed individuals involved in the audit process to ascertain their insights on the value-added by the Oversight processes and the responsiveness of Davis-Besse staff to oversight results and potential findings. These individuals covered a spectrum of line and Oversight managers, performance- and compliance-based auditors and assessors, and CAP administrators. For a list of individuals interviewed, see Section 4 of this report. In general, the staff and Management are very receptive to Oversight findings. The Oversight staff believes the line organizations and Management are responsive to audit and assessment findings and communication between these groups have improved. Some concern was received in regards to items being transferred from CREST to SAP that were identified during an audit. The station should focus appropriate attention on SAP items resulting from audits due to the follow up that is required when the next audit is performed.

## **2.6.2 Evaluation of Davis-Besse Self-Assessment of the CAP**

To evaluate the effectiveness of the Davis-Besse self-assessment of the CAP, the Team assessed the depth and quality of self-assessments and the scope and timeliness of corrective actions taken for identified findings. The Team reviewed five self-assessment reports completed since the 2006 Independent Assessment to determine the depth of review, the level of criticality, and the significance of the findings. During this assessment, several other self-assessment evaluations applicable to the CAP were identified and those findings were also evaluated by the Team.

The Team evaluated the aggressiveness of the Davis-Besse staff in correcting self-assessment findings on the implementation of the CAP. This included determining whether the CAs for the reviewed self-assessments were adequate, timely, and properly prioritized; and whether effectiveness reviews were ensuring the desired results.

Davis-Besse performs Focused IPAs and snapshot self-assessments in accordance with NOBP-LP-2001, "FENOC Self Assessment/Benchmarking Practice." The self-assessment schedule is derived annually, based on management's collective judgment of priority needs. Senior site and corporate management participation in this process reinforced management support of the self-assessment program. "Snapshots" were performed as effectiveness verifications, prior to significant outside inspections, or when a manager perceived the need for performance adjustment.

The Team noted that while the number of IPAs and snapshot self-assessments has increased, there are currently only three Davis-Besse Focused self-assessments scheduled for 2007. The Performance

Improvement Group issued an intra-company memorandum on 3/19/07 stating that only five snapshot assessments had been identified at that date, reminding the station of the benefit and purpose for performing snapshot assessments. Subsequently, Davis-Besse has 31 snapshots logged for 2007 when in comparison to 2006, there was a total of 39 snapshots logged for the entire year.

The Team reviewed the following self-assessment reports:

**DB-SS-06-39, Davis-Besse Safety Culture Assessment (RAS-06-00373)**

Davis-Besse conducted a Safety Culture Assessment using results from oversight interviews, surveys of site personnel, performance indicators, and safety culture monitoring to determine overall rating of 18 measurements that were assessed. Twelve CRs were generated to document measures that were rated as Yellow or Red, two of which were related to the CAP. CR06-7799 was generated to document response to Workers Confidence in the Corrective Action Process (Yellow rating) with greater than 7% and 10% of employees surveyed stating they are not confident that nuclear safety implications are prioritized, tracked, and resolved in a timely manner. CR 06-7801 was initiated to document the (Red rating) more than 700 Davis-Besse CRs that remain open due to CAs not being complete. Davis-Besse had 1,089 CRs that remained open through the end of September 2006.

The Team found this Cultural Assessment report to be factual in representing personnel survey and PI results and were proactive in writing CRs for areas that were rated as Yellow or Red. This supports Davis-Besse's commitment to sustaining and improving an environment with a strong safety focus.

**DB-SA-06-08, Davis-Besse Self Assessment of System 26 Diesel Fuel Storage & Transfer**

Davis-Besse conducted a self-assessment that reviewed and analyzed CRs, the Quarterly System Health Report, Beta Test Reports, EPRI Guidelines, American Society for Testing and Materials Standards, preventive maintenance activities, procedures, and the system description. This review was intended to identify any issues in the Diesel Fuel System that present a common theme of significance that can be addressed to enhance the performance of the Davis-Besse Diesel Fuel Quality for reliable operation of the Emergency Diesel Generators, Station Blackout Generator, Miscellaneous Diesel Generator, Diesel Fire Pump, Auxiliary Boiler, and the DBAB Emergency Diesel Generator. This report reviewed the Chemistry analysis of the diesel fuel in all the site tanks as well as the recent CRs, and procedures to identify any significant issues that needed to be enhanced.

The Team noted this assessment to be self critical in identifying eight Areas for Improvement and eight Noteworthy Items to enhance the overall process.

**DB-SA-07-19, Davis-Besse Self Assessment of Training Effectiveness Evaluation  
Accreditation Objective 6**

Davis-Besse conducted a self-assessment to review the training evaluation processes during the period from 1/1/06 to 11/30/06, using the criterion for accreditation Objective 6 from ACAD 02-001, "Objectives and Criteria for Accreditation of Training in the Nuclear Power Industry."

Results of this assessment indicated the self-assessment program is being used to identify weaknesses in training programs and processes. Weaknesses are appropriately captured in either the corrective action system or action tracking system, and CAs are completed as scheduled. Management observations of training activities are appropriately distributed across programs and settings. Integrated performance assessments show improvement in the quality of training materials and instructor skills in areas selected for observation focus.

One AFI was identified and documented on CR 07-12198 in regards to all training programs are collecting student feedback in accordance with the Fleet business practice; however, some programs are not documenting supervisor review of the feedback packages due to poor form design. Two Noteworthy Items and No Strengths were identified as a result of this self-assessment.

The Team noted this self-assessment provided a broad-based review of the training evaluation processes, with thorough effort being placed on reducing variability and identifying weaknesses in training programs and processes.

#### **DB-C-06-03, Davis-Besse Fleet Oversight Assessment Report – 3<sup>rd</sup> Qtr 2006**

Davis-Besse conducted an assessment on the four functional areas of Operations, Maintenance, Engineering, and Support to determine overall program effectiveness. The 3<sup>rd</sup> quarter assessment plan originally incorporated scheduled primary elements and reconciliations. However, due to the transition to compliance and performance based processes, only reconciliations were performed to satisfy the program requirements. No elements were assessed during this evaluation period. All areas were rated as White, with the exception of the CA (Support Area) that was rated Yellow (marginally effective). Although improvements were observed during the reconciliation period, challenges remain within the corrective action program relating the implementation of a meaningful trending program, timely initiation of CRs during refueling outages, timely resolution of SCAQ CAs, and overall effectiveness of CAs.

This assessment also identified that Oversight had to prompt organizations to write CRs, or the Oversight group initiated the CRs when the line organization did not (CR 06-02820). It is recognized that the biggest contributor to the poor Overall CAP Index ratings is mainly due to the increase in cause evaluations required based on the new Limited Apparent Cause requirements, which has resulted in more CR cause evaluations rejected by the CARB.

The Team found this assessment to be a comprehensive review of a broad area of plant and CAP activities, with no additional findings identified.

#### **DB-PA-06-04, Davis-Besse Fleet Oversight Quarterly Performance Report – 4<sup>th</sup> Qtr 2006**

Davis-Besse conducted this as the first assessment following implementation of the new Oversight performance assessment process. The Fleet rated the CAP as EFFECTIVE during this quarter due to having improvements in the area of identification/classification and CA backlog reduction. The number of evaluations and CA responses rejected by Oversight has also decreased. Improvement in the initiation of CRs during outage periods were noted following a September 2006 reactor trip and during a November 2006 planned outage. The assessment noted that the primary CAP challenge remains the implementation of a meaningful trending program. Improvements in the trending program are being developed by the Fleet Corrective Action Group.

The Team determined this assessment to provide valuable recommendations and appropriate focus on CAP issues that related to initiation and implementation issues including primary CAP challenges.

#### **DB-PA-07-01, Davis-Besse Fleet Oversight Quarterly Performance Report – 1<sup>st</sup> Qtr 2007**

Davis-Besse Oversight conducted an assessment of field/testing activities, meeting/training observations, interviews, and documentation reviews to assess activities performed in the 1<sup>st</sup> quarter of 2007. The Team noted CAP trending and analysis results for recurring issues and documented two instances where personnel violated radiation work permits during the 1<sup>st</sup> quarter of 2007.

Compliance with procedure requirements continue to be documented in the CAP. Thirty-five CRs were generated during the 1<sup>st</sup> quarter of 2007 related to procedure compliance issues, compared to 45 generated

the previous quarter. Although considered a decrease in number, the overall trend remains high with increased emphasis required. Challenges to station Management were identified in changing the start date of the next outage from February 2008 to December 2007, which could potentially challenge milestones from being completed in a quality manner.

No rating was given to the CAP during the 1<sup>st</sup> quarter of 2007 due to Oversight not performing sufficient evaluations during this quarter to assign a rating. The generic implication training for condition report evaluators was effective and addressed an INPO Area for Improvement and other confirmatory order independent assessment issues.

The Team found this report to include meaningful results of CAP trending that identified recurring issues. CAP implementation was generally good with a high number of procedural compliance issues continuing to be documented. Both of these areas indicate the Davis-Besse staff has a heightened awareness, but continued focus is warranted to provide valuable CAP trending to identify Areas in Need of Improvement.

The Team noted a common statement in five of the six assessments reviewed and results of three compliance audits (Fitness for Duty, Emergency Preparedness, and Control of Special Processes) that no findings were identified. Davis-Besse Management and Oversight need to ensure the station is being self-critical in identifying Areas for Improvement in order to achieve excellence in performance.

#### **DB-SS-06-20, Snapshot Assessment of the Equipment Reliability Bubble Chart Process**

This assessment was performed to evaluate industry best practices and define an effective method for FENOC to accomplish bubble chart binning as a tool for evaluating Equipment Reliability and Preventive Maintenance effectiveness. The assessment included a benchmark visit, evaluation/refinement of a FENOC pilot effort for bubble Chart binning and evaluation of the extent to which this tool should be used in existing Plant Health Reports. Nine Noteworthy Items were entered into SAP (600379921) for further action.

The Team found the assessment fulfilled the stated action plan and, when the SAP action is complete, the contribution of the Fleet bubble chart binning tool to plant equipment reliability should be enhanced.

#### **DB-SS-06-24, Thermal Performance Monitoring (FS-SA-06-15)**

A team of 5 FENOC staff conducted an assessment of the Thermal Performance Program at all three sites and compared site programs with the *INPO Engineering Program Guide* and the *EPRI Thermal Performance Diagnostic Manual*. The FENOC staff concluded that the program has had a "successful start" after being only one year old; however, many follow-up actions were identified. The assessment included a review of software and modeling for the turbine cycle, the condensers, and the cooling towers, as well as procedures, staffing, and communications.

The Team concluded that this assessment was comprehensive and self-critical and resulted in seven tracking items for Noteworthy issues, and six CAP CRs to track Fleet Area for Improvement issues.

#### **DB-SS-06-36, Corrective Action Program (CAP) Assessment Results Review**

This assessment was conducted by two Davis-Besse Oversight Assessors in order to compare the overall results of Davis-Besse internal assessments over a 2-year period with the 2006 Independent COIA Corrective Action Program Assessment Team results. The differences between the two assessments were reviewed and the potential reasons evaluated.

The Team noted that the Davis-Besse staff were being sufficiently self-critical and that the comparison of internal and external assessments was relatively consistent.

#### **DB-SS-06-34, Snapshot Assessment -Tracking for Focused Self Assessment Findings**

This assessment was performed to confirm that focused self-assessment findings are correctly entered into the CAP and/or SAP processes for tracking completion. All the findings of the four selected self-assessments were captured in CR's and/or SAP notifications as required. The assessment concluded that the identification of seven Areas for Improvement and 24 Noteworthy Items indicated an aggressive approach to these assessments looking for performance improvement opportunities.

The Team found the snapshot assessment sample appropriate and the conclusions reasonable.

#### **DB-SS-06-35, Snapshot Assessment-System Walk Downs by Plant Engineering**

The assessment was performed to determine whether system walk downs are performed in accordance with Davis-Besse Business Practice PES-0005, "System Walk Downs," and to validate the availability of the records generated by this practice. The assessment found that the required walk downs were completed, but the recordkeeping was inconsistent. An SAP action (60386147) was implemented to review the Business Practice requirements with all plant system engineers, and create specific direction for where to store the records.

The Team found the assessment adequate, in general, but noted that the conclusion that the engineers who did not keep records of system walk downs had performed in accordance with the Business Practice was not sufficiently self-critical.

#### **DB-SS- 06-14, Davis-Besse Self Assessment of Use of Relevant Operating Experience in Pre-job Briefs**

Davis-Besse conducted a self-assessment to focus on the use of OE in pre-job briefs and a benchmark against industry peers on the promptness of completing confirmatory screenings and follow-up actions and evaluations.

The assessment concluded that while some improvement could be made overall, the OE being used for pre-job briefs are relevant to the task. The assessment also identified that while Davis-Besse continued to be challenged on promptly completing confirmatory screenings, follow-up actions were not needed due to existing open actions in place tracked via DB CR 2005-05780 and DB CR 2006-7798.

The Team noted the assessment was self-critical, of appropriate depth, and concluded that while additional improvement was needed, there were existing open actions tracking the improvement issues.

#### **DB-SS-06-37, Davis-Besse Self Assessment of Assess station's effectiveness in prompt and timely identification of adverse conditions in the Corrective Action Program**

Davis-Besse conducted a self-assessment to evaluate the timeliness difference from when an issue was discovered as compared to when the issue was documented in the Condition Report Program.

This assessment was in response to the issue captured in DB CR 2006-01456. The intent of the assessment was to determine the effectiveness of the action taken for the referenced CR.

The assessment concluded the timeliness had improved in all areas compared and that overall, the site was effective in making timely entries into the CAP. No additional actions were assigned.

The Team noted the assessment was self-critical, of appropriate depth, and concluded that actions performed to address previous gaps to excellence on timeliness of report had been effective at improving the timeliness.

#### **DB-SA-07-022, Davis-Besse Self Assessment of Corrective Action Program Implementation**

Davis-Besse conducted an assessment to determine the present site performance in addressing the Areas for Improvement and Areas in need of Attention from the 2006 COIA.

The assessment concluded (overall) the actions performed to address the 2006 COIA appeared to have been addressed. The assessment identified no Strengths, one Area for Improvement, and no Noteworthy Items. The Area for Improvement concerned five CAs, which appeared to have been improperly closed for various reasons other than closure to the work management system. The assessment report noted that existing CR DB 07-18607 was written to document the Area for Improvement.

The Team noted the assessment was self-critical, of appropriate depth, and documented both the actions already performed to address gaps to excellence or referenced the CR tracking the actions if not previously completed.

#### **DB-SS-06-26, Common Cause Review - July, 2006**

Davis-Besse performed a common cause roll-up for root and apparent cause evaluations completed between 6/1/05 and 6/30/06. The purpose was to review the evaluations in the aggregate to identify substantial factors that may not be resolved broadly enough in the individual evaluations.

The assessment report identified seven commonalities among the evaluations reviewed, five of which had been previously identified as trends and two of which had not been previously identified in the areas of pre-job briefs and preventive maintenance deficiencies. These were noted as Areas for Improvement and CRs 06-03302 and 06-03303 were initiated.

The Team determined that the analysis methodology was sound, that the conclusions were appropriate, and that the conclusions were appropriately documented in the CAP.

### **2.6.3 Adequacy, Timeliness, and Effectiveness of Improvements in the CAP as a Result of Internal Assessments**

The assessment team noted that internal assessments perform an in-depth, critical review of CAP activities. CAP implementation has shown improvement with heightened focus and attention to detail from the Davis-Besse staff.

### **2.6.4 Review of Safety Review Committee and Corporate Activities**

#### **February 2007 Company Nuclear Review Board (CNRB)**

The Team reviewed the February 2007 Meeting Minutes approved on 3/19/07. Major issues highlighted included the following:

- Outage preparations (15RFO has been moved up 7 weeks in order to deal with the Alloy 600 issues, but if an outage was needed in May 2007 for the reactor coolant pump, then the Alloy 600 issues might need to be dealt with then and readiness would be a concern);
- Abnormal vibration on turbine cooling water valves (CR 07-14199 was written for this);



- More than normal movement on heater drain piping hangers to the 4<sup>th</sup> stage feed water heater (had already been documented on CR 06-9917); and
- Noteworthy Items recognized were the engineering backlog reduction in Plant and Design Engineering.

Preparations included review of plans for the pressurizer nozzle weld overlays, the reactor coolant pump upper thrust bearing temperatures, and preparations for the technical program training accreditation renewal.

In the area of CAP implementation, the CNRB subcommittee reviewed four root cause evaluations and five apparent cause evaluations and determined that they were all acceptable. The subcommittee concluded that there was positive response to OE timeliness, aggressive gap closure plans, and IPA activities.

The CNRB subcommittee indicated that operating logs may describe activities that require CRs and for which "Oversight" will be following up on. In addition, the CNRB stated that the PSA model is out of date; however, the minutes of the meeting did not indicate whether or not the issue was entered into the CAP.

The Team was subsequently provided with several CRs which document problems with having the Probabilistic Risk Assessment (PRA) model out of date: CR 05-05839, Emergency Diesel Generator 1-1 PRA Outlier; 06-7678, Potential Violation of Maintenance Rule Due to SBODG Outage Risk; and CR 06-7688, Potential Timeliness Issues with PRA Corrective Action.

The NRC had identified an error in the PRA model for the recovery probability of the AFW system following a station black-out diesel generator (SBODG) event since there was no lighting and no communications and the steam generators would probably be overfilled and the pumps stopped. This was corrected for the new MSPI use, but the Davis-Besse staff neglected to update the PRA input to the online Safety Monitor for day-to-day risk assessments for the MR implementation. The CRs indicate that the PRA update was delayed due to higher priority work, including the outage and other engineering work.

In October 2006, the planned outage of the SBODG placed the station into a risk condition of Yellow since the Safety Monitor program had not been updated. CR 05-05839 documentation indicates that the PRA was then updated as an interim model, which takes no credit for recovery of the auxiliary feed water pump turbine (AFPT) by manual control. This interim model is currently being used for online risk assessment. This results in the EDGs being "Yellow" for online risk assessment. This model was also used for significance determination for a Licensee Event Report and is planned to remain in effect until Revision 4 of the PRA is completed.

The Team noted that the Davis-Besse investigation concluded that the improper change management and inadequate communications between the engineering staff and the operations staff regarding responsibility for the Safety Monitor had contributed to the errors. The PRA model, Revision 4, is still not completely updated but is "imminent."

The Team concluded that the CNRB had appropriately highlighted this issue as needing resolution.

#### **June 2007 CNRB**

The Team also reviewed the Draft Minutes of the 6/8/07, CNRB meeting since the minutes were not yet approved. Major issues highlighted included the following:

- Events that collectively affect management decisions, attitude, and the CAP;

- A variety of Chemistry issues, including condenser tube leaks and the tritium plan; and
- Outage preparations.

The report also notes an executive request to the Board to gauge the “receptiveness” of Davis-Besse organizations to insight from outside groups.

The minutes also address the use of 17% overtime in Security, and associated benchmarking and specific actions taken as a result. The Team’s follow-up of this indicated that six vacancies were approved to address overtime use.

### **Corporate Assessment of Readiness of Mid-cycle INPO Assessment (CA-SA-07-019)**

A Corporate Assessment Team (which included the Davis-Besse site VP as the sponsor) performed a review of the Davis-Besse response to the last INPO evaluation and included a review of PI 2.1, corrective actions not comprehensive, and PI 2.2, corrective actions not timely. Davis-Besse had implemented very good training sessions for evaluators and management which this Team had observed during the last CAP independent assessment. An internal assessment recommendation was made to address an issue of rotating CARB members quarterly.

This corporate assessment indicated that for “very old SCAQ corrective actions remain open” the reasons are not well documented or known. The year-end result for CR open was Yellow. A new recommendation was written to re-evaluate the need for interim actions for the remaining oldest SCAQ. The assessment conclusion focused on assuring that the Davis-Besse staff could adequately communicate the reasons for the old CRs vs. fixing the conditions.

### **2.6.5 Summary**

The assessment Team reviewed the effectiveness of Davis-Besse’s internal assessment of the CAP, including oversight audits, self-assessments, and CNRB meetings. The Team concluded that Davis-Besse is effectively identifying and resolving CAP issues that are identified during audits and assessments.

#### **Areas of Strength**

The Team considers the detail, quality, and management support of the self-assessment process to be a significant contributor to achieving excellence at Davis-Besse.

#### **Areas in Need of Attention**

None

#### **Areas for Improvement**

None

#### **Conclusion**

The Team rated the Effectiveness of Internal Assessment Activities of the Davis-Besse CAP as HIGHLY EFFECTIVE.

## 2.7 Evaluation of the Implementation of the Corrective Action Program by Engineering

The Team evaluated the effectiveness of the Engineering Department's implementation of the CAP in selected program areas. The evaluation consisted of an assessment of activities and conclusions addressed in the other areas of the plan as they could be related to the Engineering Sections, and supplemented by statistical comparison of these Sections to Davis-Besse as a whole. The selected areas reviewed during the 2007 assessment included the following:

- a. Promptness in initiating CRs for identified conditions adverse to quality;
- b. CR ownership and appropriate initiator involvement;
- c. Quality of root and apparent causes produced by Engineering, and the associated management behaviors and guidance;
- d. Prompt acceptance of CAs;
- e. CA quality and implementation timeliness;
- f. Effectiveness of CAs to prevent recurrence;
- g. Support of CAs assigned to others; and
- h. Workload management and backlog management.

### 2.7.1 Evaluation Findings

As a result of personnel interviews, the many CR's reviewed, and the assessment of Team findings in the other sections of this report, the Team determined that Engineering performance in the following areas was essentially the same as the Davis-Besse site as a whole.

- Promptness in initiating CRs for identified conditions adverse to quality;
- CR ownership and appropriate initiator involvement;
- Prompt acceptance of CAs; and
- Support of CAs assigned to others.

Regarding workload management and backlog management, the Team noted that Engineering Sections are assigned 61% of the CAP backlog, perform 54% of root and apparent cause evaluations, and are associated with 37% of monitored work activities (Davis-Besse site documents). The site has achieved about a 32% reduction in CAP backlog under the *GAP Reduction Plan* (Section 2.5 of this report). Engineering has achieved about the same reduction. Although Engineering has the highest site CAP backlog, they are working off the backlog at the same rate as the rest of the site. Therefore, Engineering performance in this area should be rated the same as the rest of the site.

With regard to quality of root and apparent causes produced by Engineering and the associated management behaviors and guidance; CA quality and implementation timeliness; and the effectiveness of CAs to prevent recurrence; the Team reviewed the scope and findings of this report primarily in Sections 2.2, 2.3, and 2.4. There were four **Areas in Need of Attention** in these Sections and there was Engineering involvement in each of the areas (eight of 11 examples involved Engineering-assigned CRs or CAs). The Team noted that the majority of examples in these findings related to attention to detail in implementing the CR process rather than substantive deficiencies in analysis or CA quality. The Team also noted that Engineering staff rigor was a contributing cause in a recent RCE (CR 07-18074, HPI Train

1 Discharge Piping-Potential Air Intrusion) for which CAP (re)training is an assigned CA. Given the high level of Engineering involvement in the CAP process and the significance of the Areas in Need of Attention cited in the other areas of this report, the Team concluded that a separate finding in this area was redundant. However, in evaluating the individual Areas in Need of Attention from this report, the Team observed that the Engineering organization should determine whether collectively, this assessment merits the enhancement of planned CAP lessons learned training for that Department.

## **2.7.2 Summary**

The Team determined that the Engineering Department implementation of the CAP was the same as the rest of the site for most areas reviewed. The concentration of attention to detail-related errors in Engineering, although potentially related to Engineering's high level of involvement in the CAP process, merits further assessment by Davis-Besse.

### **Areas of Strength**

None

### **Areas in Need of Attention**

None

### **Areas for Improvement**

None

### **Conclusion**

The Team rated the Evaluation of the Implementation of the Corrective Action Program by Engineering as EFFECTIVE.

## **2.8 Evaluation of Open Corrective Actions Taken in Response to the NRC Special Team Inspection – Corrective Action Program Implementation Team Inspection (CATI) – Report Number 05000346/2003010**

### **2.8.1 Background**

The Team reviewed the status of the open Corrective Action Program Team Inspection (CATI) CAs as of July 2007 and those which had been closed after the last assessment. According to the list provided to the Team in preparation for the assessment, there were four open items associated with two CRs. Additional actions had been closed.

The Team subsequently reviewed a comprehensive list of items open as of the last assessment. The status is given below.

## **2.8.2 Open Corrective Action Review – Closed NCVs**

### **NCV 03-010-17, Lack of Design Basis Calculation to Support Service Water Single Failure**

This item is closed. CR 02-07802, action 2, incorporated the setpoint basis into calculation C-NSA-011.01-016; the calculation has been reviewed and approved. An associated CR 07-22099 addresses additional postulated conditions. CAs in that CR made changes to calculations, the USAR, and procedures to assure the service water system will function when the return lines up to the cooling tower makeup. Outstanding CAs 2 and 4 are tracking additional calculation verifications in the pressure control mode, cold weather, and use of the “seismic” line.

### **NCV 03-010-20, Borated Water Storage Tank Leakage Calculation Affects Dose Calculation**

This item is closed. The calculation and USAR were updated to include the control room dose from leakage from the ECCS (see CR 02-07701).

## **2.8.3 Open Corrective Action Review – Open NCVs**

The following actions had open CR CAs or Notifications tracking the status. The Team requested the status of each item to determine whether or not additional tracking was appropriate.

### **CR 03-06944, CATI: Fuse sizing for MOV 0106 and MOV 3870**

NCV 03-010-06 and CA #3 are tracking open actions to change the fuses. This action is scheduled to be completed October, 2007.

### **NCV 03-010-08, Failure to Demonstrate HPI Minimum Recirculation Time**

CR 03-11268 CA #4 is closed to notification 600354176 for tracking testing a spare pump. This is scheduled to be tested by December 2007.

The rest of the items were tracked by open Notifications with no completion dates since they were considered enhancements.

### **CR 03-02730, CATI: Lack of Vendor Data for High Voltage Switchgear at High Temperature**

CA #2 was closed to notification 600364404 to update the USAR.

### **CR 03-06907, CATI: Calculation Quality Collective Significance Review**

CA311 and CA #12 are closed to notifications 600358387 and 600342729.

### **CR 03-02654, CATI: Cable Ampacity on Containment Spray Pump Motor**

Notification 600304880 and CR 06-9223 CA #2 are tracking open actions.

### **CR 03-03572, CATI: Lack of Coordination on Bus E1 and F1**

CA #12 is closed to notification 600305621 for tracking changes to overload heaters.

### **CR 03-05739, CATI: Deficiencies in Component Evaluation for EDG Room High Temperature**

The action was being tracked by a new CR 06-00327 with CA #2 open.

## **CR 03-06497, CATI: The NRC Inspector Disagrees with CR 03-03891 Resolution**

CA #1 is closed to notification 600305682.

### **2.8.4 Summary**

The Team had the same difficulty as the previous year during the follow-up of this area since the Davis-Besse site uses essentially three data bases to track these open issues: (1) the regulatory compliance system, which tracks NRC findings, including NCVs; (2) the CREST system, which tracks conditions adverse to quality; and (3) the SAP system, which tracks notifications including “enhancements.” The Team concluded that two items tracked as NCVs remained open and were scheduled to be completed by the end of 2007. The remaining open CATI actions were tracked by Notifications since they were considered enhancements.

#### **Areas of Strength**

None

#### **Areas in Need of Attention**

None

#### **Areas for Improvement**

None

#### **Conclusion**

The Team rated the Evaluation of Open Corrective Actions Taken in Response to the NRC Special Team Inspection as EFFECTIVE.

## **2.9 Status of Corrective Actions from Previous Independent Assessments of the Davis-Besse Corrective Action Program**

The Team reviewed the CAs proposed and taken in response to Areas in Need of Attention and Areas for Improvement identified during either the 2004, 2005, or 2006 Independent Assessment of the Davis-Besse CAP. The findings from the 2004 Assessment were closed in the 2006 Assessment Report. The Team evaluated the CAs since the 2006 Assessment for strengths, weaknesses, or slow responses. The following are the observations of the Team for closed CRs developed in response to prior Assessments.

### **2.9.1 Review of Condition Reports**

#### **CR 06-06723, COIA-CAP 2006: Equipment Trending Below Industry Standards**

#### **CR 05-04411, COIA-CAP-2005: Equipment Trending Below Industry Standards**

The 2006 Team identified that trending of equipment problems across systems continues to be an Area for Improvement. This was a continuation of the same issue identified during the 2004 and 2005 CAP Assessments. FENOC has developed a draft Procedure NOBP-ER-3916, “Component Health Trending Reports,” which, when implemented, may assist FENOC with the identification of common component problems.

Davis-Besse responded with the following remedial actions:

1. Assigned appropriate maintenance strategy template numbers to the population of functional locations currently covered by PM tasks;
2. Issued Business Practice NOBP-ER-3916, "Component Health and Trending (CHT) Process," on 1/26/07;
3. Modified the CREST database to accept validated System and Functional Location numbers that match the system and functional location numbers in SAP;
4. Conduct a snapshot assessment of the CHT application approximately 1 year after initial startup (this is planned for August 2007, following the completion of the 2<sup>nd</sup> quarter Component and System Health Reporting cycle);
5. Issued NOBP-ER-3902, "Component Template Development," Revision 2 that provides for an ER of a Component Maintenance Strategy Template approximately once every 2 years;
6. Conducted training at Davis-Besse on 2/27/07, on the use of the ER Workbench, Module 16, Component Health and Trending Process; and
7. Completed the development of all Phase 1 component Maintenance Strategy Templates.

The Team found that the above actions were completed with the exception of the ER scheduled for August 2007. The equipment trending assessment is further detailed in Section 2.4 of this report. The Equipment Template has been placed on the station website and is being populated with data. Since this population was not complete, the equipment trend report for the 1<sup>st</sup> quarter of 2007 was not completed. The first equipment trend report is due out after the 2<sup>nd</sup> quarter in 2007. The Team observed a sample of component templates, but could not verify the implementation of equipment trending through the compilation of the quarterly report. The absence of completed quarterly trend reports is noted as an **Area in Need of Attention** in Section 2.4.

#### **CR 06-09223, COIA-CAP 2006: Closing CAQ CRs to Notifications**

The 2006 Team found examples of CR CAs that had been closed to SAP notifications. The Team questioned whether these CAs were being adequately controlled/monitored in the SAP process.

The Davis-Besse response in CR 06-9223 validated the example raised in the COIA report, and created a new CR CA (06-9223-02) to track the required action. The MRB also directed an assessment of the number of CREST to SAP errors and whether errors occur more frequently in any particular section. A review of all the 194 potential transfer activities found 11 incomplete or inadequate transfers (including the COIA identified example). Seven of 11 issues were related to the Engineering Sections, but split among two separate Sections. The 10 remaining items were remediated by CA 06-9223-03. Davis-Besse concluded that no further action was necessary. The Performance Improvement Section also verifies that SAP transfers are correctly implemented during their final review of CRs.

The 2007 Team reviewed the Davis-Besse response. The Team performed a sample review of CREST to SAP transfers since the Davis-Besse assessment in late 2006 (using the same search technique). This sample identified two additional examples of incorrect transfer to SAP.

The first example related to CA 06-2588-14, FME Inspection of EHC Piping, is discussed in Section 2.2 of this report. The second example (CA 07-15971-02) involved rework of flow transmitter FT2878, affected valves, and pipe supports. This work was classified as Priority 500 work and should not have been transferred out of the CREST system. This is also contrary to guidance in Section 4.10.4 of NOBP-

LP-2019. As detailed in Section 2.2, the Team considers the tracking of actions outside of CAP as an **Area in Need of Attention**.

**CR 06-09228, COIA-CAP 2006: Evaluation for 05-00288 was Determined to be Incomplete**

**CR 05-04408, COIA-CAP-2005: CR Root Cause & Apparent Cause Evaluations Inadequate**

The 2006 Team had determined that the Davis-Besse staff had still not corrected the inaccurate information describing the 1/17/05, event where the operators, trying to keep power and Tave higher, had performed several control rod withdrawals while subcritical in the intermediate range and while at or below the TS low temperature limit of 525°F.

The 2007 Team reviewed documentation in CR 06-9228, which has finally corrected the original CR 05-00288 cause analysis, which had erroneously concluded that the reactor was never subcritical during the time that the control rods were being withdrawn. CR 06-9228 correctly states that “this would indicate that the reactor was subcritical by some amount when commencing rod withdrawals.” Although the 06-9228 CR does not discuss the inappropriate actions of the crew in this plant condition, it does describe the correct final decision of the crew to shutdown the reactor when power could not be maintained.

The 2007 Team concluded that this issue is closed.

**CR 06-09229, 2006 CAP-COIA: CR Evaluation Weaknesses**

The 2006 Team concluded an **Area in Need of Attention** was in CR evaluation quality based on weaknesses identified in several CRs that the Team reviewed. CR 06-9229 was written to evaluate the finding, and addresses each of the weaknesses identified. The 2007 Team reviewed the results of the evaluations documented in CR 06-9229. Each of the weaknesses is addressed individually below.

*CR 06-2588, Master Trip Solenoid Valve B Did Not Trip When Test Button Pushed*

The 2006 Team observed that the investigation did not identify a root cause and therefore, did not provide CAs to prevent recurrence, extent of condition, or extent of cause. As a result, the likelihood of event recurrence is considered high. The CARB did not correct this weakness in the original evaluation. The details of this event are discussed in Section 2.2.1 of this report.

The Davis-Besse response was that:

- Extent of condition was pursued, but due to the uniqueness of the EHC system in the plant, no comparable systems or components were identified and the extent of condition section of the report was therefore brief;
- No extent of cause was performed because no cause could be identified; and
- No actions to prevent recurrence could be generated with no cause identified.

The response continues stating that the investigation was pursued to the fullest extent possible given the information available and that all plausible failure modes were investigated, but that the data simply did not support a definitive root cause determination. The response concludes that it is unclear what further actions could have been performed to strengthen the investigation analysis and that no further actions are required for this cause evaluation.

The CARB review of the investigation in 2006 resulted in approving completion of the investigation as is, but directed addition of a CA to perform a chemical flush of the EHC supply line. Subsequent to completion of the investigation, additional CAs were initiated to continue the analysis by:



- Sending EHC fluid samples to an external laboratory for analysis;
- Sending the EHC filter elements removed from the system to an external laboratory for analysis; and
- Sending the failed master trip solenoid valve assembly to two external entities for analysis.

Actions associated with the above included Engineering review of the results, and a determination of the need for additional actions based on those results (discussed in Section 2.2.1 above). CR 06-9229 concluded that since no definitive cause came out of the follow up actions, the RCE remained accurate, and no further action was required for CR 06-2588. CR 06-9229 incorporated the observed evaluation weakness (including CARB approval) into lessons-learned training for full apparent and root cause evaluators as well as CARB members on 3/14/07.

The 2007 Team reviewed the information in CR 06-9229, the subsequent investigative actions taken after the CR 06-2588 investigation was complete, and interviews during the 2007 COIA. It concluded that there was sufficient data available for many CAP programs to identify the most likely cause or causes for the event, to evaluate CA(s) to prevent recurrence, and to analyze the extent of cause. Extending the root cause evaluation to include these activities would have been appropriate. The 2007 Team observed that the CARB was too quick in allowing closure of the investigation. Based on the completion of lessons learned training for CARB members that included this observation, the Team considered this action adequate.

*CR 05-04988, Analysis of Material Collected from Flow Indicator for RE4597AA*

The 2006 Team observed that it was not clear in record documentation whether there was a preventive action taken for an inappropriate act by employees identified in the investigation as the most likely cause of the event. CR 06-9229 responded that a CA was added to document the preventive action taken. The 2007 Team considered this response adequate.

*CR 05-05559, Boric Acid Pumps Operability Standing Order 05-013*

The 2006 Team observed that the documentation of the justification for exempting service water pumps from the extent of condition CA did not address why the same organization that failed to exercise appropriate rigor in the 2005 boric acid pump calculation did not apply to the 2003 service water calculation, and that the deferral of the extent of condition review to a CA after CARB approval of the investigation without requiring CARB re-review of the results was a missed opportunity for the CARB to verify completion of the RCE for this event.

CR 06-09229 indicates that a subsequent action was added for the CARB to perform this review. The 2007 Team considered this response adequate.

*CR 06-00154, Discovery of Damaged Engine Components in EDG 2*

The 2006 Team observed that the investigation did not document CAs taken to correct the condition, nor did it adequately document actions to address the extent of condition on the other three diesel generators on which similar maintenance had been performed.

The response in CR 06-9229 indicates that the focus of the root cause investigation was on what caused the damaged parts, not on the repair of the EDG, which was conducted outside of the investigation via the work management process. The response also provides additional basis for limiting the extent of condition to the affected diesel generator.

Documenting CAs to restore the condition as well as to address the causes of the event in CAP is an industry standard, and is required in Section 4.10.5 of NOBP-LP-2019. The response to the observation that the repair was conducted under work orders did not address the concern. Subsequent discussions with CAP personnel indicated that the investigation report did contain an item in the timeline that indicates a work order had been completed which, if reviewed, would indicate restoration of the condition. In addition, the inclusion of this observation in lessons-learned training for full apparent and root cause evaluators as well as CARB members on 3/14/07 was noted. The 2007 Team considered this response adequate.

*CR 06-00583, EDG2 Tapping Noise, Evaluation of Operability Decision Process*

The 2006 Team observed that the investigation analysis could have been of greater potential value, and that the CA to preclude recurrence (training on problem solving and decision making) was not institutionalized in the training process.

CR 06-09229 explained the separation of the event into the two investigations, which led to the narrow scope in this investigation. The response also states that two CAs were added to address the problem solving and decision making case study in Supervisor and Engineering training. The 2007 Team considered this response adequate.

*CR 06-01503, Personnel Contamination Events in Non-posted Areas*

The 2006 Team observed that the identification of several contamination events in non-posted areas without any CA was a weak analysis. The response in CR 06-09229 clarified that the analysis had looked for common fault areas and having found none, determined that no CAs were appropriate. The 2007 Team considered this response adequate.

*CR 06-01697, Decline in Site Radiation Protection Performance During 14RFO*

After a Nuclear Oversight-identified CR was evaluated as not representing an adverse trend, another CR was initiated 2 months later by the RP organization on the same topic, which resulted in an investigation and CAs. The 2006 Team observed the RP organizational response to an issue identified outside their organization was not commensurate to one identified internally.

The response in CR 06-9229 indicates that lessons learned from this observation will be to take a more self-critical analysis position. The 2007 Team considered this response adequate.

*CR 05-00293, Green Dust in Containment*

The 2006 Team observed that the CR records had conflicting statements regarding the origin of the dust, and that although CR 05-04313 indicated that it was the “final report” of the Operational Decision-making Team, another team was formed on 8/8/06.

The response in CR 06-09229 explained the apparent conflicting statements on the origin of the dust and the way in which potential contradictions between multiple teams is being managed. The 2007 Team considered this response adequate.

*Conclusion*

Based on the adequate response to each CR evaluation weakness above and the completion of lessons-learned training for full apparent and root cause evaluators as well as CARB members on 3/14/07, the 2007 Team considered the issues in CR 06-9229 closed.

**CR 06-09230, COIA-CAP 2006: Some Delays in the Internal Reviews of Incoming OEs**

The 2006 COIA Team determined that increased attention needs to be directed to completing reviews of incoming operating experience evaluations within the 60-day guideline established by NOBP-LP-2100, "Operating Experience Program."

The action performed was a continuation of the efforts begun just prior to the 2006 COIA, specifically to include in the Monday MAOM package the OE items in review and their status. CR 06-09232 below describes improved MAOM emphasis on overdue items. This CR documented the results of the increased attention effort. Although some instances of OE evaluations exceeding the timeliness guideline are discussed in Section 2.3 of this report, the Team's overall assessment was that there was a significant improvement in the timeliness of OE evaluations. The Team considered this action closed.

**CR 06-09231, COIA-CAP 2006: Few Resources Directed Towards Backlog Reduction**

**CR 06-09239, CR 06-9239, COIA-CAP 2006: The Number of SCAQ Items Open Over 135 Days**

**CR 05-04407, COIA-CAP-2005: CR Evaluation and Corrective Action Completion Timeliness**

**CR 05-04409, COIA-CAP-2005: Age of SCAQ/CAQ Preventive & Remedial Actions**

**CR 05-04771, COIA-CAP-2005: CR-CA Backlog Potential Effect on Effectiveness**

The 2006 Team identified that the CAP backlog was above industry standards and the age of the oldest issues was rising. The high number of open SCAQ preventive and remedial actions was highlighted. Progress in reducing the CR backlog needed aggressive attention to continue backlog reduction, especially with many resources dedicated to 15RFO preparation.

Davis-Besse developed and implemented an *Open Condition Report GAP Closure Plan*, setting aggressive goals and indicators to monitor progress. These actions were implemented under CA 06-7801-01. This CA was closed at the outset of implementation of the GAP Closure Plan. The Plan included special focus on SCAQ short-term actions. At the time of the COIA assessment, there were about 600 open CRs, and the indicators were on track to reach the goal of maintaining a working level of less than 500 open issues documented on CRs. There was some indication that the further reduction to 500 CRs would be challenging. The progress in reducing the backlog of CAs is detailed in Section 2.5 of this report.

The 2007 Team found that sufficient resources and attention were applied to achieve significant progress in backlog reduction since approval and implementation of the *Open Condition Report GAP Closure Plan*. The Team noted that there is no CR action at present, tracking implementation of the *GAP Closure Plan* in the CAP; however, the goals are continuously monitored by site performance indicators and monitored weekly at MAOM. The Team considered this action closed.

**CR 06-09232, COIA-CAP 2006: Lack of Cognitive Binning During 14RFO**

**CR 05-04773, COIA-CAP-2005: Lack of Smarter Corrective Action**

The 2006 Team observed that the lack of cognitive binning by several Sections during 14RFO may be indicative of a lack of focus on trending and its ability to identify long term problems. The lack of binning was raised by the CARB, and had been the subject of a prior CR 06-02686, Abandonment of Cognizant Binning During Outages.

Davis-Besse implemented corrective actions to assure that Sections brought their binning databases up to date with outage CR data and to provide outage resources for cognitive binning during 15RFO. A self-assessment DB-SS-11, 14RFO Comparison to Other FENOC Outages, showed that adverse trend CRs had been effectively originated during 14RFO. Review of this self-assessment was discussed in the 2006 COIA-CAP Report.

The 2007 Team found that although 15RFO has not yet occurred, the CAs implemented provide assurance that any adverse trends will be addressed in a timely manner. This item is closed.

#### **CR 06-09233, COIA-CAP-2006: Open SAP Items Were Not Incorporated in Department & Section IPAs**

The 2006 Team identified that SAP open items were trended in only one of the Section IPAs, and recommended that SAP items be incorporated in all the IPAs.

Davis-Besse responded that SAP is used to document issues that are not adverse conditions, such as document requests, enhancements, and tracking documentation. The industry does not normally include these types of issues in the IPA Process. Combining adverse conditions with enhancement items could skew the data and consequently provide a false indication of emergent issues, rather than focusing on adverse conditions. The IPA process was revised to provide a standard template for all IPAs. The CR response also stated that the Information Technology department now generates an "Overdue Notification Backlog Elimination Program Report." This report is generated every other Monday and results are provided to the SAP site representative. The site representative then takes the information to the morning managers meeting to provide SAP status.

The 2007 Team reviewed the response to CR 06-9233 and also sampled the type of issues being input into the SAP process. No adverse conditions were identified in this SAP sample. Based on this information, the Team found this response acceptable. However, the Team emphasized the importance of continuing the screening of SAP input to assure that adverse conditions are not misplaced into the SAP process.

#### **CR 06-09235, COIA-CAP 2006: Identification of Repeat Occurrences are not Retrievable**

#### **CR 05-04770, COIA-CAP-2005: Repeat Event Guidance Weakness**

The 2006 COIA Team determined that the identification of repeat occurrence was dependant on the memories of individuals involved in the CR process, rather than being retrievable from the CR database. The lack of a clear definition of what was a repeat occurrence and the reliance on staff recollection for repeat issues may limit the ability to establish the effectiveness of the CAP over an extended time period. The CR action taken was to both raise awareness for the use of the codes established to identify condition reports as repeat items and to communicate to the Fleet (for Fleet improvement) the standards and expectations for using the codes. The Davis-Besse team also reviewed the CR population and applied coding to reflect repeat items as well. The repeat codes are applied during the initial screening process by the Performance Improvement group.

The Team used the repeat event code to review items in the CR program and selected random CRs which were coded as repeat events. The assessment of these conditions was that appropriate evaluation methods were selected and the repeat event code was correctly applied. The Team also noted that both full apparent causes and root causes contained discussion points related to previous site events when evaluating new events, thereby capturing the repeat aspect within the evaluation process. The Team considered this action closed.

### **CR 06-09236, COIA-CAP 2006: CR 05-738 Repeat Occurrence Due To Untimely CA**

The 2006 Team observed that the recurrence of CRs regarding reactor trip breaker fuse size discrepancies did not focus attention on the untimely implementation of CA for the original problem identification. Drawing discrepancies caused repetitive CRs, but the changes to correct the drawings continued to receive low priority.

Davis-Besse evaluation of the concern concluded that the repeat occurrences were missed opportunities to elevate CA priority to avoid further CRs. The subject drawing change was elevated to a CR remedial action to track closure. The higher LACE of this issue, under CR 06-9236, uncovered another drawing discrepancy that is also tracked by a CR remedial action.

The 2007 Team reviewed Davis-Besse's response to repeat concerns in CR 06-9235 above and in Section 2.3 of this report. This item is closed.

### **CR 06-09238, COIA-CAP 2006: CR 05-05395, INPO AFI P1.2-1, CA on Training**

#### **CR 05-04774, COIA-CAP-2005: CR Evaluation Weaknesses**

CAs for CR 05-05395, 2005 INPO AFI P1.2-1, included providing a hands-on lessons-learned session on the extent of condition, extent of cause, and previous OE reviews for applicable trained or qualified individuals. However, the hands-on lessons-learned session was not attended by 45 individuals (<1/3 of the target audience), who were subsequently sent the PowerPoint presentation via e-mail. Missing attendees included Directors with root cause approval authority, CARB members, root cause evaluators, apparent cause evaluators, and CR Analysts. It was unclear what portion of the session was hands-on, but if that was the intent, it would not have been performed by the 45 members of the target audience that received the material via e-mail. CR 06-09238 evaluated this **Area in Need of Attention** and determined that the action was a lessons-learned session, not required training, that little hands-on activity was involved; thus, providing a copy of the presentation to individuals not in attendance for self-study was deemed appropriate. The Team considered this explanation acceptable.

## **2.9.2 Summary**

The Assessment Team reviewed the CAs proposed and taken in response to Areas in Need of Attention and Areas for Improvement identified during either the 2004, 2005, or 2006 Independent Assessment of the Davis-Besse Corrective Action Program. Davis-Besse made sufficient progress on the remaining open issues to close all but two of the prior issues. The implementation of an effective equipment trending program was identified as an **Area in Need of Attention** in Section 2.4 of this report, and closure of significant corrective actions to SAP items was identified as an **Area in Need of Attention** in Section 2.2.

### **Areas of Strength**

None

### **Areas in Need of Attention**

None

### **Areas for Improvement**

None

## **Conclusion**

The Team rated the Status of Corrective Actions from Previous Independent Assessments of the Davis-Besse Corrective Action Program as **EFFECTIVE**.

## 3.0 METHODOLOGY

### 3.1 Assessment Methodology

The assessment methodology included the following:

- Observing activities;
- Interviewing personnel;
- Reviewing documentation;
- Evaluating trend analysis;
- Reviewing procedures, instructions, and programs; and
- Comparing actual performance levels with pre-established ones.

The Team gathered data on the implementation of the Corrective Action Program (CAP) through document reviews, observations, and interviews. The Team observed several Management Alignment and Ownership Meetings (MAOMs) and two Corrective Action Review Board (CARB) meetings.

The Team reviewed Condition Reports (CRs), Apparent Cause Evaluations (ACEs), Root Cause Evaluations (RCEs), trend reports, self-assessments, and other assessment reports. The Team also interviewed CR initiators, evaluators, and management personnel. The data obtained was evaluated in order to identify Areas of Strength, Areas in Need of Attention, and Areas for Improvement.

The following general standards of acceptable Corrective Actions (CAs) were applied to the assessment of the Davis-Besse CAP implementation:

- The problem is identified in a timely manner commensurate with its significance and ease of discovery;
- Identification of the problem is accurate and complete and includes consideration of the generic implications and possible previous occurrences;
- The problem is properly prioritized for resolution commensurate with its safety significance;
- The root causes of the problem are identified and CAs are appropriately focused to address the causes and to prevent recurrence of the problem; and
- CAs are completed in a timely manner.

Areas of Strength, Areas in Need of Attention, and Areas for Improvement were based on the definitions in DBBP-VP-0009, "Management Plan for Confirmatory Order Independent Assessments," using the following terminology.

#### **Area of Strength**

This term is used to characterize demonstrated performance in a program or process element within an area being assessed that is exceptionally effective in achieving its desired results, demonstrates a high degree of attention to detail, and is significant in obtaining desired results. An Area of Strength is a program, process, or activity of such a high quality that it could serve as an example for other similar elements.

### **Area in Need of Attention**

This term is used to identify a performance, program, or process element that is sufficient to meet its basic intent. However, management attention is required to achieve full effectiveness and consistency. Areas in Need of Attention are not normally identified or addressed in action plans submitted to the U.S. Nuclear Regulatory Commission (NRC), but are brought to management attention for consideration and possible entry into the Davis-Besse CAP.

### **Area for Improvement**

This term is used to characterize an identified performance, program, or process element that requires improvement to obtain the desired results in a consistent and effective manner. All Areas for Improvement identified in the Assessment Report is expected to be addressed by the Action Plan submitted to the NRC.

## **3.2 Assessment Categories**

Based on the Team's overall assessment, each area evaluated was given a rating of the area's overall effectiveness. The categories used to identify the overall effectiveness are defined in DBBP-VP-0009 and below.

### **HIGHLY EFFECTIVE**

Assessment results identified no Areas for Improvement and no or few Areas in Need of Attention. Performance, programs, and processes are more than sufficient to obtain the desired results with consistency and effectiveness.

### **EFFECTIVE**

Assessment results identified *no or a few* Areas for Improvement and *one or several* Areas in Need of Attention. Performance, programs, and processes are sufficient to obtain the desired results with consistency and effectiveness. (*edited version*)

### **MARGINALLY EFFECTIVE**

Assessment results identified more than several Areas for Improvement and several or more Areas in Need of Attention. The basic intent of the program or process is achieved; however, the performance, program, or process is challenged to obtain the desired results with consistency and effectiveness. Prompt management action is required.

### **NOT EFFECTIVE**

Assessment results identified significant shortcomings such that the basic intent of the program or process is not being achieved. Items identified as NOT EFFECTIVE require immediate management action.



## 4.0 REFERENCES

### 4.1 Persons Interviewed during the Assessment

The following is the list of individuals interviewed during the 2007 Independent Assessment of the Corrective Action Program Implementation at Davis-Besse Nuclear Power Station between July 9 and July 20, 2007.

| Name   | Position   |
|--|--|
| <b>Supervision, Oversight, Training, and Security</b>    |  |
| Mark Bezilla   | Site VP, DB Nuclear                                |
| Shelly Brinkman  | Security Officer                                   |
| Edward Chimahusky  | Supervisor, Oversight                              |
| Clancy Detray  | Auditor/Assessor, Oversight                        |
| Lynn Harder  | Radiation Protection Manager                       |
| Jeffrey Heuerman   | Security Officer                                   |
| Robert Hovland   | Training Manager                                   |
| David Hower  | Nuclear Specialist, Technical Training             |
| Raymond Hruby  | Manager, Site Regulatory Compliance                |
| Rick Jarosi  | Staff Nuclear Specialist, Employee Concerns        |
| Vito Kaminskas   | Director, Site Operations                          |
| Tim Kreft  | Auditor/Assessor, Oversight                        |
| Mark Levering  | Auditor, Oversight and QA Program Manager          |
| Matt Lewczynski  | Staff Nuclear Specialist, Oversight                |
| Steven Loehlein  | Director, Corrective Action Program and Assessment |
| Robert Robinson  | Supervisor, Quality Control                        |
| Randy Rossomme   | Manager, Fleet Corrective Action Program           |
| <b>Site Performance Improvement</b>                      |  |
| Charles Ackerman   | Performance Improvement                            |
| Priscilla Faris  | Nuclear Oversight                                  |
| Brian Hennessey  | Supervisor, Performance Improvement                |
| John Johnson   | Performance Improvement                            |
| Clark Price  | Director, Performance Improvement                  |
| Kathryn Nessar   | Fleet Performance Improvement                      |
| <b>Engineering &amp; Probabilistic Safety Assessment</b> |  |
| Kenneth Byrd   | Manager, Design Engineering                        |
| William DeJong   | PSA Lead   |

| Name                         | Position                               |
|------------------------------|--|
| John Grabnar                 | Director, Site Engineering             |
| David Imlay                  | Manager, Technical Support Engineering |
| Robert Najuch                | Supervisor, Project Engineering        |
| Aaron Quaderer               | PSA Analyst                            |
| Dennis Shreiner              | Site Lead, Equipment Trending          |
| Scott Plymale                | Manager, Plant Engineering             |
| Steven Slosnerick            | Staff Nuclear Engineer                 |
| <b>Maintenance</b>           |  |
| Kenneth Dieterick            | Maintenance Department                 |
| John Dominy                  | Manager, Site Maintenance              |
| Gary Melssen                 | Maintenance Rule Engineer              |
| Lucas Ring                   | Maintenance Department                 |
| <b>Operations</b>            |  |
| Robert Bechtel               | Reactor Operator                       |
| Vito Kaminskas               | Director Site Operation                |
| Robert Lakis                 | Nuclear Unit Supervisor                |
| Robert Robinson              | Supervisor, Nuclear Quality Control    |
| <b>Contractors</b>           |  |
| Charles Rupp                 | Design Engineer, Design Basis E&I      |
| <b>Root Cause Evaluators</b> |  |
| Larry Bonker                 | Root Cause Evaluator                   |

## 4.2 Condition Reports

The following is a list of the Condition Reports (CRs) reviewed during the 2007 Independent Assessment of the Corrective Action Program Implementation at Davis-Besse Nuclear Power Station.

| CR Number | Title  |
|-----------|--|
| 01-00009  | Barrier Penetration Inspections                                |
| 06-00154  | Discovery of Damaged Engine Components in EDG 2                |
| 05-00219  | Loss of DI Bus During Testing                                  |
| 05-00293  | Green Dust in Containment                                      |
| 02-00502  | Main Steam Safety Valve As-Found Teat Results                  |
| 06-00583  | EDG2 Tapping Noise, Evaluation of Operability Decision Process |
| 03-01167  | SOER 99-01A, Loss of Grid (Periodic Review)                    |
| 06-01503  | Personnel Contamination Events in Non-posted Areas             |

| CR Number | Title   |
|-----------|---|
| 02-01590  | Drawing Discrepancy   |
| 05-01642  | Decay Heat Train 2 Suction Piping – Refilling/Restoration                             |
| 06-01697  | Decline in Site Radiation Protection Performance During 14RFO                         |
| 02-02340  | IPR: Cathodic Protection  |
| 06-02588  | Master Trip Solenoid Valve B Did Not Trip When Test Button Pushed                     |
| 06-02649  | Failure to Enter T/S 3.3.3.5.2 When Unprotected Appendix R Circuit Identified in 2005 |
| 02-02879  | Boric Acid Buildup on Equipment in BAAT Rm  |
| 02-02941  | Operational Readiness Review Action Items   |
| 06-03252  | Instrument Valves Out of Position Prior to CS Pump 2 Quarterly Test                   |
| 06-03386  | RCS Identified Leakage (IL) Reaches Action Level 1 Based Upon Rate Of Change          |
| 02-03483  | DH 2733. DH Pump 1 Suction (BWST or Emergency Sump) gasket leakage                    |
| 03-03937  | Seismic Analysis of Masonry Walls   |
| 02-03972  | Degradation of Service Water Supply Water Piping to Auxiliary Feed Water Piping       |
| 05-04407  | COIA-CAP-2005: CR Evaluation and Corrective Action Completion Timeliness              |
| 05-04408  | COIA-CAP-2005: CR Root Cause & Apparent Cause Evaluations Inadequate                  |
| 05-04409  | COIA-CAP-2005: Age of SCAQ/CAQ Preventive & Remedial Actions                          |
| 05-04411  | COIA-CAP-2005: Equipment Trending Below Industry Standards                            |
| 02-04768  | SHRR Walkdown – 13.8 and 4.16 KV SYSTEMS  |
| 05-04770  | COIA-CAP-2005: Repeat Event Guidance Weakness   |
| 05-04771  | COIA-CAP-2005: CR-CA Backlog Potential Effect on Effectiveness                        |
| 05-04773  | COIA-CAP-2005: Lack of Smarter Corrective Action                                      |
| 05-04774  | COIA-CAP-2005: CR Evaluation Weaknesses   |
| 02-04806  | Generic Implications for CR 02-03027 Found Additional Condition                       |
| 02-04925  | SHRR: 480VAC Substation Transformer issues  |
| 05-04988  | Analysis of Material Collected from Flow Indicator for RE4597AA                       |
| 02-05032  | SHRR DHR Train 2 Walkdown BA Residue in Aux Building                                  |
| 02-05039  | LIR – EDG System does not meet IEEE-STD-387-1972 Requirements                         |
| 02-05306  | Makeup System Walkdown – room 211 Boric Acid Residue on Manual Valves                 |
| 02-05526  | High Energy Line Break (HELB) Collective Significance Review                          |
| 05-05559  | Boric Acid Pumps Operability Standing Order 05-013                                    |
| 02-05755  | CR 02-5755 SHRR: Recommend SFAS MOD 00-0019 be Implemented prior to Restart           |
| 02-06003  | PR/CM: Procedure NG-EN-00307, Configuration Management is Lacking                     |
| 06-06003  | Manual Reactor Trip Due to Lowering Condenser Vacuum                                  |
| 06-06048  | NPDES Limit Exceeded Due to Circ Water Chlorination Not Secured After Plant Trip      |
| 06-06129  | Safety Concern when Using Davit Arms for Lifting                                      |
| 06-06626  | AOV Component Level Calculation Input Errors  |
| 06-06723  | COIA-CAP 2006: Equipment Trending Below Industry Standards                            |
| 06-06990  | MISC DSL Generator Auto Transfer Switch Clearance Unexpected Results                  |
| 06-06998  | Acid Deposits Found on Packing Gland of CF13  |
| 06-07088  | Infrared Inspection Identifies a Hot Termination for DB-ACB34561                      |

| CR Number | Title  |
|-----------|--|
| 06-07799  | Safety Culture Assessment 2006 DB  |
| 06-08128  | FAC Program Deficiency Evaluation  |
| 06-08144  | Infrared Identified a Warm Riser to Dead End Termination on the Lemoyne Line     |
| 06-08304  | Missed ANI Review and Resolution of CR 04-04122                                  |
| 06-08338  | ALARA Program – NRC Identified Potential Green Finding                           |
| 06-09223  | COIA-CAP 2006: Closing CAQ CRs to Notifications                                  |
| 06-09228  | COIA-CAP 2006: Evaluation for 05-00288 Was Determined to be Incomplete           |
| 06-09229  | 2006 CAP-COIA: CR Evaluation Weaknesses  |
| 06-09230  | COIA-CAP 2006: Some Delays in the Internal Reviews of Incoming OEs               |
| 06-09231  | COIA-CAP 2006: Few Resources Directed Towards Backlog Reduction                  |
| 06-09232  | COIA-CAP 2006: Lack of Cognitive Binning During 14RFO                            |
| 06-09233  | COIA-CAP-2006: Open SAP Items Were Not Incorporated in Department & Section IPAs |
| 06-09235  | COIA-CAP 2006: Identification of Repeat Occurrences are not Retrievable          |
| 06-09236  | COIA-CAP 2006: CR 05-738 Repeat Occurrence Due To Untimely CA                    |
| 06-09238  | COIA-CAP 2006: CR 05-05395, INPO AFI PI.2-1, CA ON TRAINING                      |
| 06-09239  | CR 06-9239, COIA-CAP 2006: The Number of SCAQ Items Open Over 135 Days           |
| 06-09394  | Failure to Tighten Set Screw on CC1467 Following Identification                  |
| 06-09484  | EFP Valves Found Out of Required Position  |
| 06-09544  | Program Health Report for Flow Accelerated Corrosion Program Not Effective       |
| 06-09637  | Wrong Fuse Pulled in RC2825 for De-Energizing RE5403 Aux Relays                  |
| 06-09656  | Violation Of IS-DP-00504 Section 6.11.8  |
| 06-10332  | Damaged FME Bag in Mechanical Penetration Room                                   |
| 06-10490  | Valve SP9A6B Packing Leak  |
| 06-10550  | SAF-T-CLIMB Notched-Rail Fall Protection System Defect                           |
| 06-10623  | 2006 DB Safety Culture/ SCWE Survey Results for Chemistry; Red Pillars           |
| 06-10648  | Red Pillar in Plant Engineering 2006 SCWE Survey                                 |
| 06-11157  | CST Usable Volume Criteria Not Updated in 3 System Descriptions                  |
| 06-11269  | EDG Vent Dampers May Not Be Structurally Adequate                                |
| 06-11482  | Analysis of Hydrogen Concentration in the RCS                                    |
| 07-12484  | Down Draft Table Filters Ignited on Test Run                                     |
| 07-12586  | Impact of Unavailability EIAC Modification on S&IA Performance Criteria          |
| 07-13004  | Reactor Coolant Pump Motor MP36-1 Upthrust Bearing Temperature Rise              |
| 07-13188  | Unsat Observation of NLO Continuing Training CRC Meeting                         |
| 07-13331  | MU32 Is Stuck Open Slightly  |
| 07-13478  | K5-1 #3cyl. Fuel Injector Leaked Exhaust Gas During The Test Start               |
| 07-14554  | Cooling Tower Freeze Protection Drawing Discrepancies                            |
| 06-15275  | CR 06-15275, Loose Connections Found in Cabinet 3618                             |
| 07-17279  | Momentary Computer Failure   |
| 07-17392  | Apparent SF6 Gas Leak on 345KV ACB 34563   |

| CR Number | Title  |
|-----------|--|
| 07-17452  | Exponent Failure Analysis Report of the DB RPV Head Discovered March 2002                    |
| 07-17562  | Potential for Exposure to Personnel in Trailers/Buildings near Rad Storage Facility          |
| 07-17600  | Nuclear Electric Insurance Limited (NEIL) – 6 Question Response                              |
| 07-17967  | Discrepancies with Hilti QWIK Bolt II Stud Type Anchors                                      |
| 07-18003  | Disabling Seismic Monitoring System Impacted Emergency Assessment Capability                 |
| 07-18042  | Shift Engineer Qualification Status  |
| 07-18074  | HPI Train 1 Discharge Piping-Potential Air Intrusion   |
| 07-19089  | DB Emergency Action Level (EAL) Review   |
| 07-19158  | Caldon System Trouble Alarm 10-4-A   |
| 07-19548  | RCP 2-1 Vibrations   |
| 07-19909  | 2007 Operations 1 <sup>ST</sup> Quarter Cognitive Binning Trend for Poor Program Performance |
| 07-20358  | Gas Void Detected in Piping Downstream of MU208  |
| 07-21561  | Inadvertent Closure of RD172B1   |
| 07-21651  | Evaluate Past Plant Performance for Operation at Greater Than 2772 MWT                       |
| 07-21731  | #3 Main Turbine Control Valve Did Not Fast Close During DB-SS-04151 on 5/21/07               |

### 4.3 Procedures

The following is a list of the procedures reviewed and used during the 2007 Independent Assessment of the Corrective Action Program Implementation at Davis-Besse Nuclear Power Station.

| Procedure Number | Procedure Name  |
|------------------|---|
| NOP-ER-1001      | Continuous Equipment Performance Improvement  |
| NOP-LP-2001      | Corrective Action Program   |
| NOP-LP-2023      | Conduct of Fleet Oversight  |
| NOP-LP-2100      | Operating Experience Program  |
| NOP-SS-8001      | FENOC Activity Tracking   |
| NOP-WM-1003      | Nuclear Maintenance Notification Initiation, Screening, and Minor Deficiency Monitoring Processes |
| NOBP-LP-2001     | FENOC Focused Self-Assessment Process   |
| NOBP-LP-2018     | Integrated Performance Assessment/Trending  |
| NOBP-LP-2019     | Corrective Action Program Supplemental Expectations and Guidance                                  |
| NOBP-LP-2602     | Human Performance Success Clocks  |
| NOBP-ER-3009     | FENOC Plant Health Report Program   |
| NOBP-ER-3902     | Component Template Development (ER Workbench Module 2)  |
| NOBP-ER-3916     | Component Health and Trending (CHT) Process   |
| DBBP-RC-0009     | Performance Improvement Model and Implementation Process  |
| DBBP-VP-0009     | Management Plan for Confirmatory Order Independent Assessments                                    |

#### 4.4 Audits and Assessment Reports Reviewed

The following audits, self-assessments, and reports were reviewed by the Team during the completion of this report.

| Number        | Audits and Assessments   |
|---------------|--|
| DB-C-06-03    | Davis-Besse Fleet Oversight Assessment Report – 3 <sup>rd</sup> Qtr 2006   |
| DB-PA-06-04   | Davis-Besse Fleet Oversight Assessment Report – 4 <sup>th</sup> Qtr 2006   |
| DB-PA-07-01   | Davis-Besse Fleet Oversight Assessment Report – 1 <sup>st</sup> Qtr 2007   |
| DB-SA-06-08   | Davis-Besse Self Assessment of System 26 Diesel Fuel Storage & Transfer  |
| DB-SA-07-017  | Site Roll-Up Integrated Performance Assessment   |
| DB-SA-07-19   | Davis-Besse Self Assessment of Training Effectiveness Evaluation   |
| DB-SA-07-021  | Snapshot Self-Assessment – Engineering Package Review for 10CFR50.54(q) Applicability  |
| DB-SA-07-022  | Corrective Action Program Implementation   |
| DB-SS 06-14   | Snapshot Assessment – Use of Relevant Operating Experience in Pre-Job Briefs   |
| DB-SS-06-20   | Snapshot Assessment of the Equipment Reliability Bubble Chart Process  |
| DB-SS-06-24   | Thermal Performance Monitoring (FS-SA-06-15)   |
| DB-SS-06-26   | Common Cause Review - July 2006  |
| DB-SS-06-34   | Snapshot Assessment -Tracking for Focused Self Assessment Findings   |
| DB-SS-06-35   | Snapshot Assessment-System Walk Downs by Plant Engineering   |
| DB-SS-06-36   | Corrective Action Program (CAP) Assessment Results Review  |
| DB-SS-06-37   | Snapshot Self-Assessment – Assess station’s effectiveness in prompt and timely identification of adverse conditions in the Corrective Action Program |
| DB-SS-06-39   | Davis-Besse Safety Culture Assessment  |
| DB-SS-07-02   | Integrated Performance Assessment – Design Engineering   |
| DB-SS-07-004  | Integrated Performance Assessment – Maintenance  |
| FL-SA-07-021  | Integrated Performance Assessment Snapshot Assessment  |
| FL-SA-07-035  | Evaluate the Threshold for Problem Identification and CR Initiation Processes at Each of the FENOC Sites for Commonality                             |
| D-SPO-05A     | SCAQ Root Cause Evaluations  |
| 4/26/07       | Cognitive Trend Report – Technical Services Engineering – 1/1/07-3/31/07   |
| 5/10/07       | Cognitive Trend Report – Radiation Protection – 1/1/07-3/31/07   |
| May 2007      | Monthly Performance Report   |
| COIA-CAP-2006 | Action Plan to Address Area for Improvement (AFI)  |