

Table of Contents

	Page
CR-2011-04507	1
CR-2011-04507 (Attachments)	5
CR-2011-04507	8
CR-2011-04507	9
Form # FORM-2011-04507-1	10
Form # FORM-2011-04507-1 (Attachments)	11
CR-2011-04507	14

D/①①

Header							
CR Identifier CR-2011-04507		Origination Date 10/28/2011		Owning Organization DB-EN-DESN		Originator's Department DB-EN-DESN	
Site G201	Unit 1	Category AF	Due Date 12/01/2011				
Title Isolated crack indication identified by Impulse Response Testing of the Shield Building							
Discover Date 10/28/2011		Discover Time 08:31		Event Date 10/28/2011		Event Time 08:31	
Functional Location - System				Functional Location			
Equipment Description				AP-913		EP Equipment	
Identified By Individual				QA Finding? No		SRO Review Required but Initially Skipped No	
Condition Report							
Description of Condition and Probable Cause							
Impulse Response (IR) testing is being used to help located below the surface concrete cracking. CR 2011-03346 was written to identify cracking in the architectural flute shoulder area. CR 2011-04402 was written to identify cracking in the main steam line room.							
This CR is being written to document and evaluate three small isolated areas identified by the Impulse Response testing that are located in the architectural flute shoulder areas but not part of CR 2011-03346 and a core sample that contained a vertical crack.							
IR location with small isolated areas that indicate subsurface deformities/ imperfections:							
Shoulder 10 approximate 212 azimuth and elevation 673 Shoulder 13 approximate 285 azimuth and elevation 618 Shoulder 15 approximate 330 azimuth and elevation 664							
In addition, Core bore "M" F7 (Flute at 292.50 azimuth and elevation 633) contained a vertical radial crack.							
Immediate Actions Taken							
Informed Problem Solving Decision Making team							
Recommended Actions							
Initial Reviews							
Contact							
Jon Hook							
Supervisor Comments							
This CR documents additional cracks in the Containment Shield Building during the extent of condition activities for CR 2011-03346. Recommend this CR be closed to CR 2011-03346.							
Is this a consequential Human Performance Error/Event which requires a Quick Human Performance Checklist?				SRO Review Required?			
No				Yes			
MRB Comments							
MRB Questions							
CARB N	EOE	IOE	GC	EFC	MRW	MR	PE
RE	NDT	10CFR21 Required?					
		0					
Brief							
Pre-job Brief Date 09/27/2011		EACE Required?			HPCL Needed?		
Investigation / Closure Summary							
Investigation							
1-Abstract							
2-Introduction							

2.1-Problem Statement

2.2-Consequences

3-Data Analysis

3.1-Methodology

3.2-Sequence of Events

3.3-Discussion

4-Latent Organizational Weakness Evaluation

5-Generic Implications

5.1-Plant and Industry Experience

5.2-Extent of Condition

6-Apparent and Contributing Cause(s)

7-Corrective Action Plan

8-References

9-Attachments

Corrective Actions Taken

PROBLEM STATEMENT

CR 2011-03346 was written to document cracking in the architectural flutes shoulder area, and CR 2011-04402 was written to document cracking in the main steam line room. During impulse response (IR) testing for the investigation into the extent of concrete cracking identified by CR 2011-03346, several small isolated areas indicated subsurface imperfections were identified. These locations are at the edge or slightly beyond the thicken wall area of the architectural flute shoulder. The isolated areas with subsurface imperfections are identified as follows:

- 1.Shoulder 10 approximate 212 azimuth and elevation 673 (S10-672-35)
- 2.Shoulder 13 approximate 285 azimuth and elevation 618
- 3.Shoulder 15 approximate 330 azimuth and elevation 664

In addition to the IR indication, a vertical radial crack was identified in the core bore located at Core Bore "M" in Flute #7.

INVESTIGATION

See Attached Investigation Form

PAST OPERABILITY

Based on the evaluation above, these indications and cracks have a negligible structural impact on the shield building. Therefore, the shield building will continue to meet its design function.

CORRECTIVE ACTIONS

None Required

Corrective Actions Planned

None

Hardware / Degraded Condition Resolution Required

No

Does the CR involve information obtained or an observation made of a BASIC COMPONENT that could compromise safety?

No

ANII Review?

No

Review

Review Level	Review Results	Additional Review	Approved w/ Comments	Date	Comments
Peer Review	Approved		Y	11/01/2011	No Peer Review necessary, this was downgraded from a Full Apparent Cause Evaluation to a fix. This peer was done for the fix.
Manager Approval	Approved			11/01/2011	
CARB Review					

Forms

Form #	Form/Document	Assigned Org/Team	Due Date	Status	Result
1	Other Supporting Document	DB-EN-DESN-MS	11/01/2011	Complete	

Downgrade Requests

Downgrade Request	Initiated On	Original Category	Proposed Category	Status
Click to view	11/01/2011 10:58	AA	AF	Approved

INPO Code**INPO Code**

NO INPO CODE

Event Codes**Event Code**

EQ05; EQUIPMENT OPERATION / STRUCTURAL DEGRADATION -- Equipment operation degraded, (such as leaks, vibration, makes noise, runs hot, or is out of...

Activity / Process/ Cause Codes

Activity Code	Related Process Code	Cause Code Data	Component Type	Component Number	Related Corrective Actions
0575; COMPONENT DEGRADATION -- Hardware deficiencies where a component is degraded but still able to perform its primary function.	HDW				

Workbook Events

Event	Status	Assigned to	Created by	Created on	Finished by	Finished on
Initiate	Completed	Hook, Jon	Hook, Jon	10/28/2011 08:48 EDT	Hook, Jon	10/28/2011 08:48 EDT
Supervisor Review	Completed	Hook, Jon	Hook, Jon	10/28/2011 08:48 EDT	Hengge, Craig	10/28/2011 15:12 EDT
SRO Review	Completed	CR Holding Tank	Hengge, Craig	10/28/2011 15:12 EDT	AUTO-GENERATED	10/28/2011 17:04 EDT
MRB Review	Completed	CR CRPA Team - G201	AUTO-GENERATED	10/28/2011 17:04 EDT	Baker, Katie	10/29/2011 13:35 EDT
Assign Closure Summary	Skipped		Baker, Katie	10/29/2011 13:35 EDT	Baker, Katie	10/29/2011 13:35 EDT
Closure Summary	Skipped		Baker, Katie	10/29/2011 13:35 EDT	Baker, Katie	10/29/2011 13:35 EDT
Pre-job Brief	Completed	Hook, Jon	Baker, Katie	10/29/2011 13:35 EDT	Hook, Jon	11/01/2011 17:58 EDT
Investigation	Skipped		Hook, Jon	11/01/2011 17:58 EDT	Hook, Jon	11/01/2011 17:58 EDT
Peer Review	Reassigned	Hook, Jon	Hook, Jon	11/01/2011 17:58 EDT	Johnson, John	11/01/2011 18:11 EDT
Peer Review	Cancelled	McCloskey, Patrick	Johnson, John	11/01/2011 18:11 EDT	Bingham, Peter	11/01/2011 18:53 EDT

Workbook Events

Event	Status	Assigned to	Created by	Created on	Finished by	Finished on
Closure Summary	Completed	Reineck, Bradley	Bingham, Peter	11/01/2011 18:53 EDT	Reineck, Bradley	11/01/2011 19:06 EDT
Pre-job Brief	Skipped		Reineck, Bradley	11/01/2011 19:06 EDT	Reineck, Bradley	11/01/2011 19:06 EDT
Investigation	Skipped		Reineck, Bradley	11/01/2011 19:06 EDT	Reineck, Bradley	11/01/2011 19:06 EDT
Peer Review	Skipped		Reineck, Bradley	11/01/2011 19:06 EDT	Reineck, Bradley	11/01/2011 19:06 EDT
Manager Approval	Completed	Hook, Jon	Reineck, Bradley	11/01/2011 19:06 EDT	Hook, Jon	11/01/2011 19:21 EDT
Root Cause Sponsor	Skipped		Hook, Jon	11/01/2011 19:21 EDT	Hook, Jon	11/01/2011 19:21 EDT
QA Review	Skipped		Hook, Jon	11/01/2011 19:21 EDT	Hook, Jon	11/01/2011 19:21 EDT
CARB Review	Working	CR CRPA Team - G201	Hook, Jon	11/01/2011 19:21 EDT		

Attachments**Attachment**

2011-04507_Final.doc

PROBLEM STATEMENT

CR 2011-03346 was written to document cracking in the architectural flutes shoulder area, and CR 2011-04402 was written to document cracking in the main steam line room. During impulse response (IR) testing for the investigation into the extent of concrete cracking identified by CR 2011-03346, several small isolated areas indicated subsurface imperfections were identified. These locations are at the edge or slightly beyond the thicken wall area of the architectural flute shoulder. The isolated areas with subsurface imperfections are identified as follows:

1. Shoulder 10 approximate 212 azimuth and elevation 673 (S10-672-35)
2. Shoulder 13 approximate 285 azimuth and elevation 618
3. Shoulder 15 approximate 330 azimuth and elevation 664

In addition to the IR indication, a vertical radial crack was identified in the core bore located at Core Bore "M" in Flute #7.

INVESTIGATION

Since these three IR indications and the vertical crack are not addressed within the scope of CR 2011-03346 and CR 2011-04402, the IR indications and vertical crack shall be investigated by this CR.

The IR test results, core bore results, and the Bechtel Technical Assessment Report #25539-200-COR-0000-00001 (TAR) are included in the Root Cause Report for CR 2011-03346. Per review of the IR test report, the isolated areas with potential subsurface imperfections range in area of approximately 1 square foot to 4 square feet.

A core bore (S10-672-35) was drilled near the indication identified in shoulder #10. A laminar crack was confirmed at 1" from the outside surface of the shield building. Since the crack is only 1" from the surface, the crack remains outside the outer layer of structural reinforcing steel and adequate concrete cover remains. During a walkdown of this area, several minor tight surface cracks were identified in close proximity to the core bore. These surface cracks were of short length less than three feet. Inspection of these cracks indicates that the crack is sloping toward the core bore area. Minor surface cracks are not uncommon in concrete and do not affect the overall structural capacity of the structure. There was no spalled concrete or signs of staining at these surface cracks which would indicate corrosion of reinforcing steel. Therefore, based on the location and the slope of the surface cracks, the crack being one inch below the surface, adequate concrete cover for the reinforcing steel, no signs of reinforcing steel corrosion, and the localized indication is surrounded by sound concrete, there is no adverse affect on the structural capacity of the shield building. Based on the above, the Impulse Response reading in this area can be attributed to the local surface cracking.

The indication identified by the Impulse Response testing in shoulder #13 is a couple feet south of the original construction opening right edge and a couple of feet below the top edge. Per drawing C-112, this area contains a significant amount of additional reinforcing steel from the original construction opening. Therefore, the most likely cause for this isolated indication may be attributed to localized poorly consolidated concrete during initial concrete placement in this heavily reinforced area. A walkdown of this area did not identify any spalled concrete, surface cracks, or staining in the immediate area. The indication is localized to an area less than four square feet. Since the original construction opening has been filled, the additional opening reinforcing steel adds strength to this area. Based on the good surface condition of the area, the localized area, the additional strength from opening reinforcing steel, the structural impact on the shield building is considered negligible.

The indication identified in shoulder #15 is located approximately 13 feet south of the edge of the architectural flute. This indication is approximately one square foot and is slightly beyond the shoulder area and the additional shoulder reinforcing steel. A field walkdown of this area identified some minor surface cracks in close proximity to the Impulse Response test reading. These surface indication can and do adversely affect the readings, which could indicate an imperfection in wall. The surface area immediately surrounding this indication did not reveal any abnormal surface imperfections and the Impulse Response in the surrounding area indicate sound concrete. Therefore, based on the Impulse Response indication being an isolated point (one square foot), several surface cracks in the vicinity of the reading and sound concrete beyond this indication, the indication appears to be attributed to the localize surface cracking. The walkdown of this area found no spalled concrete or signs of staining at these surface cracks which would indicate corrosion of the reinforcing steel and the concrete surface appeared sound. Therefore, based on the above, there will be no impact on the structural capacity of the shield building,

The crack identified in core bore F7(M) appears to be a tight vertical radial crack rather than a laminar crack. The crack is seen at a depth of approximately 8 inches on one side of the core bore and at a depth of approximately 18 inches on the other side. Based on field walkdown of this core bore with the boroscope, a crack was not observed. The core bore was not wetted, which may explain why the crack was not observed. Therefore, if a crack does exist the width will be less than 0.005" which is the smallest crack width measured on the crack comparator. A crack this small is much tighter than the laminar cracks found in most of the other core bores obtained for CR 2011-03346 investigation and a crack of this width is also well within any limitations described within the ACI code. Due to the low tensile strength in concrete, cracks in concrete can never be completely eliminated. Radial cracks, such as the crack identified in this core bore, are commonly caused by concrete shrinkage during the curing process or other thermal gradients. One of the functions of reinforcing steel is to limit the size of these types of cracks. Since the wall is well reinforced with at least #10 bars every 12 inches, there is well confinement of this crack. In addition, core bores were installed in the immediate area of this core bore in the shoulder area. These core bores did not identify any cracks.

Therefore, there is no apparent connection between this vertical crack and the laminar cracks found in the adjacent shoulder area. Therefore, based on the above, the vertical crack identified within core bore F7(M) will not impact the structural capacity of the shield building and does not present a structural concern.

PAST OPERABILITY

Based on the evaluation above, these indications and cracks have a negligible structural impact of the shield building. Therefore, the shield building will continue to meet its design function.

CORRECTIVE ACTIONS

None Required

CR - SRO Review

CR	Site	Unit	PFA Requested?	Current Mode (Unit 1)	Power Level (Unit 1)	Current Mode (Unit 2)	Power Level (Unit 2)
CR-2011-04507	G201	1	No	Defueled	0		

Peer Reviewer

Horvath, Eric A.

SRO Comments

As stated in the Supervisory Comments this Condition Report will be close to Condition Report 2011-03346. Therefore, Tech Spec Equipment Operable has been marked N/A. Reportable has been marked NO.

CR Originator

Jon; Hook; 14268

Immediate Actions Taken

Informed Problem Solving Decision Making team

Tech Spec Equipment Operable?

N/A

Immediate Investigation Required?

No

Mode Hold Restraint?

No

Plant Condition Restraint?

No

EP Equipment Category?

N/A

Past Operability Review?

No

Reportable?

No

CR Description

Impulse Response (IR) testing is being used to help located below the surface concrete cracking. CR 2011-03346 was written to identify cracking in the architectural flute shoulder area. CR 2011-04402 was written to identify cracking in the main steam line room.

This CR is being written to document and evaluate three small isolated areas identified by the Impulse Response testing that are located in the architectural flute shoulder areas but not part of CR 2011-03346 and a core sample that contained a vertical crack.

IR location with small isolated areas that indicate subsurface deformities/ imperfections:

Shoulder 10 approximate 212 azimuth and elevation 673

Shoulder 13 approximate 285 azimuth and elevation 618

Shoulder 15 approximate 330 azimuth and elevation 664

In addition, Core bore "M" F7 (Flute at 292.50 azimuth and elevation 633) contained a vertical radial crack.

Supervisor Comments

This CR documents additional cracks in the Containment Shield Building during the extent of condition activities for CR 2011-03346. Recommend this CR be closed to CR 2011-03346.

Functional Location System**Equipment Description**

Functional Location System			Functional Location			
Equipment Description			AIP-913		EP Equipment	
Event	Status	Assigned to	Created by	Created on	Finished by	Finished on
Initiate	Completed	Hengge, Craig	Hengge, Craig	10/28/2011 15:12 EDT	Hengge, Craig	10/28/2011 15:12 EDT
Unit 2 SRO Review	Skipped		Hengge, Craig	10/28/2011 15:12 EDT	Hengge, Craig	10/28/2011 15:12 EDT
Unit 1 SRO Review	Completed	CR SRO Review Team - G201 (Unit 1)	Hengge, Craig	10/28/2011 15:12 EDT	Rayburn, William	10/28/2011 16:55 EDT
Close	Completed		Rayburn, William	10/28/2011 16:55 EDT	Rayburn, William	10/28/2011 16:55 EDT

CR - Reportability Review

Header**CR**

CR-2011-04507

Reportable? FLOC System FLOC

No

Reportability Determination**LER 1****LER 2****LER 3****LER 4****Supervisor Comments**

This CR documents additional cracks in the Containment Shield Building during the extent of condition activities for CR 2011-03346. Recommend this CR be closed to CR 2011-03346.

SRO Comments

As stated in the Supervisory Comments this Condition Report will be close to Condition Report 2011-03346. Therefore, Tech Spec Equipment Operable has been marked N/A. Reportable has been marked NO.

Workbook Events

Event	Status	Assigned to	Created by	Created on	Finished by	Finished on
Initiate	Completed	Hook, Jon	AUTO-GENERATED	10/28/2011 17:07 EDT	AUTO-GENERATED	10/28/2011 17:07 EDT
Reportability Review	Completed	CR Reportability Review Team - G201	AUTO-GENERATED	10/28/2011 17:07 EDT	Wolf, Gerald	10/29/2011 14:42 EDT
Close	Completed		Wolf, Gerald	10/29/2011 14:42 EDT	Wolf, Gerald	10/29/2011 14:42 EDT

CR - Forms

Header

CR	Form #	Site	Document Type	Assigned Organization
CR-2011-04507	FORM-2011-04507-1	G201	Other Supporting Document	DB-EN-DESN-MS; DB-Mech/Structural Engr

Due Date

11/01/2011

Description

Investigation Form Attached

Response**Workbook Events**

Event	Status	Assigned to	Created by	Created on	Finished by	Finished on
Initiate	Completed	Reineck, Bradley	Reineck, Bradley	11/01/2011 14:51 EDT	Reineck, Bradley	11/01/2011 14:51 EDT
Assign	Skipped		Reineck, Bradley	11/01/2011 14:51 EDT	Reineck, Bradley	11/01/2011 14:51 EDT
Attach	Completed	Osting, Steven	Reineck, Bradley	11/01/2011 14:51 EDT	Reineck, Bradley	11/01/2011 14:51 EDT
Approve	Skipped		Reineck, Bradley	11/01/2011 14:51 EDT	Reineck, Bradley	11/01/2011 14:51 EDT
Close	Completed		Reineck, Bradley	11/01/2011 14:51 EDT	Reineck, Bradley	11/01/2011 14:51 EDT

PROBLEM STATEMENT

CR 2011-03346 was written to document cracking in the architectural flutes shoulder area, and CR 2011-04402 was written to document cracking in the main steam line room. During impulse response (IR) testing for the investigation into the extent of concrete cracking identified by CR 2011-03346, several small isolated areas indicated subsurface imperfections were identified. These locations are at the edge or slightly beyond the thicken wall area of the architectural flute shoulder. The isolated areas with subsurface imperfections are identified as follows:

1. Shoulder 10 approximate 212 azimuth and elevation 673 (S10-672-35)
2. Shoulder 13 approximate 285 azimuth and elevation 618
3. Shoulder 15 approximate 330 azimuth and elevation 664

In addition to the IR indication, a vertical radial crack was identified in the core bore located at Core Bore "M" in Flute #7.

INVESTIGATION

Since these three IR indications and the vertical crack are not addressed within the scope of CR 2011-03346 and CR 2011-04402, the IR indications and vertical crack shall be investigated by this CR.

The IR test results, core bore results, and the Bechtel Technical Assessment Report #25539-200-COR-0000-00001 (TAR) are included in the Root Cause Report for CR 2011-03346. Per review of the IR test report, the isolated areas with potential subsurface imperfections range in area of approximately 1 square foot to 4 square feet.

A core bore (S10-672-35) was drilled near the indication identified in shoulder #10. A laminar crack was confirmed at 1" from the outside surface of the shield building. Since the crack is only 1" from the surface, the crack remains outside the outer layer of structural reinforcing steel and adequate concrete cover remains. During a walkdown of this area, several minor tight surface cracks were identified in close proximity to the core bore. These surface cracks were of short length less than three feet. Inspection of these cracks indicates that the crack is sloping toward the core bore area. Minor surface cracks are not uncommon in concrete and do not affect the overall structural capacity of the structure. There was no spalled concrete or signs of staining at these surface cracks which would indicate corrosion of reinforcing steel. Therefore, based on the location and the slope of the surface cracks, the crack being one inch below the surface, adequate concrete cover for the reinforcing steel, no signs of reinforcing steel corrosion, and the localized indication is surrounded by sound concrete, there is no adverse affect on the structural capacity of the shield building. Based on the above, the Impulse Response reading in this area can be attributed to the local surface cracking.

The indication identified by the Impulse Response testing in shoulder #13 is a couple feet south of the original construction opening right edge and a couple of feet below the top edge. Per drawing C-112, this area contains a significant amount of additional reinforcing steel from the original construction opening. Therefore, the most likely cause for this isolated indication may be attributed to localized poorly consolidated concrete during initial concrete placement in this heavily reinforced area. A walkdown of this area did not identify any spalled concrete, surface cracks, or staining in the immediate area. The indication is localized to an area less than four square feet. Since the original construction opening has been filled, the additional opening reinforcing steel adds strength to this area. Based on the good surface condition of the area, the localized area, the additional strength from opening reinforcing steel, the structural impact on the shield building is considered negligible.

The indication identified in shoulder #15 is located approximately 13 feet south of the edge of the architectural flute. This indication is approximately one square foot and is slightly beyond the shoulder area and the additional shoulder reinforcing steel. A field walkdown of this area identified some minor surface cracks in close proximity to the Impulse Response test reading. These surface indication can and do adversely affect the readings, which could indicate an imperfection in wall. The surface area immediately surrounding this indication did not reveal any abnormal surface imperfections and the Impulse Response in the surrounding area indicate sound concrete. Therefore, based on the Impulse Response indication being an isolated point (one square foot), several surface cracks in the vicinity of the reading and sound concrete beyond this indication, the indication appears to be attributed to the localize surface cracking. The walkdown of this area found no spalled concrete or signs of staining at these surface cracks which would indicate corrosion of the reinforcing steel and the concrete surface appeared sound. Therefore, based on the above, there will be no impact on the structural capacity of the shield building,

The crack identified in core bore F7(M) appears to be a tight vertical radial crack rather than a laminar crack. The crack is seen at a depth of approximately 8 inches on one side of the core bore and at a depth of approximately 18 inches on the other side. Based on field walkdown of this core bore with the boroscope, a crack was not observed. The core bore was not wetted, which may explain why the crack was not observed. Therefore, if a crack does exist the width will be less than 0.005" which is the smallest crack width measured on the crack comparator. A crack this small is much tighter than the laminar cracks found in most of the other core bores obtained for CR-2011-03346 investigation and a crack of this width is also well within any limitations described within the ACI code. Due to the low tensile strength in concrete, cracks in concrete can never be completely eliminated. Radial cracks, such as the crack identified in this core bore, are commonly caused by concrete shrinkage during the curing process or other thermal gradients. One of the functions of reinforcing steel is to limit the size of these types of cracks. Since the wall is well reinforced with at least #10 bars every 12 inches, there is well confinement of this crack. In addition, core bores were installed in the immediate area of this core bore in the shoulder area. These core bores did not identify any cracks.

Therefore, there is no apparent connection between this vertical crack and the laminar cracks found in the adjacent shoulder area. Therefore, based on the above, the vertical crack identified within core bore F7(M) will not impact the structural capacity of the shield building and does not present a structural concern.

PAST OPERABILITY

Based on the evaluation above, these indications and cracks have a negligible structural impact of the shield building. Therefore, the shield building will continue to meet its design function.

CORRECTIVE ACTIONS

None Required

CR - Downgrades

Header							
CR	Original Category	Proposed Category	QA Finding	Originator	Assigned Org	Current Due Date	Disposition
CR-2011-04507	AA	AF	No	Hook, Jon G.	DB-EN-DESN	11/27/2011	Approved

CR Description

Impulse Response (IR) testing is being used to help located below the surface concrete cracking. CR 2011-03346 was written to identify cracking in the architectural flute shoulder area. CR 2011-04402 was written to identify cracking in the main steam line room.

This CR is being written to document and evaluate three small isolated areas identified by the Impulse Response testing that are located in the architectural flute shoulder areas but not part of CR 2011-03346 and a core sample that contained a vertical crack.

IR location with small isolated areas that indicate subsurface deformities/ imperfections:

Shoulder 10 approximate 212 azimuth and elevation 673

Shoulder 13 approximate 285 azimuth and elevation 618

Shoulder 15 approximate 330 azimuth and elevation 664

In addition, Core bore "M" F7 (Flute at 292.50 azimuth and elevation 633) contained a vertical radial crack.

Reason for Downgrade

Based on an inspection of all four areas, the isolated areas are all acceptable and do not affect the structural design or capacity of the shield building

Justification

Core Bore S10-672-35 had a laminar crack identified 1" from the concrete surface. During an inspection of the immediate area of the core bore, a small localized surface crack less than three feet in length is in close proximity to the core bore. The slope of this crack is toward the core bore. There was no signs of spalled concrete or signs of staining at these surface cracks. Based on the location and slope of the surface cracks, the crack being one inch below the surface, adequate concrete cover for the reinforcing steel, no signs of reinforcing steel corrosion, and the localized indication is surrounded by sound concrete, there is no adverse affect on the structural capacity of the shield building. Based on the above, the Impulse Response reading in this area can be attributed to the local surface cracking.

Indication identified by the Impulse Repose testing in Shoulder #13 is adjacent to the original construction opening. This area contains a significant amount of additional reinforcing steel from the original construction opening. Therefore, the most likely cause for this isolated indication may be attributed to localized poorly consolidated concrete during initial concrete placement in this heavily reinforced area. Since the original construction opening has been filled, the additional opening reinforcing steel adds strength to this area. Based on the good surface condition of the area, the localized area, the additional strength from the opening reinforcing steel, the structural impact on the shield building is considered negligible.

Indication identified in shoulder #15 is located above the RVCH opening (2011). This indication is approximately one square foot and is surrounded by sound concrete. A field walkdown of this area identified some minor surface cracks in close proximity to the Impulse Response test reading. The surface indication can and do adversely affect the readings, which could indicate an imperfection in the wall. Based on the Impulse Response indication being an isolated point, several surface cracks in the vicinity of the reading and sound concrete beyond this indication, the indication can be attributed to the localized surface cracking. Therefore, based on the above, there will be no impact on the structural capacity of the shield building.

A vertical radial crack was identified in core bore F7 (M). This crack is a very tight crack (<0.01 inch). Due to low tensile strength in concrete, cracks in concrete can never be completely eliminated. Radial cracks, such as this are commonly caused by concrete shrinkage during the curing process or other thermal gradients. One of the function of reinforcing steel is to limit the size of these types of cracks. Since the wall is well reinforced with at least #10 bars every 12 inches, there is well confinement of this crack. In addition, core bores installed in the immediate area did not find a connection between this vertical crack and the laminar crack found in the adjacent shoulder area. Therefore, based on the above, the vertical crack identified within core bore F7 (M) will not impact the structural capacity of the shield building and does not present a structural concern.

Manager Comments

MRB Comments

The MRB approved this downgrade on 11/1/11

Reference any rolled CRs and CAs that have been rolled into this evaluation requesting down-grade.

Workbook Events

Event	Status	Assigned to	Created by	Created on	Finished by	Finished on
Initiate	Completed	Hook, Jon	Hook, Jon	11/01/2011 10:58 EDT	Hook, Jon	11/01/2011 10:58 EDT
QA Approval	Skipped		Hook, Jon	11/01/2011 10:58 EDT	Hook, Jon	11/01/2011 10:58 EDT
Manager Approval	Completed	Hook, Jon	Hook, Jon	11/01/2011 10:58 EDT	Hook, Jon	11/01/2011 10:59 EDT

Workbook Events

Event	Status	Assigned to	Created by	Created on	Finished by	Finished on
Manager Approval	Completed	Hook, Jon	Hook, Jon	11/01/2011 10:58 EDT	Hook, Jon	11/01/2011 10:59 EDT
MRB Approval	Completed	CR CRPA Team - G201	Hook, Jon	11/01/2011 10:59 EDT	Hook, Jon	11/01/2011 10:59 EDT
Close	Completed		Hook, Jon	11/01/2011 10:59 EDT	Hook, Jon	11/01/2011 10:59 EDT