

Maintenance Shop



Omaha Public Power District

OPPD



Field Report

To: Keith Kirchner, Pat Poepfel, Rick Niedergeses	
From: Cameron Collingsworth	Project: OPPD FCS 2011 Flood Inundation Structure Assessment OPPD Plant, Ft. Calhoun, NE
CC: Project File, David Rohan	HDR Project No: 164565, Dept. 134
Date: November, 9 th 2011	Field Report No: FR-087

Team Members:

Cameron Collingsworth (HDR)
Bryan Kumm (HDR)
Hugh O'Grady (HDR)

CJC

Field Activity Objective:

Our field activity objective is to observe the Maintenance Shop and its surroundings for evidence of damage relating to the flood event.

Activities Conducted:

The team visually inspected the interior and exterior perimeter of the building for signs of distress and documented areas of concern with photographs.

Data Obtained:

Each HDR team member noted their observations as the building was inspected. Key areas of concern were specifically documented and photographed. Discipline specific checklists were completed from the field observations to ensure all key items were investigated during the inspection. Team members discussed their observations during and after the inspection to ensure a consensus was formed on all findings at the time of the inspection.

Observations:

At the time of our field observations water had receded to elevations around 993ft, which are within normal levels. During the flood event, the building was not subjected to floodwaters due to the use of an Aqua Dam. The team did not observe any signs of distress in the building other than those previously identified relating to the column in the corridor. These items include the sinking column in the corridor and the stair step cracks in the masonry walls near the sinking column on either side of the corridor. Cracks in the masonry walls as well as the column do not appear to have changed since the previous inspection. During our inspection exploratory investigations to determine the extent of voids below the slab around the column were being conducted. Results of these investigations will be discussed in Section 4 of the report along with the remediation process.

No other signs of distress were seen in the building at this time.

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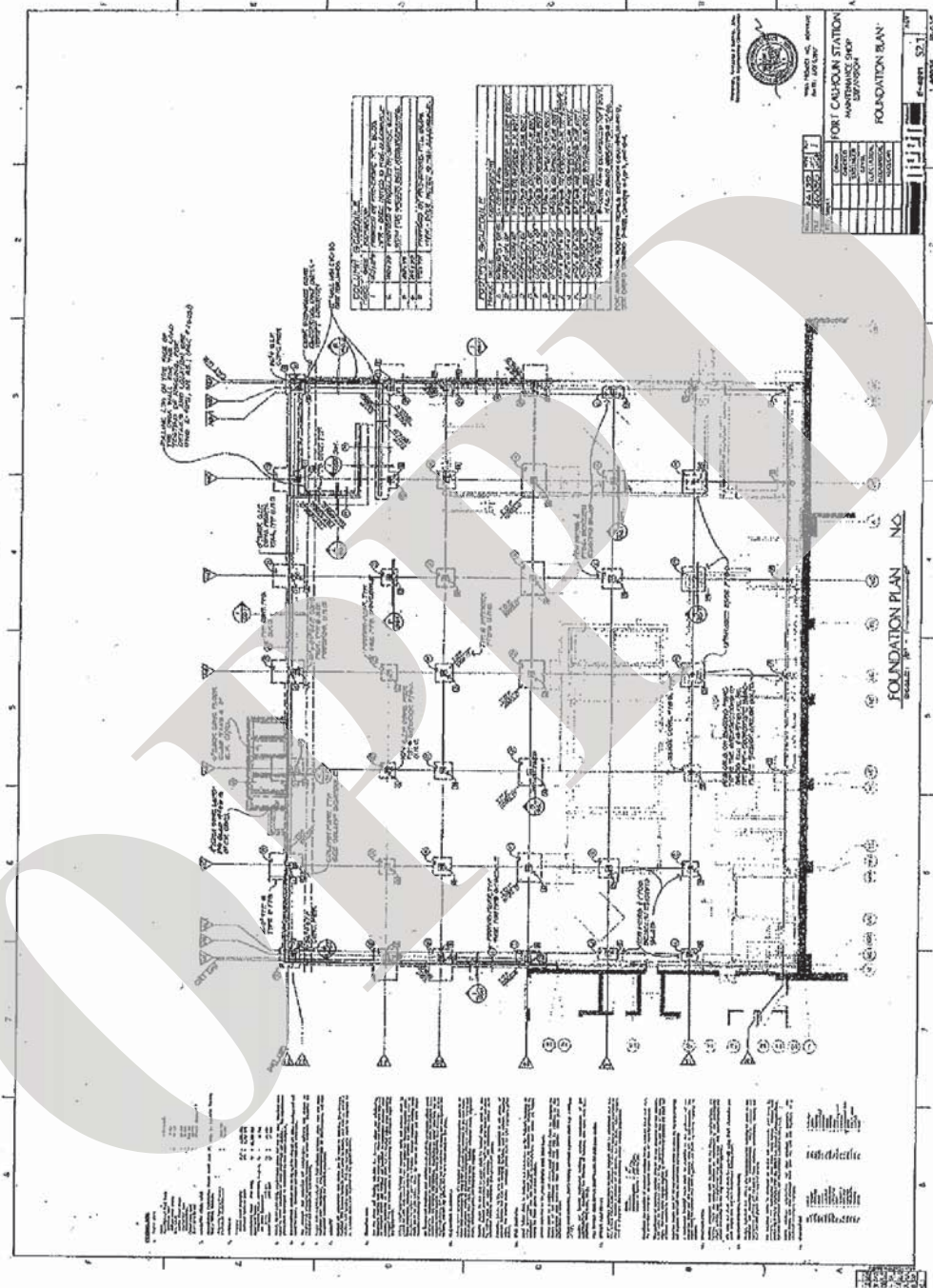
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11/6/11 HMO

Drawings do not match conditions in field.

Security-Related and/or Personal Information Restricted



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Security-Related and/or Personal Information Redacted



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**OPPD – FORT CALHOUN STATION
2011 FLOOD ASSESSMENT - GEOTECHNICAL CONDITION SURVEY**

Structure Number:		Structure Name:	Maintenance Shop
Date:	11/09/11	Inspected By:	Bryan Kumm
Weather:	Sunny 85° F		
Current Flood Elev.:	~993'		

Activity 1 – Ground Subsidence			
Is there observable ground subsidence?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A
Location			
Areal extent			
Depth			
Cracking	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A
Vertical/lateral offset			
Is there observable pavement subsidence?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
Location	Pavement area east of Maintenance Shop.		
Areal extent	Majority of pavement east of Maintenance Shop.		
Depth	Up to about 2 inches.		
Cracking	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
Vertical/lateral offset	Up to about 2 inches.		

Activity 2 – Erosion			
Is there observable scour?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A
Location			
Areal extent			
Depth			
Dimensions			
Is there observable piping (sand boils, sinkholes)?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A
Location			
Areal extent			

**OPPD – FORT CALHOUN STATION
2011 FLOOD ASSESSMENT - GEOTECHNICAL CONDITION SURVEY**

Dimensions	
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Activity 3 – Foundation Systems	
Are the foundation plans available?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Is the geotechnical report available?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Is the structure supported on deep foundations?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
Deep foundation type	
Design capacity	
Is the structure founded on spread footings?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Allowable bearing pressure	2 ksf
Sizes of footings	
Is the structure founded on a slab or grade?	No
What is the primary bearing layer for the foundations?	Old fill
What are general subsurface conditions?	Old fill overlying alluvial deposits of silt and sand.
Any observable distress?	Yes, Column TE-15 has sunk about 2 1/8 inches. Masonry walls within about 20 feet of Column TE-15 have stair stepping cracks.
Condition of floor slabs?	Fair

**OPPD – FORT CALHOUN STATION
2011 FLOOD ASSESSMENT - STRUCTURAL CONDITION SURVEY**

Structure Number:		Structure Name:	Maintenance Shop
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USER NOTES / INSTRUCTIONS

1. The purpose of this condition survey is to document observable signs of distress in the structural systems of the Fort Calhoun Nuclear Power Plant due to the 2011 flood event.
2. This inspection is not a condition survey of the entire facility but an opinion of structural damage due to the flood event only. Therefore, documented items of structural distress shall be limited to those attributed to the flood event.
3. Each observed structure shall include a review of existing inspection reports to verify if the observed item was reported prior to the flood event. If possible, review previous inspection reports prior to the on-site structure inspection.
4. Each surveyed structure shall include a review of the available existing structural drawings. If possible, review existing drawings prior to the on-site structure inspection.
5. Structures to be surveyed for flood damage were selected and prioritized by OPPD and include, but are not limited to buildings, process structures, equipment foundations, tank foundations and electrical towers.
6. Where items of distress are found, note the specific location, room number (if possible), nature of the distressed element, loads presently applied and/or load rating of that element, and estimated effect of the flood forces. Use the additional sheet as necessary to document the item. Document each area of distress with photos.
7. Possible damage from flood forces on the structure may be caused by, but are not limited to the following:
 - a. Foundation uplift due to buoyancy forces.
 - b. Undermining of foundations due to flood dynamic (velocity) forces.
 - c. Scouring of foundations due to flood dynamic (velocity) forces.
 - d. Compressibility / consolidation of existing soils due to changes in moisture content.
 - e. Expansive clay materials that undergo volume changes due to the changes in moisture content.
 - f. Settlements due to the loss of soil shear strength.
 - g. Cracking in walls due to additional lateral pressures from higher floodwater elevations.

**OPPD – FORT CALHOUN STATION
2011 FLOOD ASSESSMENT - STRUCTURAL CONDITION SURVEY**

Structure Number:		Structure Name:	Maintenance Shop
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Date:	11/09/2011	Inspected By:	Cameron Collingsworth
Weather:	Partly Cloudy mid 50's		
Current Flood Elev. Relative To FFE:	Irrelevant. River receded into its banks prior to insp.		

Activity 1 – Description of Structure	
Drawing Ref:	OPPD File #'s :42925, 42158, 46022, 46023, 46029, 46030, 46035, 46036, 46037, 46038, 46039, 16871, 16872, 16873, 16874, 39839, 40205, 42041, 42042, 42043, 46446, 46447, 46448, 46449, 46450, 46451, 49288, 56228
Sketch Map – Orientation:	N/A
Foundation:	The original and new portions of the building reside on a shallow foundation system. Exterior walls and columns are supported on continuous footings that extend below frost depth. Interior walls are supported on a thickened slab and columns are supported on shallow footings directly below the grade supported slab.
Superstructure:	Above grade, the building is constructed of steel beams and columns with apparent masonry shearwalls for lateral stability. The roof is comprised of steel joists with a metal roof deck diaphragm. Exterior walls are either precast panels, which may also provide lateral stability, or metal paneling.
Photographs:	

Activity 2 – Previously Documented Condition of Structure	
Item No.	
1	Title: KDI #3 (Column in Maintenance Shop Corridor)
	Date: 06/30/2011
	Author or Source: Kevin Melstad
Summary of Condition:	The maintenance shop column, previously addressed as Key Distress Indicator (KDI) #3 for the Priority I structure assessment, had shown signs of distress by downward deflection for several years. On the morning of 6/30/2011, an abrupt downward movement of approximately 1 inch occurred. Column has been independently dealt with in section 4 of the report and is believed to be an isolated area of distress.

Activity 3 – Present Condition of Structure	
General Description:	Other than the previously discussed issues with the corridor column discussed as a KDI in section 4 of the report, no other signs of distress were observed during our observations.
Overall Alignment	
Settlement:	None observed other than KDI #3, column in corridor.
Deflection:	None Observed
Expansion:	None Observed
Contraction:	None Observed

**OPPD – FORT CALHOUN STATION
2011 FLOOD ASSESSMENT - STRUCTURAL CONDITION SURVEY**

Structure Number:		Structure Name:	Maintenance Shop
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Other:	None
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Activity 4 – Portions Showing Distress			
Item No.			
1	General Description:	Column in maintenance shop corridor. No new signs of distress observed. Slab around column was being core drilled to investigate extents of voids below slab to determine further action. Column is addressed as a separate item and is being dealt with prior to this observation.	
	Distress Item Previously Reported (Y/N) – Report Number?	Y	
	Photograph:	See section 4 of the report for more information and photograph references.	
Nature of Loading & Detrimental Elements:			
Exposure			
	Freeze / Thaw:	N/A	
	Chemical Attack:	N/A	
	Abrasion, erosion, cavitation, impact:	Possible will be determined through KDI #3	
	Salts or Chloride Solution:	N/A	
	Other:	N/A	
Loading			
	Dead:	Office Space Above (Metal Deck w/Conc. Topping)	
	Live:	Office Space Live Load Above	
	Impact:	None	
	Dynamic / Vibration:	None	
	Flood:	None	
	Other:	None	
Soils (Foundation Conditions)			
	Flood Inundation (Y/N)?	N	
	Fdn. Uplift (Y/N)?	N	
	Undermining (Y/N)?	N	

