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LOUISIANA DIVISION
CONSOLIDATED AUDIT

LOSS PREVENTION

MARCH 1992
DOW CONFIDENTIAL

DO A 023062
CONFIDENTIAL

**ELECTRICAL SYSTEM
RELIABILITY AUDIT OF
CELL SERVICE**

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**AUDIT CONDUCTED:
February 24, 1992**

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GENERAL COMMENTS

1. There is an accumulation of dust and dirt on batteries located inside the generator control room, inside the MCC No. 1 electrical room and at the GT-502 panel. Also, there is no visible grounding conductor connected to the battery charger - inverter rack located inside the MCC No. 1 electrical room, Re.-pp. 6, 12, 19.

Action item recommendation: Review and update battery maintenance requirements. Adjust and/or revise battery maintenance program to insure batteries are adequately maintained. Re.-Safety and Loss Prevention Safety Reference E-2.

2. The area in front of the main control panel is limited/cramped; the panel rear enclosure is constructed of flammable material (wood); cable entry/exit openings are unsealed; and wiring, both inside and outside the enclosure is not installed in a neat and workmanlike manner. In addition, the rear of the panel constitutes the east wall of the laboratory, Re.-pp. 14, 16.

Action item recommendation: If feasible, replace the existing control panel with a new and more modern type panel; otherwise, rehabilitate the existing unit.

3. Cable entry/exit openings into the three motor control centers (MCC) rooms are unsealed, Re.-pp. 8, 10, 13.

Action item recommendation: Seal all cable trays and conduit penetrations into the MCC rooms in accordance with established codes and standards. Re.-See Loss Prevention Principle (LPP) 3.2.6, Dow Engineering Specification (DES) 7C-0301 and National Electrical Code (NEC) 300-21.

4. For this audit, 75 specific items or elements of electrical equipment have been audited and rated in accordance with the "Definitions of Index Numbers" page 2. A percentage breakdown of the audit ratings (index numbers), denoting an overall condition for audited equipment is as follows:

67%	Has been in service for some time and is in good condition
8%	Average condition
23.4%	Needs attention
1.6%	In operation but with significant signs of deterioration\

NOTE: Percentage values do not include housekeeping in the electrical rooms or the condition of buildings.

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DEFINITIONS OF INDEX NUMBERS

1. **NEW CONDITION**: New or recently installed; no corrosion; clean paint in good condition; all fasteners in place; documented P.M. program; complies with all current S&LP guidelines; no signs of any deterioration; access for service or maintenance is good; functional in every respect; suitable for environment or in controlled environment.
2. **GOOD CONDITION**: In service for some time; fully functional; has been incorporated into a documented P.M. program (initial operation may not have been); minimum signs of corrosion or deterioration; no obvious indication of problems (vibration, heat, noise, recurring maintenance); generally clean; suitable for environment; minimum access problems.
3. **AVERAGE CONDITION**: Average condition; functional with no obvious indications of problems (vibration, heat, noise, frequent recurring maintenance); recent inclusion in P.M. program with incomplete history; slight corrosion/deterioration of hardware; paint or insulation may be evident; access for service/maintenance may be difficult in some cases.
4. **NEEDS ATTENTION**: Needs attention, functional with definite signs of deterioration evident (corrosion, heat, noise, vibration, insulation); no P.M. history; may have loose or missing fasteners, supports or small parts; guards or barriers not effective; environment is a significant problem (cleanliness, corrosion); access for maintenance or service poor; some aspects not in compliance with current S&LP guidelines; impaired reliability.
5. **SIGNIFICANT DETERIORATION**: In operation, but with significant signs of deterioration (i.e., substantial corrosion, checking/cracking insulation); elevated noise or vibration levels; higher than normal temperatures; frequent maintenance repairs required in the same or related items; poor protection from an aggressive environment; physical and/or electrical characteristics substantially below average; major repair required to return to original condition if parts are available; low level of reliability.
6. **MARGINAL CONDITION**: Functional or operationally marginal; obsolete with no spares available; repairs not practical; high level of noise, vibration, temperature; high incidence of maintenance/repair required; marginally suitable for application/environment; unreliable.
7. **FAILURE IMMINENT**: Unsuitable for application; deterioration to the extent that repairs not practical; severe vibration, noise overheating; insulation breakdown, tracking on insulators; conditions bordering on "hazardous" or "unsafe".
8. **NONFUNCTIONAL OR UNSAFE**: Replacement required; continued use may result in serious safety or property damage incident.

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An audit of the Cell Service Plant, Block 56, was conducted on February 24, 1992. The following table summarizes the observations of the Audit Team. An index system has been used to rate the condition of the basic elements of the service. An index number of one represents a new, fully functional condition and an eight would indicate a non-functional or unsafe condition. () indicates emphasized values (weighed) based upon relative importance to equipment reliability.

- SUMMARY SHEET : CELL SERVICE -

SECTION	INDEX	
1. ELECTRICAL POWER FEED:		
Feeder L-41-----	2.67	(2.87)
2. ELECTRICAL SWITCHGEAR - STARTERS:		
Generator Control Room -----	2.33	(2.43)
MCC Room, No. 3-----	2.50	(2.60)
MCC Room, No. 2-----	2.50	(2.60)
MCC Room, No. 1-----	2.83	(3.10)
Main Control Panel-----	2.33	(2.53)
Laboratory-----	<u>2.67</u>	<u>(2.87)</u>
(Average) -----	2.53	<u>(2.69)</u>
3. FIELD WIRING:		
Cell Service -----	2.71	(2.89)
4. TRANSFORMER (Plant Power):		
T-401 -----	2.25	(2.33)
5. MOTORS:		
Motors (equal to or less than 100 HP)-----	2.71	(2.89)
Motors (motors larger than 100 HP)-----	<u>2.71</u>	<u>(2.89)</u>
Average-----	2.71	(2.89)
Plant Average	2.57	(2.73)

NOTE:

- The February, 1992 audit average index number values for "Electrical Switchgear-Starters" do not include housekeeping or condition of the electrical room/building.

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An audit of the Cell Service Plant, Block 56, was conducted on February 24, 1992. The following table summarizes the observations of the Audit Team. For purposes of comparison, the averages for the audit of November 7, 1988, appear to the right of the February, 1992, audit numbers.

- PROGRESS SUMMARY SHEET : CELL SERVICE -

SECTION		
	(2/92)	(11/88)
1. ELECTRICAL POWER FEED:		
Feeder L-41 -----	2.67	3.00
2. ELECTRICAL SWITCHGEAR - STARTERS:		
Generator Control Room -----	2.33	3.13
MCC Room, No. 3 -----	2.50	3.00
MCC Room, No. 2 -----	2.50	3.13
MCC Room, No. 1 -----	2.83	3.13
Main Control Panel -----	2.83	3.60
Laboratory -----	<u>2.67</u>	<u>3.20</u>
(Average) -----	2.53	3.20
3. FIELD WIRING:		
Cell Service -----	2.71	3.00
4. TRANSFORMER (Plant Power):		
T-401 -----	2.25	3.11
5. MOTORS:		
Motors (equal to or less than 100 HP) -----	2.71	3.00
Motors (motors larger than 100 HP) -----	<u>2.71</u>	<u>3.00</u>
Average -----	2.71	3.00
Plant Average	2.57	3.06

NOTE:

- The February, 1992 audit average index number values for "Electrical Switchgear-Starters" do not include housekeeping or condition of the electrical room/building.

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