



# CASE STUDY—STATOR

## MCEMAX Identifies Turn-to-Turn Faults

Industry:	Electric Utility	Fault Zone:	Stator
Motor Type:	AC Induction	Voltage:	4160
HP:	300	Speed:	590 rpm

### Problem

Motor reliability is critical for this large fossil fuel electric generating station located in the southeast United States. This facility uses the PdMA MCEMAX tester for predictive maintenance on both energized and deenergized motors. During normal routine testing on energized motors, the coal pulverizer motor was found to have an alarm condition. The baseline MCEMAX test indicated 10% Current Imbalance and 16% Impedance Imbalance. The decision was made to retest the motors two weeks later. The second test indicated the values had worsened. Current Imbalance had gone from 10% to 13% and Impedance Imbalance had gone from 16% to 29%. This situation is indicative of a stator fault. A portion of the EMAX Results page is shown on the right.

Voltage				
	Fund RMS	Tot RMS	C.F.	THD
Voltage 1-2	4341.59	4345.40	1.43	0.47
Voltage 2-3	4346.70	4350.50	1.42	0.49
Voltage 1-3	4392.29	4396.14	1.42	0.57
Average	4360.20	4364.01		
% Imbalance	0.74	0.74	HVF	0.00
%NEMA Derating	99.76	%NEMA Derating	100.00	
Current				
	33.71	33.75	1.44	1.49
Current 1				
Current 2	28.40	28.43	1.44	1.19
Current 3	27.29	27.32	1.46	1.45
Average	29.80	29.83		
% Imbalance	13.12	13.12		
% FLA	68.51	68.58		
Impedance				
	Real	Magnitude	Angle	
Phase 1	40.36	74.91	57.39	
Phase 2	36.05	87.97	65.81	
Phase 3	58.03	92.65	51.22	
% Imbalance	29.49			

### Action Taken

The motor was scheduled for downtime and sent to a motor shop.

### Root Cause

The motor shop disassembled the motor, pulled the rotor, and visually observed two turn-to-turn faults in the stator, shown in the picture on the right. The shop commented that this motor could have gone up in smoke the next time it was started. This plant has a predictive maintenance program that looks at conditions that can lead to stator faults. In this instance, using the MCEMAX tester they were able to detect a turn-to-turn fault with the motor energized.



### Savings

The MCEMAX provided advance warning of the impending stator fault, thus allowing the maintenance manager to schedule down time and prevent catastrophic failure of the coal pulverizer motor. This advance warning provided the company with a cost avoidance of \$60,000.