

## Appendix B4 Diesel Unit Cause Codes

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### DIESEL UNITS INDEX TO SYSTEM/COMPONENT CAUSE CODES

(Unit Codes 400-499)

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Appendix B – System/Component Cause Codes – Diesel Units

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## BALANCE OF PLANT

### Electrical

3600	Switchyard transformers and associated cooling systems – external (OMC)
3601	Switchyard transformers and associated cooling systems – external (not OMC)
3610	Switchyard circuit breakers – external (not OMC)
3611	Switchyard circuit breakers – external (OMC)
3612	Switchyard system protection devices – external (OMC)
3613	Switchyard system protection devices – external (not OMC)
3618	Other switchyard equipment – external (not OMC)
3619	Other switchyard equipment – external (OMC)
3620	Main transformer
3621	Unit auxiliaries transformer
3622	Station service startup transformer
3623	Auxiliary generators
3624	Auxiliary generator voltage supply system
3629	Other switchyard or high voltage system problems - external
3630	400-700-volt transformers
3631	400-700-volt circuit breakers
3632	400-700-volt conductors and buses
3633	400-700-volt insulators
3634	400-700-volt protection devices
3639	Other 400-700-volt problems
3640	AC instrument power transformers
3641	AC Circuit breakers
3642	AC Conductors and buses
3643	AC Inverters
3644	AC Protection devices
3649	Other AC instrument power problems
3650	DC instrument power battery chargers
3651	DC circuit breakers
3652	DC conductors and buses
3653	DC protection devices
3659	Other DC power problems
3660	4000-7000-volt transformers
3661	4000-7000-volt circuit breakers
3662	4000-7000-volt conductors and buses
3663	4000-7000-volt insulators
3664	4000-7000-volt protection devices
3669	Other 4000-7000-volt problems
3670	12-15kV transformers
3671	12-15kV circuit breakers
3672	12-15kV conductors and buses
3673	12-15kV insulators
3674	12-15kV protection devices
3679	Other 12-15kV problems
3680	Other voltage transformers
3681	Other voltage circuit breakers
3682	Other voltage conductors and buses
3683	Other voltage insulators

- 3684 Other voltage protection devices
- 3689 Other voltage problems
- 3690 Station Service Power Distribution System, General

### **Power Station Switchyard**

- 3700 Power Station switchyard (non generating unit equipment)
- 3710 Transmission line (connected to powerhouse switchyard to 1st Substation)
- 3720 Transmission equipment at the 1st substation) (see code 9300 if applicable)
- 3730 Transmission equipment beyond the 1st substation (see code 9300 if applicable)

## **GENERATOR**

This set of codes contains the generator, exciter, generator cooling systems, and generator controls. Note the main leads up to and includes the generator output breaker in this set of codes.

### **Generator**

- 4500 Rotor windings
- 4510 Rotor collector rings
- 4511 Rotor, General
- 4512 Retaining Rings
- 4520 Stator windings, bushings, and terminals
- 4530 Stator core iron
- 4535 Stator, General
- 4536 Generator Heaters
- 4540 Brushes and brush rigging
- 4550 Generator bearings and lube oil system
- 4551 Generator bearings
- 4552 Generator lube oil system
- 4555 Bearing cooling system
- 4560 Generator vibration (excluding vibration due to failed bearing and other components)
- 4570 Generator casing
- 4580 Generator end bells and bolting

### **Exciter**

- 4600 Exciter drive - motor
- 4601 Exciter field rheostat
- 4602 Exciter commutator and brushes
- 4603 Solid state exciter element
- 4604 Exciter drive - shaft
- 4605 Exciter transformer
- 4609 Other exciter problems

### **Cooling System**

(report failures caused by water leaks into generator as codes 4500, 4510, etc.)

- 4610 Hydrogen cooling system piping and valves
- 4611 Hydrogen coolers
- 4612 Hydrogen storage system
- 4613 Hydrogen seals
- 4619 Other hydrogen system problems
- 4620 Air cooling system
- 4630 Liquid cooling system
- 4640 Seal oil system and seals
- 4650 Other cooling system problems

### **Controls**

- 4700 Generator voltage control
- 4710 Generator metering devices
- 4720 Generator synchronization equipment
- 4730 Generator current and potential transformers
- 4740 Emergency generator trip devices
- 4750 Other generator controls and metering problems

### **Miscellaneous (Generator)**

- 4800 Generator main leads
- 4810 Generator output breaker
- 4805 Generator Bus Duct Cooling System
- 4830 Major generator overhaul (720 hours or longer) (use for non-specific overhaul only; see Page B-FS-2)
- 4831 Minor generator overhaul (less than 720 hours) (use for non-specific overhaul only; see Page B-FS-2)
- 4840 Inspection
- 4841 Generator dole testing
- 4842 Reactive and capability testing
- 4850 Core monitor alarm
- 4860 Generator neutral grounding equipment
- 4899 Other miscellaneous generator problems

## **DIESEL ENGINE**

### **Engine**

- 5700 Drive shaft and bearings
- 5710 Cylinders
- 5711 Cylinder heads
- 5712 Hydraulic lock (water in cylinders)
- 5720 Pistons

- 5730 Intake valves
- 5731 Exhaust valves
- 5740 Turbo charger
- 5790 Vibration
- 5799 Other engine problems

### **Engine Auxiliaries**

- 5800 Lube oil system
- 5805 Cooling system
- 5810 Heater elements
- 5815 Fuel system
- 5820 Start system
- 5825 Battery and battery charger system
- 5830 Air filter system
- 5849 Other engine auxiliaries problems

### **Engine Controls**

- 5850 Governor
- 5855 Engine control system
- 5860 Control power transformer
- 5865 Synchronization system
- 5870 Other engine control problems
- 5880 Diesel engine unit overhaul

### **Miscellaneous (Diesel Engine)**

- 5890 Major overhaul (use for non-specific overhaul only; see Page B-FS-2)
- 5895 Inspection
- 5990 Engine performance testing - individual engines (use code 9999 for total unit performance testing)
- 5999 Other miscellaneous diesel engine problems

## **REGULATORY, SAFETY, ENVIRONMENTAL**

Use these codes only for events not directly attributable to equipment failures. Inspections or testing of certain equipment due to regulation are reported using the appropriate equipment cause codes and the fact that it was a regulatory requirement noted in the verbal description section.

### **Continuous Emissions Monitoring Systems (CEMS)**

- 8700 CEMS Certification and Recertification
- 8710 SO<sub>2</sub> analyzer problems
- 8720 NO<sub>x</sub> analyzer problems
- 8730 CO analyzer problems
- 8740 CO<sub>2</sub> analyzer problems
- 8750 O<sub>2</sub> analyzer problems
- 8760 Opacity monitor problems

**Regulatory**

- 9504 Regulatory (environmental) proceedings and hearings - regulatory agency initiated
- 9506 Regulatory (environmental) proceedings and hearings - intervenor initiated
- 9510 Plant modifications strictly for compliance with new or changed regulatory requirements (scrubbers, cooling towers, etc.)
- 9520 Oil spill in Gulf of Mexico (OMC)
- 9590 Miscellaneous regulatory (this code is primarily intended for use with event contribution code 2 to indicate that a regulatory-related factor contributed to the primary cause of the event)

**Stack Emission (include exhaust emissions)**

- 9605 SO<sub>2</sub> stack emissions – diesel
- 9615 NO<sub>x</sub> stack emissions – diesel
- 9625 Particulate stack emissions – diesel
- 9635 Opacity – diesel
- 9655 Other stack or exhaust emissions – diesel  
(use codes 9220 to 9290 if fuel quality causes pollution control equipment problems that result in excess stack emissions)

**Other Operating Environmental Limitations**

- 9665 Thermal discharge limits – diesel
- 9675 Noise limits (not for personnel safety) – diesel
- 9685 Fish kill – diesel
- 9695 Other miscellaneous operational environmental limits – diesel

**Safety**

- 9700 OSHA-related retrofit or inspection
- 9720 Other safety problems

**PERSONNEL OR PROCEDURE ERRORS**

- 9900 Operator error
- 9910 Maintenance personnel error
- 9920 Contractor error
- 9930 Operating procedure error
- 9940 Maintenance procedure error
- 9950 Contractor procedure error
- 9960 Staff shortage

## INACTIVE STATES

0002	Inactive Reserve Shutdown
9990	Retired unit
9991	Mothballed unit

## PERFORMANCE

9997	NERC Reliability Standard Requirement
9998	Black start testing
9999	Total unit performance testing (use appropriate codes for individual component testing)

## EXTERNAL

Use this set of codes to report events caused by external factors (flood, lightning, etc.); economic factors (lack of fuel, labor strikes, etc.); operator training; and transmission system problems external to the plant.

### Catastrophe

9000	Flood
9001	Drought
9010	Fire including wildfires, not related to a specific component
9020	Lightning
9025	Geomagnetic disturbance
9030	Earthquake
9031	Tornado
9035	Hurricane
9036	Storms (ice, snow, etc)
9040	Other catastrophe

### Economic

0000	Reserve shutdown
9130	Lack of fuel (water from rivers or lakes, coal mines, gas lines, etc) where the operator is not in control of contracts, supply lines, or delivery of fuels
9131	Lack of fuel (interruptible supply of fuel part of fuel contract)
9134	Fuel conservation
9136	Problems with Primary Fuel for Units with Secondary Fuel Operation
9140	Plant modifications to burn different fuel that are not regulatory mandated
9150	Labor strikes company-wide problems or strikes outside the company's jurisdiction such as manufacturers (delaying repairs) or transportation (fuel supply) problems.
9151	Labor strikes direct plant management grievances that result in a walkout or strike are under plant management control.
9160	Other economic problems
9180	Economic (for internal use at plants only)



- 9181 Economic (for internal use at plants only)
- 9182 Economic (for internal use at plants only)
- 9183 Economic (for internal use at plants only)
- 9184 Economic (for internal use at plants only)
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- 9199 Economic (for internal use at plants only)

### **Fuel Quality**

(Use code 9605 to 9655 if the fuel quality results in excess stack emissions through no fault in the pollution control equipment. Use the appropriate equipment code to report fouling and slagging.)

- 9200 High ash content (OMC)
- 9201 High ash content (not OMC)
- 9205 Poor quality fuel, heat content
- 9220 High sulfur content (OMC)
- 9221 High sulfur content (not OMC)
- 9230 High vanadium content (OMC)
- 9231 High vanadium content (not OMC)
- 9240 High sodium content (OMC)
- 9241 High sodium content (not OMC)
- 9260 Low BTU oil (OMC)
- 9261 Low BTU oil (not OMC)
- 9290 Other fuel quality problems (OMC)
- 9291 Other fuel quality problems (not OMC)

### **Miscellaneous (External)**

- 9300 Transmission system problems other than catastrophes (do not include switchyard problems in this category; see codes 3600 to 3629)
- 9310 Operator training
- 9320 Other miscellaneous external problems
- 9340 Synchronoous Condenser Operation

