

## Appendix B11: Index To Internal Combustion/Reciprocating Engine Unit Cause Codes

### INTERNAL COMBUSTION/RECIPROCATING ENGINE UNITS

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**BALANCE OF PLANT**

<b>TABLE B11-1 Balance of Plant: Auxiliary Systems</b>					
<b>UNIT TYPE</b>	<b>SYSTEM</b>	<b>COMPONENT</b>	<b>SUB-COMPONENT</b>	<b>CAUSE CODE</b>	<b>DESCRIPTION</b>
Internal Combustion/Reciprocating Engines	Balance of Plant	Auxiliary Systems		3850	Instrument air compressors
Internal Combustion/Reciprocating Engines	Balance of Plant	Auxiliary Systems		3851	Instrument air piping
Internal Combustion/Reciprocating Engines	Balance of Plant	Auxiliary Systems		3852	Instrument air valves
Internal Combustion/Reciprocating Engines	Balance of Plant	Auxiliary Systems		3853	Instrument air dryers
Internal Combustion/Reciprocating Engines	Balance of Plant	Auxiliary Systems		3854	N2 backup to instrument air
Internal Combustion/Reciprocating Engines	Balance of Plant	Auxiliary Systems		3859	Other instrument air problems
Internal Combustion/Reciprocating Engines	Balance of Plant	Auxiliary Systems		3860	Fire protection system pumps
Internal Combustion/Reciprocating Engines	Balance of Plant	Auxiliary Systems		3861	Fire protection system piping
Internal Combustion/Reciprocating Engines	Balance of Plant	Auxiliary Systems		3862	Fire protection system valves
Internal Combustion/Reciprocating Engines	Balance of Plant	Auxiliary Systems		3863	Fire protection system fouling
Internal Combustion/Reciprocating Engines	Balance of Plant	Auxiliary Systems		3864	Fire protection system instrumentation and controls

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Internal Combustion/Reciprocating Engines	Balance of Plant	Auxiliary Systems		3998	Balance of plant overhaul/outage
<b>Notes: 1) For use with Unit Codes 400-499.</b>					

<b>TABLE B11-2 Balance of Plant: Electrical</b>					
<b>UNIT TYPE</b>	<b>SYSTEM</b>	<b>COMPONENT</b>	<b>SUB-COMPONENT</b>	<b>CAUSE CODE</b>	<b>DESCRIPTION</b>
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3600	Switchyard transformers and associated cooling systems - external (OMC)
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3601	Switchyard transformers and associated cooling systems - external (not OMC)
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3610	Switchyard circuit breakers - external (not OMC)
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3611	Switchyard circuit breakers - external (OMC)
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3612	Switchyard system protection devices - external (OMC)
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3613	Switchyard system protection devices - external (not OMC)
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3618	Other switchyard equipment - external (not OMC)
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3619	Other switchyard equipment - external (OMC)
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3620	Main transformer
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3621	Unit auxiliaries transformer

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Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3622	Station service startup transformer
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3623	Auxiliary generators
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3624	Auxiliary generator voltage supply system
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3629	Other switchyard or high voltage system problems - external
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3630	400-700 volt transformers
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3631	400-700 volt circuit breakers
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3632	400-700 volt conductors and buses
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3633	400-700 volt insulators
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3634	400-700 volt protection devices
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3639	Other 400-700 volt problems
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3640	AC instrument power transformers
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3641	AC Circuit breakers
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3642	AC Conductors and buses

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Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3643	AC Inverters
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3644	AC Protection devices
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3649	Other AC instrument power problems
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3650	DC instrument power battery chargers
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3651	DC circuit breakers
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3652	DC conductors and buses
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3653	DC protection devices
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3659	Other DC power problems
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3660	4000-7000 volt transformers
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3661	4000-7000 volt circuit breakers
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3662	4000-7000 volt conductors and buses
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3663	4000-7000 volt insulators
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3664	4000-7000 volt protection devices

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Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3669	Other 4000-7000 volt problems
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3670	12-15kV transformers
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3671	12-15kV circuit breakers
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3672	12-15kV conductors and buses
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3673	12-15kV insulators
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3674	12-15kV protection devices
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3679	Other 12-15kV problems
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3680	Other voltage transformers
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3681	Other voltage circuit breakers
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3682	Other voltage conductors and buses
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3683	Other voltage insulators
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3684	Other voltage protection devices
Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3689	Other voltage problems

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Internal Combustion/Reciprocating Engines	Balance of Plant	Electrical		3690	Station Service Power Distribution System, General
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**Notes: 1) For use with Unit Codes 400-499.**

<b>TABLE B11-3 Balance of Plant: Miscellaneous (Balance of Plant)</b>					
<b>UNIT TYPE</b>	<b>SYSTEM</b>	<b>COMPONENT</b>	<b>SUB-COMPONENT</b>	<b>CAUSE CODE</b>	<b>DESCRIPTION</b>
Internal Combustion/Reciprocating Engines	Balance of Plant	Miscellaneous (Balance of Plant)		3970	Distributive Control System (DCS) - process computer
Internal Combustion/Reciprocating Engines	Balance of Plant	Miscellaneous (Balance of Plant)		3971	DCS - data highway
Internal Combustion/Reciprocating Engines	Balance of Plant	Miscellaneous (Balance of Plant)		3972	DCS - hardware problems (including card failure)
Internal Combustion/Reciprocating Engines	Balance of Plant	Miscellaneous (Balance of Plant)		3973	DCS - internal and termination wiring
Internal Combustion/Reciprocating Engines	Balance of Plant	Miscellaneous (Balance of Plant)		3974	DCS - logic problems
Internal Combustion/Reciprocating Engines	Balance of Plant	Miscellaneous (Balance of Plant)		3975	DCS - upgrades
Internal Combustion/Reciprocating Engines	Balance of Plant	Miscellaneous (Balance of Plant)		3979	Other DCS problems
Internal Combustion/Reciprocating Engines	Balance of Plant	Miscellaneous (Balance of Plant)		3980	Programmable Logic Controller (PLC)
Internal Combustion/Reciprocating Engines	Balance of Plant	Miscellaneous (Balance of Plant)		3981	PLC - data highway
Internal Combustion/Reciprocating Engines	Balance of Plant	Miscellaneous (Balance of Plant)		3982	PLC - hardware problems (including card failure)

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Internal Combustion/Reciprocating Engines	Balance of Plant	Miscellaneous (Balance of Plant)		3983	PLC - internal and termination wiring
Internal Combustion/Reciprocating Engines	Balance of Plant	Miscellaneous (Balance of Plant)		3984	PLC - logic problems
Internal Combustion/Reciprocating Engines	Balance of Plant	Miscellaneous (Balance of Plant)		3985	PLC - upgrades
Internal Combustion/Reciprocating Engines	Balance of Plant	Miscellaneous (Balance of Plant)		3989	Other PLC problems
<b>Notes: 1) For use with Unit Codes 400-499.</b>					

<b>TABLE B11-4 Balance of Plant: Power Station Switchyard</b>					
<b>UNIT TYPE</b>	<b>SYSTEM</b>	<b>COMPONENT</b>	<b>SUB-COMPONENT</b>	<b>CAUSE CODE</b>	<b>DESCRIPTION</b>
Internal Combustion/Reciprocating Engines	Balance of Plant	Power Station Switchyard		3700	Power Station switchyard (non generating unit equipment)
Internal Combustion/Reciprocating Engines	Balance of Plant	Power Station Switchyard		3710	Transmission line (connected to powerhouse switchyard to 1st Substation)
Internal Combustion/Reciprocating Engines	Balance of Plant	Power Station Switchyard		3720	Transmission equipment at the 1st substation (see code 9300 if applicable)
Internal Combustion/Reciprocating Engines	Balance of Plant	Power Station Switchyard		3730	Transmission equipment beyond the 1st substation (see code 9300 if applicable)
<b>Notes: 1) For use with Unit Codes 400-499.</b>					

## **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.

<b>TABLE B11-5 External: Catastrophe</b>
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<b>UNIT TYPE</b>	<b>SYSTEM</b>	<b>COMPONENT</b>	<b>SUB-COMPONENT</b>	<b>CAUSE CODE</b>	<b>DESCRIPTION</b>
Internal Combustion/Reciprocating Engines	External	Catastrophe		9000	Flood
Internal Combustion/Reciprocating Engines	External	Catastrophe		9001	Drought
Internal Combustion/Reciprocating Engines	External	Catastrophe		9010	Fire including wildfires, not related to a specific component
Internal Combustion/Reciprocating Engines	External	Catastrophe		9020	Lightning
Internal Combustion/Reciprocating Engines	External	Catastrophe		9025	Geomagnetic disturbance
Internal Combustion/Reciprocating Engines	External	Catastrophe		9030	Earthquake
Internal Combustion/Reciprocating Engines	External	Catastrophe		9031	Tornado
Internal Combustion/Reciprocating Engines	External	Catastrophe		9035	Hurricane
Internal Combustion/Reciprocating Engines	External	Catastrophe		9036	Storms (ice, snow, etc)
Internal Combustion/Reciprocating Engines	External	Catastrophe		9040	Other catastrophe

**Notes: 1) For use with Unit Codes 400-499.**

<b>TABLE B11-6 External: Economic</b>					
<b>UNIT TYPE</b>	<b>SYSTEM</b>	<b>COMPONENT</b>	<b>SUB-COMPONENT</b>	<b>CAUSE CODE</b>	<b>DESCRIPTION</b>

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Internal Combustion/Reciprocating Engines	External	Economic		0	Reserve shutdown
Internal Combustion/Reciprocating Engines	External	Economic		9130	Failure of fuel supplier to fulfill contractual obligations or a pre-arranged deal due to physical fuel disruptions or operational impairments (e.g. force majeure on a pipeline or compressor down; making the pipeline incapable of making its firm deliveries.)
Internal Combustion/Reciprocating Engines	External	Economic		9131	Lack of fuel – due to contractual or tariff provisions that allow for service interruption or price fluctuations during peak demand periods.
Internal Combustion/Reciprocating Engines	External	Economic		9134	Fuel conservation
Internal Combustion/Reciprocating Engines	External	Economic		9136	Problems with Primary Fuel for Units with Secondary Fuel Operation
Internal Combustion/Reciprocating Engines	External	Economic		9140	Plant modifications to burn different fuel that are not regulatory mandated
Internal Combustion/Reciprocating Engines	External	Economic		9150	Labor strikes company-wide problems or strikes outside the company's jurisdiction such as manufacturers (delaying repairs) or transportation (fuel supply) problems.
Internal Combustion/Reciprocating Engines	External	Economic		9151	Labor strikes direct plant management grievances that result in a walkout or strike are under plant management control.
Internal Combustion/Reciprocating Engines	External	Economic		9160	Other economic problems
Internal Combustion/Reciprocating Engines	External	Economic		9180	Economic (for internal use at plants only)
Internal Combustion/Reciprocating Engines	External	Economic		9181	Economic (for internal use at plants only)

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Internal Combustion/Reciprocating Engines	External	Economic		9182	Economic (for internal use at plants only)
Internal Combustion/Reciprocating Engines	External	Economic		9183	Economic (for internal use at plants only)
Internal Combustion/Reciprocating Engines	External	Economic		9184	Economic (for internal use at plants only)
Internal Combustion/Reciprocating Engines	External	Economic		9185	Economic (for internal use at plants only)
Internal Combustion/Reciprocating Engines	External	Economic		9186	Economic (for internal use at plants only)
Internal Combustion/Reciprocating Engines	External	Economic		9187	Economic (for internal use at plants only)
Internal Combustion/Reciprocating Engines	External	Economic		9188	Economic (for internal use at plants only)
Internal Combustion/Reciprocating Engines	External	Economic		9189	Economic (for internal use at plants only)
Internal Combustion/Reciprocating Engines	External	Economic		9190	Economic (for internal use at plants only)
Internal Combustion/Reciprocating Engines	External	Economic		9191	Economic (for internal use at plants only)
Internal Combustion/Reciprocating Engines	External	Economic		9192	Economic (for internal use at plants only)
Internal Combustion/Reciprocating Engines	External	Economic		9193	Economic (for internal use at plants only)
Internal Combustion/Reciprocating Engines	External	Economic		9194	Economic (for internal use at plants only)

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Internal Combustion/Reciprocating Engines	External	Economic		9195	Economic (for internal use at plants only)
Internal Combustion/Reciprocating Engines	External	Economic		9196	Economic (for internal use at plants only)
Internal Combustion/Reciprocating Engines	External	Economic		9197	Economic (for internal use at plants only)
Internal Combustion/Reciprocating Engines	External	Economic		9198	Economic (for internal use at plants only)
Internal Combustion/Reciprocating Engines	External	Economic		9199	Economic (for internal use at plants only)

**Notes: 1) For use with Unit Codes 400-499.**

<b>TABLE B11-7 External: Fuel Quality</b>					
<b>UNIT TYPE</b>	<b>SYSTEM</b>	<b>COMPONENT</b>	<b>SUB-COMPONENT</b>	<b>CAUSE CODE</b>	<b>DESCRIPTION</b>
Internal Combustion/Reciprocating Engines	External	Fuel Quality		9200	High ash content (OMC)
Internal Combustion/Reciprocating Engines	External	Fuel Quality		9201	High ash content (not OMC)
Internal Combustion/Reciprocating Engines	External	Fuel Quality		9205	Poor quality natural gas fuel, low heat content
Internal Combustion/Reciprocating Engines	External	Fuel Quality		9220	High sulfur content (OMC)
Internal Combustion/Reciprocating Engines	External	Fuel Quality		9221	High sulfur content (not OMC)
Internal Combustion/Reciprocating Engines	External	Fuel Quality		9230	High vanadium content (OMC)

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Internal Combustion/Reciprocating Engines	External	Fuel Quality		9231	High vanadium content (not OMC)
Internal Combustion/Reciprocating Engines	External	Fuel Quality		9240	High sodium content (OMC)
Internal Combustion/Reciprocating Engines	External	Fuel Quality		9241	High sodium content (not OMC)
Internal Combustion/Reciprocating Engines	External	Fuel Quality		9260	Low BTU oil (OMC)
Internal Combustion/Reciprocating Engines	External	Fuel Quality		9261	Low BTU oil (not OMC)
Internal Combustion/Reciprocating Engines	External	Fuel Quality		9290	Other fuel quality problems (OMC)
Internal Combustion/Reciprocating Engines	External	Fuel Quality		9291	Other fuel quality problems (not OMC)

**Notes: 1) For use with Unit Codes 400-499. 2) 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.**

<b>TABLE B11-8 External: Miscellaneous (External)</b>					
<b>UNIT TYPE</b>	<b>SYSTEM</b>	<b>COMPONENT</b>	<b>SUB-COMPONENT</b>	<b>CAUSE CODE</b>	<b>DESCRIPTION</b>
Internal Combustion/Reciprocating Engines	External	Miscellaneous (External)		9300	Transmission system problems other than catastrophes (do not include switchyard problems in this category; see codes 3600 to 3629, 3720 to 3730)
Internal Combustion/Reciprocating Engines	External	Miscellaneous (External)		9310	Operator training
Internal Combustion/Reciprocating Engines	External	Miscellaneous (External)		9320	Other miscellaneous external problems

Internal Combustion/Reciprocating Engines	External	Miscellaneous (External)		9340	Synchronous Condenser Operation
<b>Notes: 1) For use with Unit Codes 400-499.</b>					

## 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.

TABLE B11-9 Generator: Controls					
UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Internal Combustion/Reciprocating Engines	Generator	Controls		4700	Generator voltage control
Internal Combustion/Reciprocating Engines	Generator	Controls		4710	Generator metering devices
Internal Combustion/Reciprocating Engines	Generator	Controls		4720	Generator synchronization equipment
Internal Combustion/Reciprocating Engines	Generator	Controls		4730	Generator current and potential transformers
Internal Combustion/Reciprocating Engines	Generator	Controls		4740	Emergency generator trip devices
Internal Combustion/Reciprocating Engines	Generator	Controls		4741	Frequency Trip (81 Relay)
Internal Combustion/Reciprocating Engines	Generator	Controls		4750	Other generator controls and metering problems
<b>Notes: 1) For use with Unit Codes 400-499.</b>					

TABLE B11-10 Generator: Cooling System					
UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION

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Internal Combustion/Reciprocating Engines	Generator	Cooling System		4610	Hydrogen cooling system piping and valves
Internal Combustion/Reciprocating Engines	Generator	Cooling System		4611	Hydrogen coolers
Internal Combustion/Reciprocating Engines	Generator	Cooling System		4612	Hydrogen storage system
Internal Combustion/Reciprocating Engines	Generator	Cooling System		4613	Hydrogen seals
Internal Combustion/Reciprocating Engines	Generator	Cooling System		4619	Other hydrogen system problems
Internal Combustion/Reciprocating Engines	Generator	Cooling System		4620	Air cooling system
Internal Combustion/Reciprocating Engines	Generator	Cooling System		4630	Liquid cooling system
Internal Combustion/Reciprocating Engines	Generator	Cooling System		4640	Seal oil system and seals
Internal Combustion/Reciprocating Engines	Generator	Cooling System		4650	Other cooling system problems

**Notes: 1) For use with Unit Codes 400-499. 2) Report failures caused by water leaks into generator as codes 4500, 4510, etc.**

<b>TABLE B11-11 Generator: Exciter</b>					
<b>UNIT TYPE</b>	<b>SYSTEM</b>	<b>COMPONENT</b>	<b>SUB-COMPONENT</b>	<b>CAUSE CODE</b>	<b>DESCRIPTION</b>
Internal Combustion/Reciprocating Engines	Generator	Exciter		4600	Exciter drive - motor
Internal Combustion/Reciprocating Engines	Generator	Exciter		4601	Exciter field rheostat

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Internal Combustion/Reciprocating Engines	Generator	Exciter		4602	Exciter commutator and brushes
Internal Combustion/Reciprocating Engines	Generator	Exciter		4603	Solid state exciter element
Internal Combustion/Reciprocating Engines	Generator	Exciter		4604	Exciter drive - shaft
Internal Combustion/Reciprocating Engines	Generator	Exciter		4605	Exciter transformer
Internal Combustion/Reciprocating Engines	Generator	Exciter		4609	Other exciter problems

**Notes: 1) For use with Unit Codes 400-499.**

**TABLE B11-12 Generator: Generator**

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Internal Combustion/Reciprocating Engines	Generator	Generator		4500	Rotor windings (including damper windings and fan blades on hydro units)
Internal Combustion/Reciprocating Engines	Generator	Generator		4510	Rotor collector rings
Internal Combustion/Reciprocating Engines	Generator	Generator		4511	Rotor, General
Internal Combustion/Reciprocating Engines	Generator	Generator		4512	Retaining Rings
Internal Combustion/Reciprocating Engines	Generator	Generator		4520	Stator windings, bushings, and terminals
Internal Combustion/Reciprocating Engines	Generator	Generator		4530	Stator core iron



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Internal Combustion/Reciprocating Engines	Generator	Generator		4535	Stator, General
Internal Combustion/Reciprocating Engines	Generator	Generator		4536	Generator Heaters
Internal Combustion/Reciprocating Engines	Generator	Generator		4540	Brushes and brush rigging
Internal Combustion/Reciprocating Engines	Generator	Generator		4550	Generator bearings and lube oil system (including thrust bearings on hydro units)
Internal Combustion/Reciprocating Engines	Generator	Generator		4551	Generator bearings
Internal Combustion/Reciprocating Engines	Generator	Generator		4552	Generator lube oil system
Internal Combustion/Reciprocating Engines	Generator	Generator		4555	Bearing cooling system
Internal Combustion/Reciprocating Engines	Generator	Generator		4560	Generator vibration (excluding vibration due to failed bearing and other components)
Internal Combustion/Reciprocating Engines	Generator	Generator		4570	Generator casing
Internal Combustion/Reciprocating Engines	Generator	Generator		4580	Generator end bells and bolting

**Notes: 1) For use with Unit Codes 400-499.**

<b>TABLE B11-13 Generator: Miscellaneous (Generator)</b>					
<b>UNIT TYPE</b>	<b>SYSTEM</b>	<b>COMPONENT</b>	<b>SUB-COMPONENT</b>	<b>CAUSE CODE</b>	<b>DESCRIPTION</b>
Internal Combustion/Reciprocating Engines	Generator	Miscellaneous (Generator)		4800	Generator main leads

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

**Notes: 1) For use with Unit Codes 400-499.**

## INACTIVE STATES

<b>TABLE B11-14 Inactive States: Inactive States</b>					
<b>UNIT TYPE</b>	<b>SYSTEM</b>	<b>COMPONENT</b>	<b>SUB-COMPONENT</b>	<b>CAUSE CODE</b>	<b>DESCRIPTION</b>
Internal Combustion/Reciprocating Engines	Inactive States	Inactive States		2	Inactive Reserve Shutdown

**Appendix B11: Index To Internal Combustion/Reciprocating Engine Unit Cause Codes**

Internal Combustion/Reciprocating Engines	Inactive States	Inactive States		9990	Retired unit
Internal Combustion/Reciprocating Engines	Inactive States	Inactive States		9991	Mothballed unit

**Notes: 1) For use with Unit Codes 400-499.**

## INTERNAL COMBUSTION/RECIPROCATING ENGINES

<b>TABLE B11-15 Internal Combustion/Reciprocating Engines: Engine</b>					
<b>UNIT TYPE</b>	<b>SYSTEM</b>	<b>COMPONENT</b>	<b>SUB-COMPONENT</b>	<b>CAUSE CODE</b>	<b>DESCRIPTION</b>
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5700	Drive shaft and bearings
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5710	Cylinders
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5711	Cylinder heads
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5712	Hydraulic lock (water in cylinders)
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5720	Pistons
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5730	Intake valves
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5731	Exhaust valves
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5734	Exhaust gas bellow
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5735	Main starting air valve

**Appendix B11: Index To Internal Combustion/Reciprocating Engine Unit Cause Codes**

Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5740	Turbo charger
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5756	Starting air distributor
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5758	Charge air cooler
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5759	Wastegate
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5760	Main bearing
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5761	Camshaft
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5762	Crankshaft
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5763	Liner
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5764	Flywheel
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5765	Connecting rod
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5790	Vibration
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5792	Engine Overspeed Trip
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine		5799	Other engine problems

Notes: 1) For use with Unit Codes 400-499.

TABLE B11-16 Internal Combustion/Reciprocating Engines: Engine Auxiliaries					
UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5114	Lube oil filters
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5800	Lube oil system
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5801	Lube oil separator
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5805	Cooling system
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5810	Heater elements
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5811	HT water pre heater
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5812	LT water pre heater
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5815	Fuel system
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5816	CBU fuel pump
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5817	CBU fuel filter
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5818	Pilot filter

**Appendix B11: Index To Internal Combustion/Reciprocating Engine Unit Cause Codes**

Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5820	Start system
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5825	Battery and battery charger system
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5830	Air filter system
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5831	Exhaust gas rapture disc
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5832	Turning gear
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Auxiliaries		5849	Other engine auxiliaries problems

**Notes: 1) For use with Unit Codes 400-499.**

<b>TABLE B11-17 Internal Combustion/Reciprocating Engines: Engine Controls</b>					
<b>UNIT TYPE</b>	<b>SYSTEM</b>	<b>COMPONENT</b>	<b>SUB-COMPONENT</b>	<b>CAUSE CODE</b>	<b>DESCRIPTION</b>
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Controls		5850	Governor
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Controls		5855	Engine control system
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Controls		5860	Control power transformer
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Controls		5865	Synchronization system
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Controls		5870	Other engine control problems

**Appendix B11: Index To Internal Combustion/Reciprocating Engine Unit Cause Codes**

Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Controls		5871	Peak pressure sensor
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Controls		5872	Knock sensor
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Controls		5873	Gas admission valve
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Controls		5874	Exhaust gas temp sensor
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Engine Controls		5880	Internal Combustion/Reciprocating Engines unit overhaul

**Notes: 1) For use with Unit Codes 400-499.**

**TABLE B11-18 Internal Combustion/Reciprocating Engines: Miscellaneous (Internal Combustion/Reciprocating Engines)**

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Miscellaneous (Internal Combustion/Reciprocating Engines)		5890	Major overhaul (use for non-specific overhaul only; see Page B-CCGT-2)
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Miscellaneous (Internal Combustion/Reciprocating Engines)		5895	Inspection
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Miscellaneous (Internal Combustion/Reciprocating Engines)		5990	Engine performance testing - individual engines (use code 9999 for total unit performance testing)
Internal Combustion/Reciprocating Engines	Internal Combustion/Reciprocating Engines	Miscellaneous (Internal Combustion/Reciprocating Engines)		5999	Other miscellaneous Internal Combustion/Reciprocating Engines problems

**Notes: 1) For use with Unit Codes 400-499.**

## PERFORMANCE

**TABLE B11-19 Performance: Performance**

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
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**Appendix B11: Index To Internal Combustion/Reciprocating Engine Unit Cause Codes**

Internal Combustion/Reciprocating Engines	Performance	Performance		9997	NERC Reliability Standard Requirement
Internal Combustion/Reciprocating Engines	Performance	Performance		9998	Black start testing
Internal Combustion/Reciprocating Engines	Performance	Performance		9999	Total unit performance testing (use appropriate codes for individual component testing)

**Notes: 1) For use with Unit Codes 400-499.**

## PERSONNEL OR PROCEDURAL ERRORS

<b>TABLE B11-20 Personnel or Procedural Errors: Personnel or Procedural Errors</b>					
<b>UNIT TYPE</b>	<b>SYSTEM</b>	<b>COMPONENT</b>	<b>SUB-COMPONENT</b>	<b>CAUSE CODE</b>	<b>DESCRIPTION</b>
Internal Combustion/Reciprocating Engines	Personnel or Procedural Errors	Personnel or Procedural Errors		9900	Operator error
Internal Combustion/Reciprocating Engines	Personnel or Procedural Errors	Personnel or Procedural Errors		9910	Maintenance personnel error
Internal Combustion/Reciprocating Engines	Personnel or Procedural Errors	Personnel or Procedural Errors		9920	Contractor error
Internal Combustion/Reciprocating Engines	Personnel or Procedural Errors	Personnel or Procedural Errors		9930	Operating procedure error
Internal Combustion/Reciprocating Engines	Personnel or Procedural Errors	Personnel or Procedural Errors		9940	Maintenance procedure error
Internal Combustion/Reciprocating Engines	Personnel or Procedural Errors	Personnel or Procedural Errors		9950	Contractor procedure error
Internal Combustion/Reciprocating Engines	Personnel or Procedural Errors	Personnel or Procedural Errors		9960	Staff shortage

**Notes: 1) For use with Unit Codes 400-499.**



## 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.

TABLE B11-21 Regulatory, Safety, Environmental: Other Operating Environmental Limitations					
UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Internal Combustion/Reciprocating Engines	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9665	Thermal discharge limits (Internal Combustion/Reciprocating Engines)
Internal Combustion/Reciprocating Engines	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9675	Noise limits (not for personnel safety) (Internal Combustion/Reciprocating Engines)
Internal Combustion/Reciprocating Engines	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9685	Fish kill (Internal Combustion/Reciprocating Engines)
Internal Combustion/Reciprocating Engines	Regulatory, Safety, Environmental	Other Operating Environmental Limitations		9695	Other miscellaneous operational environmental limits (Internal Combustion/Reciprocating Engines)

**Notes: 1) For use with Unit Codes 400-499.**

TABLE B11-22 Regulatory, Safety, Environmental: Regulatory					
UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Internal Combustion/Reciprocating Engines	Regulatory, Safety, Environmental	Regulatory		9504	Regulatory (environmental) proceedings and hearings - regulatory agency initiated
Internal Combustion/Reciprocating Engines	Regulatory, Safety, Environmental	Regulatory		9506	Regulatory (environmental) proceedings and hearings - intervenor initiated
Internal Combustion/Reciprocating Engines	Regulatory, Safety, Environmental	Regulatory		9510	Plant modifications strictly for compliance with new or changed regulatory requirements (scrubbers, cooling towers, etc.)
Internal Combustion/Reciprocating Engines	Regulatory, Safety, Environmental	Regulatory		9520	Oil spill in Gulf of Mexico (OMC)

**Appendix B11: Index To Internal Combustion/Reciprocating Engine Unit Cause Codes**

Internal Combustion/Reciprocating Engines	Regulatory, Safety, Environmental	Regulatory		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)
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**Notes: 1) For use with Unit Codes 400-499.**

**TABLE B11-23 Regulatory, Safety, Environmental: Safety**

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Internal Combustion/Reciprocating Engines	Regulatory, Safety, Environmental	Safety		9700	OSHA-related retrofit or inspection
Internal Combustion/Reciprocating Engines	Regulatory, Safety, Environmental	Safety		9720	Other safety problems

**Notes: 1) For use with Unit Codes 400-499.**

**TABLE B11-24 Regulatory, Safety, Environmental: Stack Emission**

UNIT TYPE	SYSTEM	COMPONENT	SUB-COMPONENT	CAUSE CODE	DESCRIPTION
Internal Combustion/Reciprocating Engines	Regulatory, Safety, Environmental	Stack Emission		9605	SO2 stack emissions (Internal Combustion/Reciprocating Engines)
Internal Combustion/Reciprocating Engines	Regulatory, Safety, Environmental	Stack Emission		9615	NOx stack emissions (Internal Combustion/Reciprocating Engines)
Internal Combustion/Reciprocating Engines	Regulatory, Safety, Environmental	Stack Emission		9616	CO stack emissions - fossil
Internal Combustion/Reciprocating Engines	Regulatory, Safety, Environmental	Stack Emission		9625	Particulate stack emissions (Internal Combustion/Reciprocating Engines)
Internal Combustion/Reciprocating Engines	Regulatory, Safety, Environmental	Stack Emission		9635	Opacity (Internal Combustion/Reciprocating Engines)

**Appendix B11: Index To Internal Combustion/Reciprocating Engine Unit Cause Codes**

Internal Combustion/Reciprocating Engines	Regulatory, Safety, Environmental	Stack Emission		9655	Other stack or exhaust emissions (Internal Combustion/Reciprocating Engines)
<b>Notes: 1) For use with Unit Codes 400-499. 2) Include exhaust emissions. Use codes 9220 to 9290 if fuel quality causes pollution control equipment problems that result in excess stack emissions.</b>					