

EVALUATION OF THE EFFECTS OF
HIGH ENERGY LINE BREAKS ON
CONTROL SYSTEMS

APPENDIX C

CONTROL SYSTEM IDENTIFICATION DIAGRAMS
AND CONTROL SYSTEM COMPONENT TABLES

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TABLE C-1

PENNSYLVANIA POWER & LIGHT COMPANY
 SUSQUEHANNA STEAM ELECTRIC STATION
 NON-SAFETY CONTROL SYSTEMS COMPONENTS OUTSIDE CONTROL BUILDING

PRESSURE REGULATOR AND TURBINE GENERATOR CONTROL SYSTEM

COMPONENT IDENTIFICATION AND FUNCTION	LOCATION IN PLANT NOTE 1
Intermediate steam pressure sensor/PT-10107	5-3
Main steam sensor/PT-10101 A, B	10-6
Electronic pressure transmitter in steam chest/ PT-10102	9-2
Generator stator cooling water common header pump discharge/PSL-10183B1	8-3
Condensor vacuum pressure switch/PSH-10502 A1, B1, C1, A2, B2, C2	7-4
Bypass valve low vacuum pressure trip/ PSH-10504A-C	7-4
Trip system pressure switch/PSL-10126A, B	6-4
Thrust bearing wear detector and low bearing oil pressure/PSL-11981 A1, A2, A3, B1, B2, B3	6-4
Shaft pump discharge low pressure trip/ PSL-11932A-C	1-3
Hydraulic fluid low pressure trip/PSL-10180A-C	1-2
Main Turbine Vibration detectors/VE-10106A-M	A, B, C 6-4 D-H, J 7-4 K, L, M 8-4
Shell expansion detector/XE-10112	6-4
Differential expansion detector/XE-10110	6-4
Eccentricity detector/XE-10116	6-4
Rotor expansion detector/XE-10114	7-4
Vibration phase angle reference detector/ XE-10106	6-4
Steam chest inner metal temperature/TE-10102A, B	6-3

TABLE C-1
(Continued)

PENNSYLVANIA POWER & LIGHT COMPANY
SUSQUEHANNA STEAM ELECTRIC STATION
NON-SAFETY CONTROL SYSTEMS COMPONENTS OUTSIDE CONTROL BUILDING

PRESSURE REGULATOR AND TURBINE GENERATOR CONTROL SYSTEM

COMPONENT IDENTIFICATION AND FUNCTION	LOCATION IN PLANT NOTE 1
Cooling water to/from generator windings temperature/TE-10183 A1, B1	8-3
LP Turbine A,B,C exhaust hood high temperature generator end trip/TSHH-10119A1, A2, A3, B1, B2, B3, C1, C2, C3	7-4
Moisture separator reheater drain tank high water level/LSH-10127A, B, LSH-10128A, B, LSH-10129A, B	A 7-4 B 3-4
Generator inlet and outlet conductivity cell/CE-10183A, B	8-3
T/G shaft speed detector/SE-10120A, B, C	6-4
Permanent Magnet Generator speed measuring unit/ES-10120	6-4
Main stop valve position transducer/ZT-10141 A-D	6-3
Control valve position transducer/ZT-10150 A-D	6-3
Position transducer - intercept valves/ ZT-10160A1 - E1	A1, B1 7-4 C1 6-4 D1 2-4 E1 3-4
Solenoid valve - bypass valve/SV-10140A-E	1-3
Reset oil valve solenoid/SV-10123	6-4
Lockout valve solenoid/SV-10124	6-4
Oil trip valve solenoid/SV-10122	6-4
Closing solenoid - control valve/SV-10150A-D	6-3
Fast-acting solenoid valve - stop valve/ SV-10141A-D	6-3
Mechanical trip solenoid/SV-10125	6-4

TABLE C-1
(Continued)

PENNSYLVANIA POWER & LIGHT COMPANY
SUSQUEHANNA STEAM ELECTRIC STATION
NON-SAFETY CONTROL SYSTEMS COMPONENTS OUTSIDE CONTROL BUILDING

PRESSURE REGULATOR AND TURBINE GENERATOR CONTROL SYSTEM

COMPONENT IDENTIFICATION AND FUNCTION	LOCATION IN PLANT NOTE 1
Master trip solenoid valve/SV-10126	6-4
Servo valve - control valve/XV-10148A-D XV-10148A-D	6-3
Servo valve - control valve/XV-10150A-D XV-10150A-D	6-3
Position transducer - intermediate stop valve/ ZT-10160A2-F2	A2, B2 7-4 C2 6-4 D2 2-4 E2, F2 3-4
Bypass valve position transducer/ZT-10140A-E	1-3
Main Stop Valve opened and closed position switches/ZS-10141 A1-D1 and A2-D2 Load limit switch (load unit)/ZS-10141 A4-D4	6-3
Intermediate stop valve open switches/ZS-10160 A1, A4, A7, B1, B4, C1, C4, C7, D1, D4, E1, E4, E7	A1, A4, A7 7-4 B1, B4, 7-4 C1, C4, C7 6-4 D1, D4 2-4 E1, E4, E7 3-4
Bypass valve position switches/ZS-10140A1-E1, A2-E2	1-3
Mechanical trip interlock switch, overspeed trip switch, mechanical trip valve switch/ ZS-10125A, B, C	6-4
Fast-acting solenoid valve - intermediate valve/SV-10160A1, B1, A2-F2 Closing solenoid valve intercept valve/SV-10160 C1-F1	A1, A2, B1, B2 7-4 C1, C2 6-4 D1, D2 2-4 E1, E2, F1, F2 3-4
Combined intercept valve/XV-10160A-F	A, B 7-4 C 6-4 D 2-4 E, F 3-4
Servo valve - main stop valve/XV-10141A-D	6-3

TABLE C-1
(Continued)

PENNSYLVANIA POWER & LIGHT COMPANY
SUSQUEHANNA STEAM ELECTRIC STATION
NON-SAFETY CONTROL SYSTEMS COMPONENTS OUTSIDE CONTROL BUILDING

PRESSURE REGULATOR AND TURBINE GENERATOR CONTROL SYSTEM

COMPONENT IDENTIFICATION AND FUNCTION	LOCATION IN PLANT NOTE 1
Servo valve - intercept valve/SV-10161A,C,E	A 7-4 C 6-4 E 3-4
Servo valve - bypass valve/XV-10139A-E	1-3
Stator coolant low inlet pressure switch/ PSLL-10187	8-3

TABLE C-2

PENNSYLVANIA POWER & LIGHT COMPANY
SUSQUEHANNA STEAM ELECTRIC STATION
NON-SAFETY CONTROL SYSTEMS COMPONENTS OUTSIDE CONTROL BUILDING

TRAVERSING INCORE PROBE CONTROL SYSTEM

COMPONENT IDENTIFICATION AND FUNCTION	LOCATION IN PLANT NOTE 1
Drive mechanisms/J-001A-E	25-4
Purge valve/J-009	25-4
Chamber shields/J-005A-E	25-4
Guide tube assembly/J-004A-E	25-4
Indexing mechanisms/J-002A-E	26-2
Drywell penetrations/J-003A-E	26-3

TABLE C-3

PENNSYLVANIA POWER & LIGHT COMPANY
 SUSQUEHANNA STEAM ELECTRIC STATION
 NON-SAFETY CONTROL SYSTEMS COMPONENTS OUTSIDE CONTROL BUILDING

REACTOR WATER CLEANUP CONTROL SYSTEM

COMPONENT IDENTIFICATION AND FUNCTION	LOCATION IN PLANT NOTE 1
Reactor bottom head flow transmitter/FT-1N037	28-4
RWCS inlet flow transmitter/FT-1N036	28-5
RWCS blowdown flow transmitter/FT-1N012	28-5
RWCS return flow transmitter/FT-1N041	28-5
HV-1F033 flow control/PSL-1N013&PSH-1N014	28-5
RWCS pump cooling water temperature/TE-1N001A,B	A 28-5 B 25-5
RWCS pump hi temperature shutoff/TISH-1N002A,B	28-5
Filter demin inlet temperature/TE-1N007	28-5
Filter demin inlet high temperature shutoff/ TISH-1N008	28-5
RWC recirc. pump flow low/PDIS-1N025	28-5
RWCS return flow element/FE-1N040	28-5
RWCS flow to main condensor or liquid radwaste/ FE-1N011	25-5
Regen. ht. ex. tube Inlet flow/FE-1N035	28-5
Filter demin. inlet/outlet pressure differential/ PDIS-14587A,B	25-6
Filter demin. effluent strainer pressure differential/PDIS-14588A,B	25-6
E/P converter for filter demin. flow/FY-14590A,B	25-6
Flow to regen ht. exchange/FRCS-14574A,B	25-6

TABLE C-4

PENNSYLVANIA POWER & LIGHT COMPANY
 SUSQUEHANNA STEAM ELECTRIC STATION
 NON-SAFETY CONTROL SYSTEMS COMPONENTS OUTSIDE CONTROL BUILDING

RECIRCULATION FLOW CONTROL SYSTEM

COMPONENT IDENTIFICATION AND FUNCTION	LOCATION IN PLANT NOTE 1
Temperature switch high-high, MG set fluid drive oil/TSHH-14021 A2, B2	A2 11-4 B2 10-4
Level switch high-high feedwater heater train isolation 2-A, B, C/LSHH-10317 A2, B2, C2	A2 2-3 B2,C2 3-3
Level switch high-high feedwater heater train isolation 1-A, B, C/LSHH-10305 A2, B2, C2	A2 2-3 B2,C2 3-3
Pressure switch low, condensate pump discharge/PSL-10507 A,B,C,D	8-1
Flow transmitter, reactor feed pump discharge/FT-10604 A1, B1, C1	A1,B1 10-4 C1 11-4
Pressure switch low, MG set lube pump start/PSL-14030 A1, A2, B1, B2	A1,A2 11-4 B1,B2 10-4
Pressure switch low, MG set lube oil pump/PSL-14031 A, B	A 11-4 B 10-4
Pressure switch high, MG set lube oil pump permissive/PSH-14030 A, B	A 11-4 B 10-4
Temperature switch high, MG set motor cooling air out/TSH-14001 A, B	A 11-4 B 10-4
Temperature switch high, MG set generator cooling air out/TSH-14025A, B	A 11-4 B 10-4
Recirculation pump A, B suction valve position switch/ZS-14323 A, B	26-2
Recirculation pump A, B discharge valve position switch/ZS-14331A, B	26-2
Recirculation loop A, B discharge bypass valve position switch/ZS-14332A, B	26-2
Reactor runback feedwater flow/FE-1N001A,B,C	11-4

TABLE C-4
(Continued)

PENNSYLVANIA POWER & LIGHT COMPANY
SUSQUEHANNA STEAM ELECTRIC STATION
NON-SAFETY CONTROL SYSTEMS COMPONENTS OUTSIDE CONTROL BUILDING

RECIRCULATION FLOW CONTROL SYSTEM

COMPONENT IDENTIFICATION AND FUNCTION	LOCATION IN PLANT NOTE 1
Reactor vessel low level recirc/LIS-1N025A,B,C,D pump trip	A,B 29-5 C,D 27-5
Reactor vessel high pressure/PS-1N045A,B,C,D trip	A,B 29-5 C,D 27-5

TABLE C-5

PENNSYLVANIA POWER & LIGHT COMPANY
 SUSQUEHANNA STEAM ELECTRIC STATION
 NON-SAFETY CONTROL SYSTEMS COMPONENTS OUTSIDE CONTROL BUILDING

FEEDWATER CONTROL SYSTEM

COMPONENT IDENTIFICATION AND FUNCTION	LOCATION IN PLANT NOTE 1
Feedwater flow elements/FE-1N001 A,B,C	11-4
Feedwater flow transmitters/FT-1N002 A,B,C	11-4
Main steam flow elements/FE-1N051,2,3,4	26-4
Main steam flow transmitters/FT-1N003A,B,C,D	29-4
Reactor vessel level differential pressure transmitter/Pdt-1N004A,B,C	A,C 29-5 B 27-5
Reactor vessel pressure transmitter/PT-1N005	29-5
Reactor feed pump turbine (RFPT) electric automatic speed changer/LZ-12730A,B,C	A 10-2 B,C 11-2
RFPT solenoid valves/SV-12772A,B,C	A 10-2 B,C 11-2
Turbine first stage pressure transmitter/PT-1N007	5-3
Feedwater flow control/LY-10641	11-4
RFPT motor speed changers/HZ-12730A,B,C	11-2
RFPT solenoid valves/SV-12746A,B,C	A 10-2 B,C 11-2

TABLE C-6

PENNSYLVANIA POWER & LIGHT COMPANY
 SUSQUEHANNA STEAM ELECTRIC STATION
 NON-SAFETY CONTROL SYSTEMS COMPONENTS OUTSIDE CONTROL BUILDING

REACTOR MANUAL CONTROL SYSTEM

COMPONENT IDENTIFICATION AND FUNCTION	LOCATION IN PLANT NOTE 1
Flow element CRD/FE-1N003	29-4
Flow transmitter CRD/FT-1N004	29-4
Charging water header pressure transmitter/ PT-1N005	29-4
Flow element drive water header/FE-1N006	29-4
Flow transmitter drive water header/FT-1N007	29-4
Differential pressure CRD drive water/Pdt-1N008	29-4
Flow transmitter cooling water header/FT-1N009	29-4
Differential pressure CRD cooling water/Pdt-1N011	29-4
Pressure transmitter turbine first stage/ PT-1N054A,B	A 5-3 B 2-3
Level switch scram discharge volume/LSH-1N013E	29-4
Flow control station converter/LY-1K001	29-4
Flow element cooling water header/FE-1N010	29-4

TABLE C-7

PENNSYLVANIA POWER & LIGHT COMPANY
SUSQUEHANNA STEAM ELECTRIC STATION
NON-SAFETY CONTROL SYSTEMS COMPONENTS OUTSIDE CONTROL BUILDING

NUCLEAR PRESSURE RELIEF CONTROL SYSTEM

COMPONENT IDENTIFICATION AND FUNCTION	LOCATION IN PLANT NOTE 1
Temperature monitor SV discharge piping/ TE-1N004A-H, J-N, P,R,S	26-4
Reactor vessel pressure/PS-1N022A-H, J-N, P,R,S	29-5
Vibration transmitters/VT-140180A1-A8, B1-B8	26-4