

- NOTES:**
- DELETED.
 - AUTOMATIC TRANSFER WILL BE INITIATED IMMEDIATELY FOLLOWING GENERATION SYSTEM FAULTS AND TURBINE TRIPS RESULTING FROM VIBRATION, LOW VACUUM AND THRUST BEARING WEAR. ALL OTHER TURBINE TRIPS WILL BE DELAYED 30 SECONDS BEFORE TRANSFER.
 - THIS CIRCUIT BREAKER SUPPLIES ESSENTIAL SERVICE WATER LOADS.
 - DELETED.
 - EACH SINGLE PHASE TRANSFORMER WILL BE RATED 345KV, 533.3MVA. IMPEDANCE ON TRANSFORMER MVA BASE IS 9.10%.
 - SEE DRAWING E-U1001.
 - DELTA CONNECTED STABILIZING WINDING WILL NOT BE INCLUDED ON UNION ELECTRIC TRANSFORMER, PRIMARY WINDING WILL BE RATED 345KV.
 - THIS BREAKER IS TRIPPED BY THE LOAD SHEDDER/SEQUENCER FOLLOWING AN SIS OR ESSENTIAL BUS UNDERVOLTAGE SIGNAL.
 - TRY SURGE CAPACITORS MA05A, MA05B, MR02A AND MR02B SHALL BE RATED 13.8KV 1500F PER PHASE.
 - RETRANSFER TIME SETTING AT 2 MINUTES.
 - DELETED.
 - ALTERNATE EMERGENCY POWER SYSTEM (AEPS)-COOP WITH D/G BACKUP. SEE DRAWING 8600-X-90988.
 - ALTERNATE FLEX D/G CONNECTION. SEE DRAWING E-23PG17.

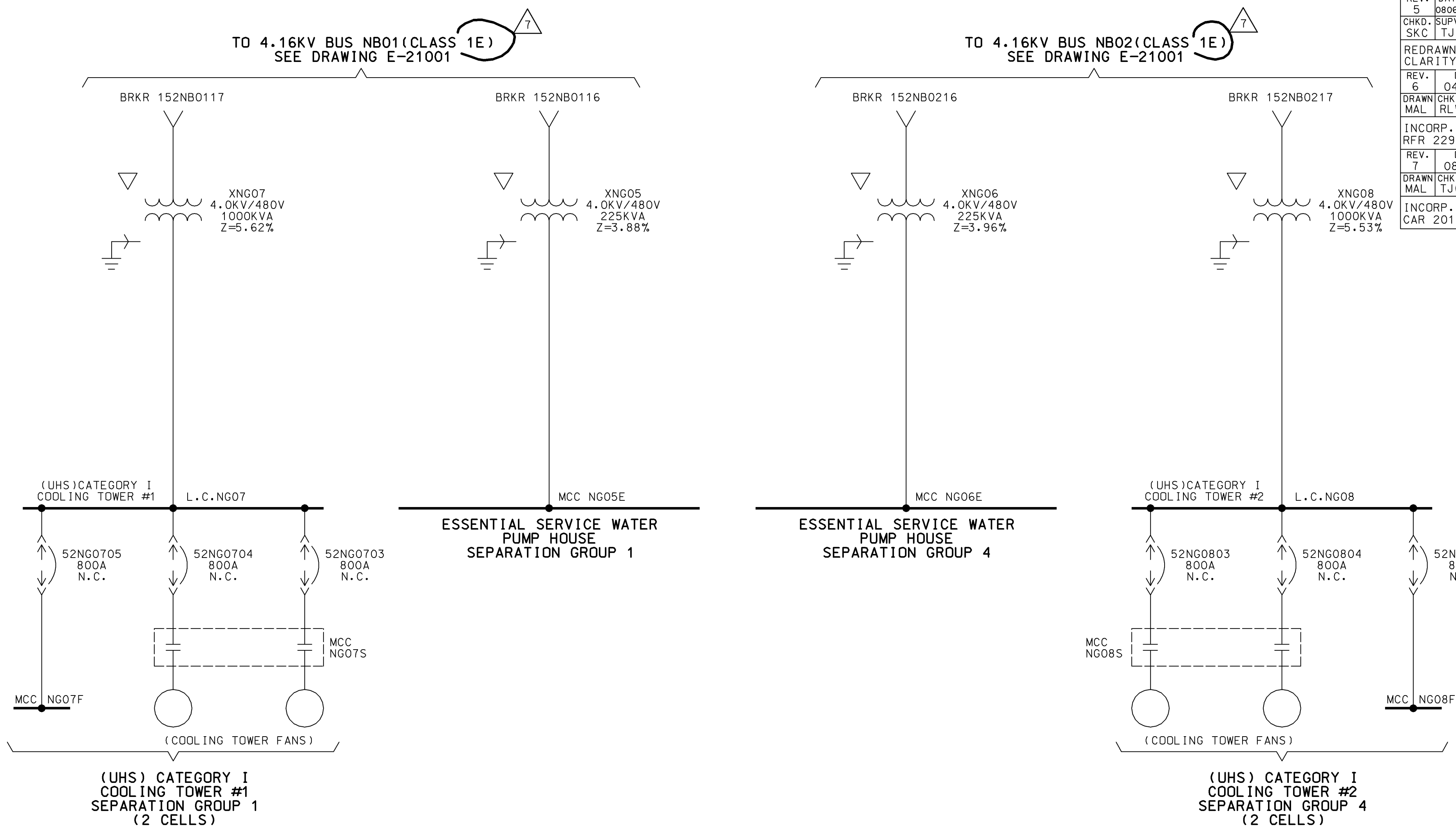
13.8KV			H.P.	BREAKER NO.	4.16KV			H.P.	BREAKER NO.	4.16KV			H.P.	BREAKER NO.
BUS PA01					CLASS 1E BUS NB01					BUS PB03				
REACTOR COOLANT PUMP DPBB01A			7000	252PA0107	RESIDUAL HEAT REMOVAL PUMP DPEJ01A			500	152NB0101	HEATER DRAIN PUMP DPAF01A			1500	152PB0303
REACTOR COOLANT PUMP DPBB01B			7000	252PA0108	SAFETY INJECTION PUMP DPDM01A			450	152NB0103	CONDENSATE PUMP DPAD01A			3500	152PB0304
BUS PA02					CENTRIFUGAL CHARGING PUMP DPBG05A			600	152NB0104	CONDENSATE PUMP DPAD01C			3500	152PB0305
REACTOR COOLANT PUMP DPBB01C			7000	252PA0205	COMPONENT COOLING WATER PUMP DPEG01A			700	152NB0107	CENTRAL CHILLER COMPRESSOR DSCB01A			927	152PB0302
REACTOR COOLANT PUMP DPBB01D			7000	252PA0204	COMPONENT COOLING WATER PUMP DPEG01C			700	152NB0108	NORMAL CHARGING PUMP DPBG04			600	152PB0301
					CONTAINMENT SPRAY PUMP DPEO1A			500	152NB0102	BUS PB04				
					AUXILIARY FEEDWATER PUMP DPAL01A			800	152NB0105	CONDENSATE PUMP DPAD01B			3500	152PB0403
					ESSENTIAL SERVICE WATER PUMP DPEF01A			1750	152NB0115	HEATER DRAIN PUMP DPAF01B			1500	152PB0404
					CLASS 1E BUS NB02					CENTRAL CHILLER COMPRESSOR DSCB01B			927	152PB0405
					RESIDUAL HEAT REMOVAL PUMP DPEJ01B			500	152NB0204	MOTOR DRIVEN FEEDWATER PUMP DPAE02			300	152PB0406
					SAFETY INJECTION PUMP DPDM01B			450	152NB0202					
					CENTRIFUGAL CHARGING PUMP DPBG05B			600	152NB0201					
					COMPONENT COOLING WATER PUMP DPEG01B			700	152NB0206					
					COMPONENT COOLING WATER PUMP DPEG01D			700	152NB0207					
					CONTAINMENT SPRAY PUMP DPEO1B			500	152NB0203					
					AUXILIARY FEEDWATER PUMP DPAL01B			800	152NB0205					
					ESSENTIAL SERVICE WATER PUMP DPEF01B			1750	152NB0215					

AS-BUILT CLASS 1

MAIN SINGLE LINE DIAGRAM

FSAR FIGURE 8.3-1 SHEET 1

DRWN	N/A	DATE		CLASS	
CHKD	N/A	DATE			
SUPV	N/A	DATE			
APPD	N/A	DATE	LOCATION	CALLAWAY ENERGY CENTER	
UNION ELECTRIC COMPANY				ST. LOUIS, MO	
E-21001(Q)				REV.	25



REV. 5	DATE 080693	DRAWN HLP
CHKD. SKC	SUPV. TJM	APPD. N/A
REDRAWN FOR CLARITY.		
REV. 6	DATE 041905	
DRAWN MAL	CHKD. RLW	SUPV. TWS
INCORP. RFR 22941A		
REV. 7	DATE 080311	
DRAWN MAL	CHKD. TJC	SUPV. TWS
INCORP. CAR 201101335.		

NOTES:

1. THE EQUIPMENT SHOWN IS FOR ONE UNIT.

AS-BUILT CLASS 1

DRAWN (DATE) N/A	SINGLE LINE DIAGRAM ESSENTIAL SERVICE WATER SYSTEM FSAR FIGURE 8.3-1 SHEET 2		
CHKD. (DATE) N/A			
SUPV. (DATE) N/A			
APPD. (DATE) N/A			
LOCATION	CALLAWAY ENERGY CENTER		CLASS
UNION ELECTRIC COMPANY ST. LOUIS, MO		E-U1001(Q)	REV. 7

FIGURE 8.3-1 (SHEET 3)
DELETED

FIGURE 8.3-1 (SHEET 4)
DELETED

(0)S0012-3

SAFETY RELATED LOAD GROUP 1

DESCRIPTION	EQUIPMENT NUMBER	LOAD SHED SIGNAL (NOTE 9)	VOLTAGE	BUS # & LOAD GRP.	LOAD NAME- PLATE RATING	LOCA TIME TO START (SEC) SEE NOTE1	LOOP TIME TO START (SEC) SEE NOTE1
COMPONENT COOLING WATER PP #1	DPEG01A	UV1A	4160 V	NB01 (1)	700 HP	5	5
COMPONENT COOLING WATER PP #3	DPEG01C	UV1B	4160 V	NB01 (1)	700 HP	---	---
CONTAINMENT SPRAY PP #1	DPEN01A	UV1B	4160 V	NB01 (1)	500 HP	NOTE 15	---
RESIDUAL HEAT REMOVAL PP #1	DPEJ01A	UV1A	4160 V	NB01 (1)	500 HP	10	MANUAL
ESSENTIAL SERVICE WATER PP #1	DPEF01A	UV1A	4160 V	NB01 (1)	1750 HP	20	20
CENTRIFUGAL CHARGING PP #1	DPBG05A	---	4160 V	NB01 (1)	600 HP	0	0
SAFETY INJECTION PP #1	DPEM01A	UV1B	4160 V	NB01 (1)	450 HP	5	---
AUXILIARY FEEDWATER PP #1	DPAL01A	UV1A	4160 V	NB01 (1)	800 HP	30	30
COOLING TOWER FAN #1	DCEF01A		480 V	MCC (1)	200/50 HP	NOTE 2	NOTE 2
COOLING TOWER FAN #3	DCEF01C		480 V	MCC (1)	200/50 HP	NOTE 2	NOTE 2
U.H.S. CLNG TWR.ELECT.RM.SUPPLY FAN GRP.1	DCGD02A	---	480 V	MCC (1)	3 HP	NOTE 11	NOTE 11
125 VOLT BATTERY CHARGER NK21	NK21	---	480 V	NG01 (1)	49 KW	0	0
125 VOLT BATTERY CHARGER NK23	NK23	---	480 V	NG03 (1)	49 KW	0	0
125 VOLT SWING BATTERY CHARGER NK25	NK25	---	480 V	NG01 (1)	1.7 KW	0	0
CONTAINMENT COOLER #1	DSGN01A	---	480 V	NG01 (1)	150/75 HP	35	35
CONTAINMENT COOLER #3	DSGN01C	---	480 V	NG03 (1)	150/75 HP	35	35
H2 RECOMBINER #1	SGS01A	---	480 V	NG03 (1)	75 KW	MANUAL (NOTES 13&21)	---
H2 MIXING FANS GRP. 1 (TWO FANS)	DCGN03A&C	---	480 V	MCC (1)	50/25 HP EACH	0	0
AUX.BLDG.PENETRATION RM. COOLERS GRP.1	DSGL15A	---	480 V	MCC (1)	20 HP	0	0
EMER.EXH.HEATING COIL & FAN GROUP.1	E6010A DCEG02A	---	480 V	MCC (1)	37 KW + 25 HP	0	NOTE 2
CONTROL RM. FILTRATION FAN GRP.1	DCGK03A	---	480 V	MCC (1)	5 HP	0	0
CONTROL RM. A/C GRP.1 (CPRSR & FAN)	SGK04A	---	480 V	NG01 (1)	48.6 KW + 40 HP	30	30
CLASS IE EQUIP.A/C UNIT GRP.1 (CPRSR & FAN)	SGK05A	---	480 V	MCC (1)	33.7 KW + 15 HP	30	30
DIESEL GEN. BLDG. SUPPLY FAN GRP.1 (NOTE 20)	DCGM01A	---	480 V	NG03 (1)	NOTE 22	0.7	0.7
HYDROGEN ANALYZER GRP.1	SGS02A	---	480 V	MCC (1)	1 HP	MANUAL	---
EMERGENCY FUEL OIL TRANSFER PP GRP.1	DPJE01A	---	480 V	MCC (1)	2.5 KW	0	0
FUEL POOL PUMP ROOM COOLER	DSGG04A	---	480 V	MCC (1)	3 HP	NOTE 11	NOTE 11
FUEL POOL COOLING PUMP #1	DPEC01A	UV1A	480 V	NG01 (1)	150 HP	MANUAL	MANUAL
DG A AUX. LUBE OIL PUMP GRP. 1	DPKJ03A	---	480 V	MCC (1)	15 HP	0	0
CLASS IE LOAD CENTER LOSSES GRP.1			4160 V	NB01 (1)	3225 KVA	0	0
AUX. FEEDWATER PP ROOM COOLER GRP.1	DSGF02A		480 V	MCC (1)	10 HP	NOTE 11	NOTE 11
AUX. BLDG. PUMP ROOM COOLERS GRP.1	NOTE 14	---	480 V	MCC (1)	55 HP	NOTE 11	NOTE 11
ESS. SERV. WATER PP HSE SUPPLY FAN GRP.1	DCGD01A	---	480 V	MCC (1)	20 HP	NOTE 11	NOTE 11
MCC DIST. PANELS GRP.1	---	---	120 V	MCC (1)	300 KVA	0	0
CONTROL ROOM PRESZN.SYSTEM (HEATER & FAN)	F6K02A DCEG04A	---	480 V	MCC (1)	15 KW + 7.5 HP	0	0
E.S.W. STRAINER #1	DPEF02A	---	480 V	MCC (1)	1.3 HP	NOTE 2	NOTE 2
MOTOR OPERATED VALVES GRP.1	---	---	480 V	MCC (1)	33.7 HP	0	0
ESW TRN A TO UHS HV	EFHV37	--	480V	MCC(1)	1.6 HP	20	20

SAFETY RELATED LOAD GROUP 2

DESCRIPTION	EQUIPMENT NUMBER	LOAD SHED SIGNAL (NOTE 9)	VOLTAGE	BUS # & LOAD GRP.	LOAD NAME- PLATE RATING	LOCA TIME TO START (SEC) SEE NOTE1	LOOP TIME TO START (SEC) SEE NOTE1
COMPONENT COOLING WATER PP #2	DPEG01B	UV2A	4160 V	NB02 (2)	700 HP	5	5
COMPONENT COOLING WATER PP #4	DPEG01D	UV2B	4160 V	NB02 (2)	700 HP	---	---
CONTAINMENT SPRAY PP #2	DPEN01B	UV2B	4160 V	NB02 (2)	500 HP	NOTE 15	---
RESIDUAL HEAT REMOVAL PP #2	DPEJ01B	UV2A	4160 V	NB02 (2)	500 HP	10	MANUAL
ESSENTIAL SERVICE WATER PP #2	DPEF01B	UV2A	4160 V	NB02 (2)	1750 HP	25	25
CENTRIFUGAL CHARGING PP #2	DPBG05B	---	4160 V	NB02 (2)	600 HP	0	0
SAFETY INJECTION PP #2	DPEM01B	UV2B	4160 V	NB02 (2)	450 HP	5	---
AUXILIARY FEEDWATER PP #2	DPAL01B	UV2A	4160 V	NB02 (2)	800 HP	30	30
COOLING TOWER FAN #2	DCEF01B		480 V	MCC (2)	200/50 HP	NOTE 2	NOTE 2
COOLING TOWER FAN #4	DCEF01D		480 V	MCC (2)	200/50 HP	NOTE 2	NOTE 2
U.H.S. CLNG TWR.ELECT.RM.SUPPLY FAN GRP. 2	DCGD02B	---	480 V	MCC (2)	3 HP	NOTE 11	NOTE 11
125 VOLT BATTERY CHARGER NK22	NK22	---	480 V	NG04 (2)	49 KW	0	0
125 VOLT BATTERY CHARGER NK24	NK24	---	480 V	NG02 (2)	49 KW	0	0
125 VOLT SWING BATTERY CHARGER NK26	NK26	---	480 V	NG04 (2)	1.7 KW	0	0
CONTAINMENT COOLER #2	DSGN01B	---	480 V	NG02 (2)	150/75 HP	35	35
CONTAINMENT COOLER #4	DSGN01D	---	480 V	NG04 (2)	150/75 HP	35	35
H2 RECOMBINER # 2	SGS01B	---	480 V	NG04 (2)	75 KW	MANUAL (NOTES 13&21)	---
H2 MIXING FANS GRP. 2 (TWO FANS)	DCGN03B&D	---	480 V	MCC (2)	50/25 HP EACH	0	0
AUX.BLDG.PENETRATION RM. COOLERS GRP. 2	DSGL15B	---	480 V	MCC (2)	20 HP	0	0
EMER. EXH. HEATING COIL & FAN GROUP. 2	E6010B DCEG02B	---	480 V	MCC (2)	37 KW + 25 HP	0	NOTE 2
CONTROL RM. FILTRATION FAN GRP. 2	DCGK03B	---	480 V	MCC (2)	5 HP	0	0
CONTROL RM. A/C GRP. 2 (CPRSR & FAN)	SGK04B	---	480 V	NG02 (2)	48.6 KW + 40 HP	30	30
CLASS IE EQUIP. A/C UNIT GRP. 2 (CPRSR & FAN)	SGK05B	---	480 V	MCC (2)	33.7 KW + 15 HP	30	30
DIESEL GEN. BLDG. SUPPLY FAN GRP. 2 (NOTE 20)	DCGM01B	---	480 V	NG04 (2)	NOTE 22	0.7	0.7
HYDROGEN ANALYZER GRP. 2	SGS02B	---	480 V	MCC (2)	1 HP	MANUAL	---
EMERGENCY FUEL OIL TRANSFER PP GRP. 2	DPJE01B	---	480 V	MCC (2)	2.5 KW	0	0
FUEL POOL PUMP ROOM COOLER	DSGG04B	---	480 V	MCC (2)	3 HP	NOTE 11	NOTE 11
FUEL POOL COOLING PUMP #2	DPEC01B	UV2A	480 V	NG02 (2)	150 HP	MANUAL	MANUAL
DG B AUX. LUBE OIL PUMP GRP. 2	DPKJ03B	---	480 V	MCC (2)	15 HP	0	0
CLASS IE LOAD CENTER LOSSES GRP. 2			4160 V	NB02 (2)	3225 KVA	0	0
AUX. FEEDWATER PP ROOM COOLER GRP. 2	DSGF02B		480 V	MCC (2)	10 HP	NOTE 11	NOTE 11
AUX. BLDG. PUMP ROOM COOLERS GRP. 2	NOTE 14	---	480 V	MCC (2)	55 HP	NOTE 11	NOTE 11
ESS. SERV. WATER PP HSE SUPPLY FAN GRP. 2	DCGD01B	---	480 V	MCC (2)	20 HP	NOTE 11	NOTE 11
MCC DIST. PANELS GRP. 2	---	---	120 V	MCC (2)	300 KVA	0	0
CONTROL ROOM PRESZN. SYSTEM (HEATER & FAN)	F6K02B DCEG04B	---	480 V	MCC (2)	15 KW + 7.5 HP	0	0
E.S.W. STRAINER #2	DPEF02B	---	480 V	MCC (2)	1.3 HP	NOTE 2	NOTE 2
MOTOR OPERATED VALVES GRP. 2	---	---	480 V	MCC (2)	34.3 HP	0	0
ESW TRN B TO UHS HV	EFHV38	--	480V	MCC(2)	1.6 HP	25	25

NOTES:

1. THE SAFETY ANALYSIS ASSUMES A 12 SEC. START TIME FOR THE DIESEL TO COME UP TO SPEED AND VOLTAGE AFTER DG START SIGNAL. HOWEVER THE START TIMES SHOWN ARE BASED ON STEP 0 FOR THE LOADS.

2. STARTS AND/OR STOPS AUTOMATICALLY BY A SIGNAL FROM PRESSURE OR TEMPERATURE SWITCH, OR MANUALLY OPERATED WHEN REQUIRED.

3. DELETED

4. DELETED

5. DELETED

6. SEQUENCER STARTS ONE OF THE TWO COMPONENT COOLING WATER PUMPS IN EACH LOAD GROUP AND 5 SECONDS LATER STARTS THE 2ND (STANDBY) PUMP IN THE SAME LOAD GROUP PROVIDED THE FIRST PUMP FAILED TO START SIMILAR SEQUENCE OF OPERATION IS PROVIDED FOR ESSENTIAL SERVICE WATER PUMPS.

7. DELETED

8. DELETED

9. "UV" SIGNALS SHED BOTH SAFETY AND NON-SAFETY RELATED LOADS UPON LOSS OF VOLTAGE ON D-G BUSES. THE "S" SIGNAL ORIGINATES WITHIN THE LOAD SHEDDER/SEQUENCER PANEL. THIS SIGNAL IS A DERIVATIVE OF THE SAFETY INJECTION SIGNAL (SIS) AND SERVES TO TRIP THOSE NON I.E. LOADS CONNECTED TO THE CLASS I.E. BUSES ON THE OCCURRENCE OF AN SIS.

10. DELETED.

11. STARTING OF A PUMP ROOM COOLER WILL BE INTERLOCKED WITH ITS RESPECTIVE PUMP MOTOR BREAKER.

12. DELETED

13. UNDER CERTAIN CIRCUMSTANCES THIS LOAD MAY BE CONNECTED TO THE BUS AND SINCE IT IS NOT SHED, THIS LOAD MUST BE CONSIDERED AS STARTING AT 0 SEC.

14. AUXILIARY BUILDING PUMP ROOM COOLERS ARE AS FOLLOWS:
PUMP SERVED EQUIPMENT NO. TIME TO START
GROUP 1/GROUP 2
CENT.CHARGING DSG12A/DSGL12B
SAFETY INJECTION DSGLO9A/DSGL09B
COMP.COOLING WTR DSG11A/DSGL11B
R.H.R. DSG10A/DSGL10B
CNTMT SPRAY DSG13A/DSGL13B

15. CONTAINMENT SPRAY PUMP STARTS AT 15 SEC. IF A CSAS IS PRESENT AT 15 SEC. OTHERWISE, CONTAINMENT SPRAY PUMP STARTS ANYTIME AFTER 41.5 SEC. WHEN A CSAS IS PRESENT.

16. E.S.W. PUMPHOUSE HEATERS ARE AS FOLLOWS:
GRP.1 EQUIP. NO.
GRP.2 EQUIP. NO.
EGD01A
EGD01C
EGD01E
EGD01G

17. DELETED.

18. DELETED

19. DELETED

20. THIS START TIME INCLUDES A TIME DELAY RELAY DELAY TIME DRAWING E-23GM01, E-23GM01A.

21. SUGGESTED START TIMES WERE REMOVED PER CAR 200609539.

22. THE BUFFALO FORGE-WESTINGHOUSE AND RELIANCE MOTORS ARE NAMEPLATED AT 100 HP; THE PMT-BALDOR MOTOR IS NAMEPLATED AT 150 HP.

NON-SAFETY RELATED LOAD GROUP 1

DESCRIPTION	EQUIPMENT NUMBER	LOAD SHED SIGNAL (NOTE 9)		VOLTAGE	BUS # & LOAD GRP.	LOAD NAME- PLATE RATING	LOCA TIME TO START (SEC) (SEE NOTE1)	LOOP TIME TO START (SEC) (SEE NOTE1)
		LOCA	BLACK- OUT ONLY					
INSTRUMENT AIR COMPRESSOR #1	DCKA01A	S-1	UV1B	480 V	NG03 (1)	259.3 HP	---	MANUAL
CRDM #4 COOLING FANS	DCGN01D	S-1	---	480 V	MCC (1)	35 HP	---	MANUAL
BORIC ACID TRANSFER PP #1	DPBG02A	S-1	---	480 V	MCC (1)	15.5 KW	---	MANUAL NOTE 21
PRESSURIZER HEATER BU GRP.1	---	S-1	UV1B	480 V	PG21 (1)	692 KW	---	MANUAL NOTE 21
INST. AC POWER 120 V. GRP.1	XPN07	---	---	480 V	MCC (1)	22½ KVA	0	0
125 V. BATTERY CHARGER PK21	PK21	S-1	UV1B	480 V	NG01 (1)	49 KW	MANUAL	MANUAL
125 V. BATTERY CHARGER PK23	PK23	S-1	UV1B	480 V	NG01 (1)	49 KW	MANUAL	MANUAL
BOP COMPUTER - GRP.1	P003	S-1	---	480 V	MCC (1)	35 KVA	---	MANUAL NOTE 21
P.P.HSE. (CLNG TOWER)STDBY AC LTG. GRP.1	XQB52	S-1	---	480 V	MCC (1)	30 KW	---	0
P.P.HSE. (CLNG TOWER) STDBY AC LTG.GRP.1	XQB50	S-1	---	480 V	MCC (1)	15 KVA	---	MANUAL
LOAD CENTER LOSSES GRP.1	XPG21			4160 V	NB01 (1)	750 KVA	---	MANUAL NOTE 21
E.S.W. UNIT HTRS. GRP.1	EOD02A&C	S-1	---	480 V	MCC (1)	40 KW	MANUAL	0
U.H.S. SUMP HTR. GRP.1	SEF02A&C	S-1	---	480 V	MCC (1)	6 KW EACH	MANUAL	0
U.H.S. CLNG.TWR.EQUIP.RM.SUMP PUMP	DPEF02A	S-1	---	480 V	MCC (1)	1.0 HP	MANUAL	0
E.S.W. PUMPHOUSE HTRS. GRP.1	NOTE 16	S-1	---	480 V	MCC (1)	70 KW	MANUAL	0
STANDBY A.C. LTG. GRP.1	---	S-1	---	480 V	MCC (1)	75 KW	---	0
POST ACCIDENT SAMPLING SYSTEM	XSJ01	S-1	--	480 V	MCC (1)	45 KVA	MANUAL	MANUAL

NON-SAFETY RELATED LOAD GROUP 2

DESCRIPTION	EQUIPMENT NUMBER	LOAD SHED SIGNAL (NOTE 9)	VOLTAGE	BUS # & LOAD GRP.	LOAD NAME- PLATE RATING	LOCA TIME TO START (SEC) SEE NOTE1	LOOP TIME TO START (SEC) SEE NOTE1
		LOCA BLACK-OUT ONLY					
INSTRUMENT AIR COMPRESSOR #2	DCKA01B	S-2 UV2B	480 V	NG04 (2)	259.3 HP	---	MANUAL
CRDM #2 COOLING FANS	DCGN01B	S-2 ---	480 V	MCC (2)	35 HP	---	MANUAL
BORIC ACID TRANSFER PP #2	DPBG02B	S-2 ---	480 V	MCC (2)	15.5 KW	---	MANUAL NOTE 21
PRESSURIZER HEATER BU GRP.2	---	S-2 UV2B	480 V	PG22 (2)	692 KW	---	MANUAL NOTE 21
INST. AC POWER 120 V. GRP.2	XPN08	---	480 V	MCC (2)	22½ KVA	0	0
125 V. BATTERY CHARGER PK22	PK22	S-2 UV2B	480 V	NG04 (2)	49 KW	MANUAL	MANUAL
125 V. BATTERY CHARGER PK24	PK24	S-2 UV2B	480 V	NG04 (2)	49 KW	MANUAL	MANUAL
BOP COMPUTER - GRP.2	P002	S-2 ---	480 V	MCC (2)	35 KVA	---	MANUAL NOTE 21
BORIC ACID FILTER TO CHARGING PUMP VALVE	BGHV8104	S-2 ---	480 V	MCC (2)	0.7 HP	---	---
P.P.HSE. (CLNG TOWER)STDBY AC LTG. GRP.2	XQB53	S-2 ---	480 V	MCC (2)	30 KW	---	0
P.P.HSE. (CLNG TOWER) STDBY AC LTG.GRP.2	XQB51	S-2 ---	480 V	MCC (2)	15 KVA	---	MANUAL
LOAD CENTER LOSSES GRP.2	XPG22		4160 V	NB02 (2)	750 KVA	---	MANUAL NOTE 21
E.S.W. UNIT HTRS. GRP.2	EOD02B&D	S-2 ---	480 V	MCC (2)	40 KW	MANUAL	0
U.H.S. SUMP HTR. GRP.2	SEF02B&D	S-2 ---	480 V	MCC (2)	6 KW EACH	MANUAL	0
U.H.S. CLNG.TWR.EQUIP.RM.SUMP PUMP	DPEF02B	S-2 ---	480 V	MCC (2)	1.0 HP	MANUAL	0
E.S.W. PUMPHOUSE HTRS. GRP.2	NOTE 16	S-2 ---	480 V	MCC (2)	70 KW	MANUAL	0
STANDBY A.C. LTG. GRP.11	---	S-2 ---	480 V	MCC (2)	60 KW	---	0
250 V. BATTERY CHARGER PJ31	PJ31	S-2 UV2B	480 V	NG02 (2)	65 KW	---	MANUAL NOTE 21
E.S.W. PUMPHOUSE MONORAIL HOIST	HKF41	S-2 ---	480 V	MCC (2)	10.5 HP	MANUAL	MANUAL

AS-BUILT

DRAWN N/A (DATE)

CHKD. N/A (DATE)

SUPV. N/A (DATE)

APPR. N/A (DATE)

LIST OF LOADS SUPPLIED BY EMERGENCY DIESEL GENERATOR

FSAR FIGURE 8.3-2

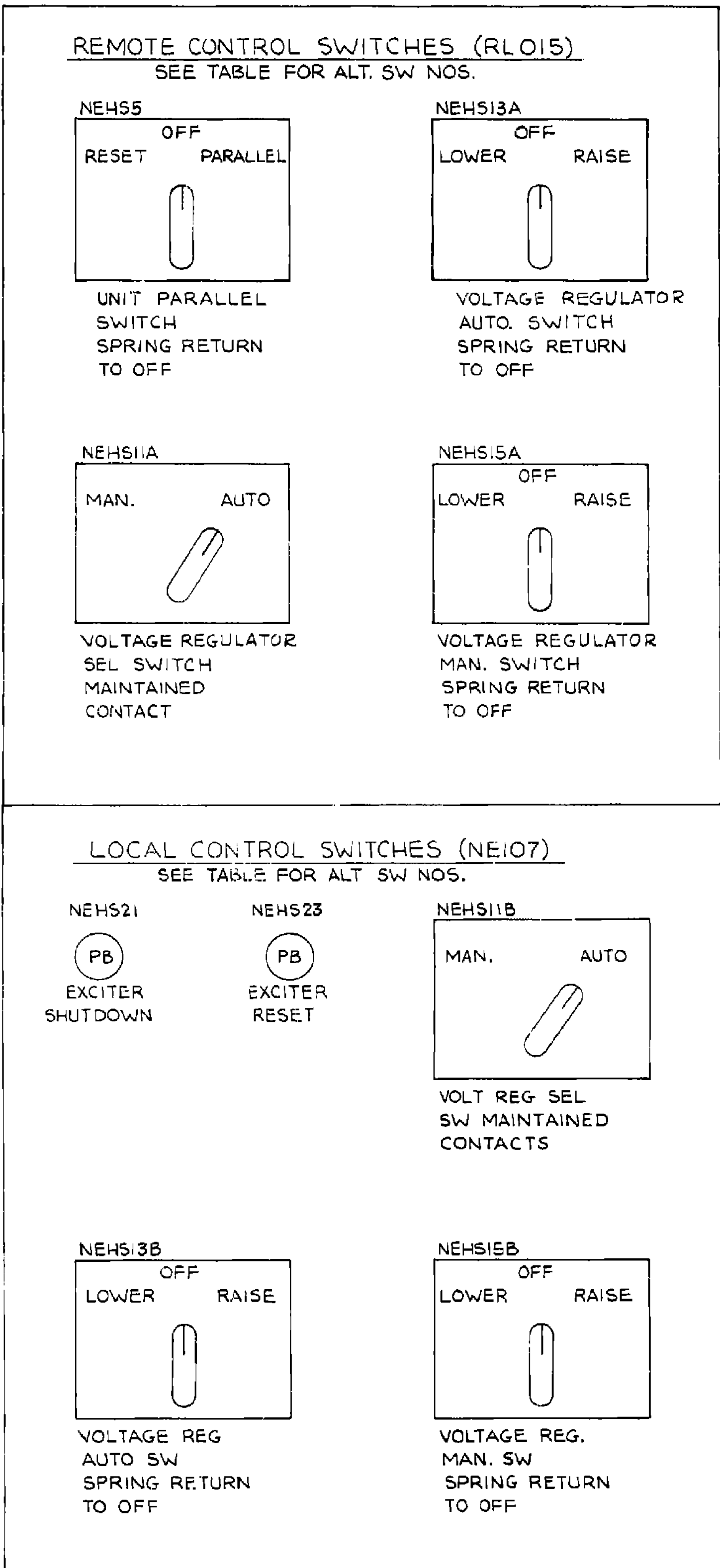
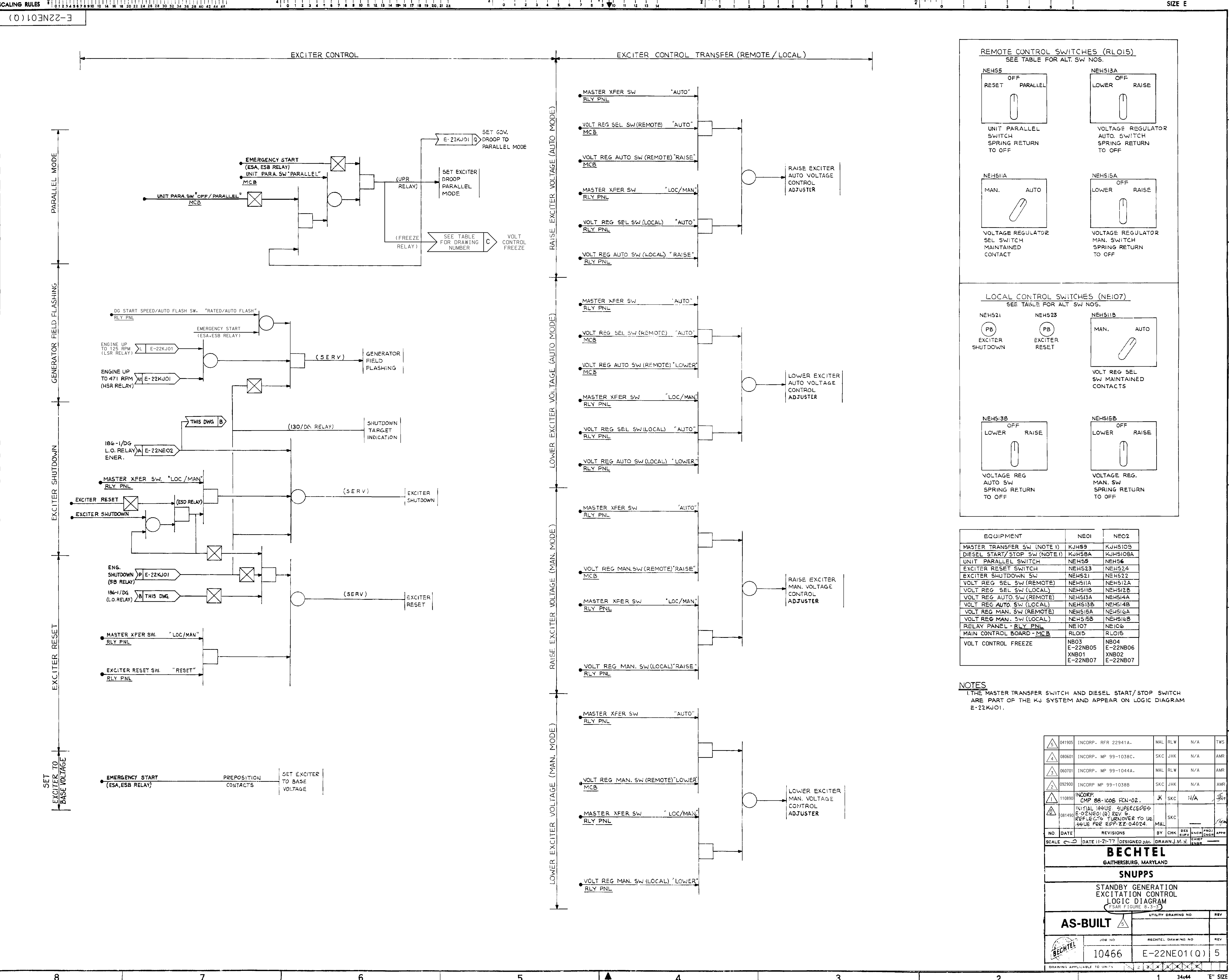
CALLAWAY ENERGY CENTER

UNION ELECTRIC COMPANY ST. LOUIS, MO

REV. 36

E-21005(Q)

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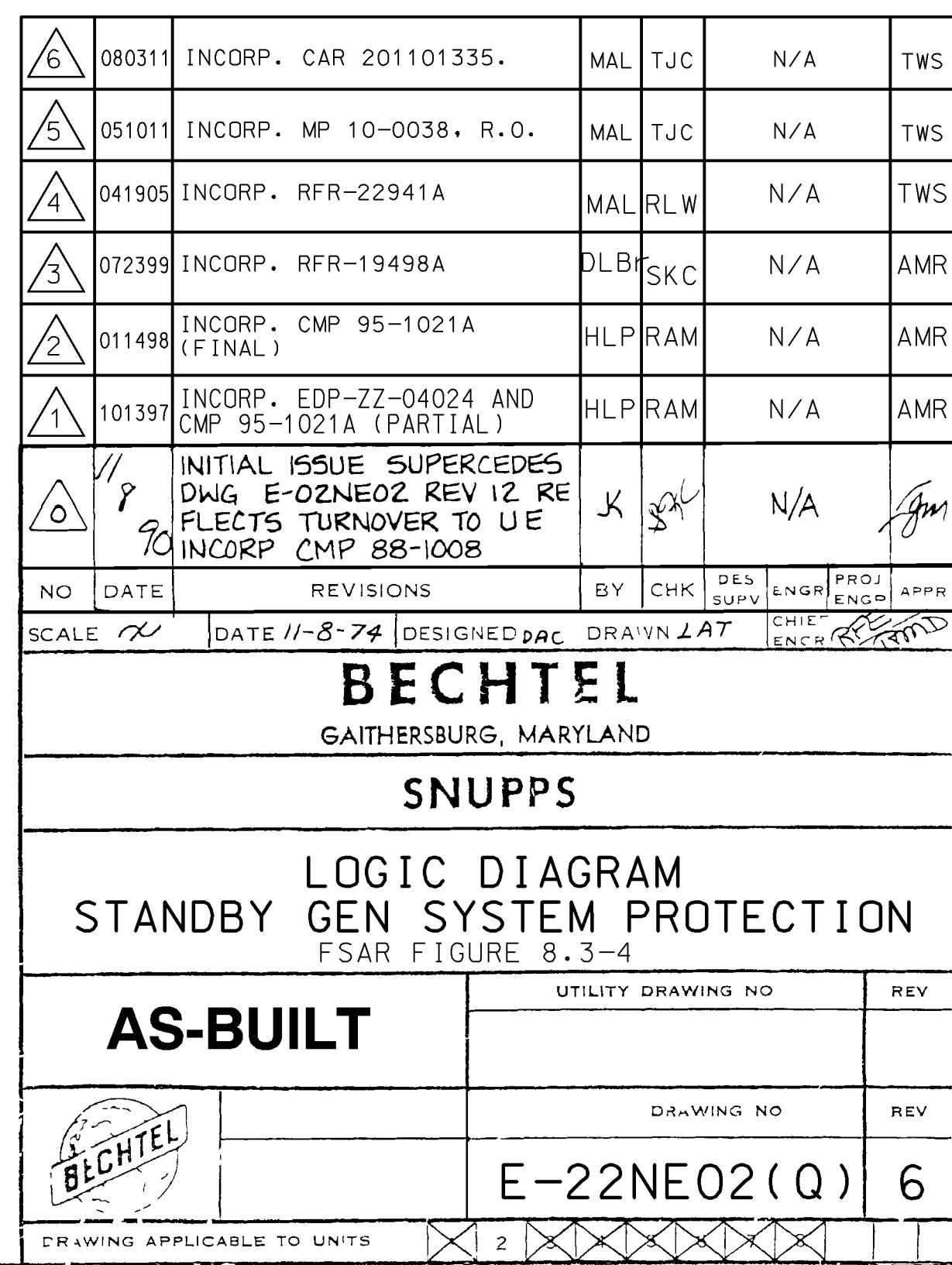


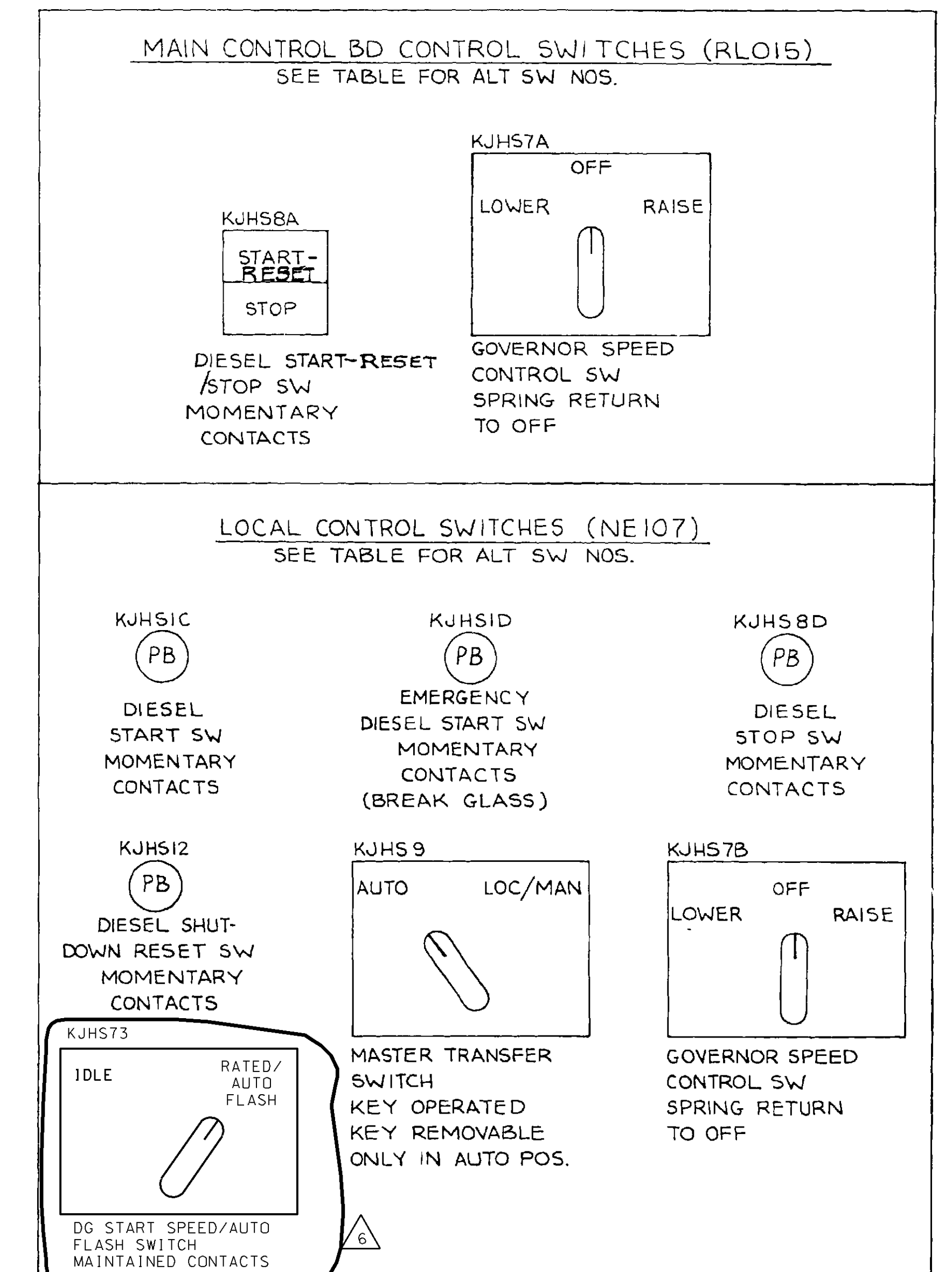
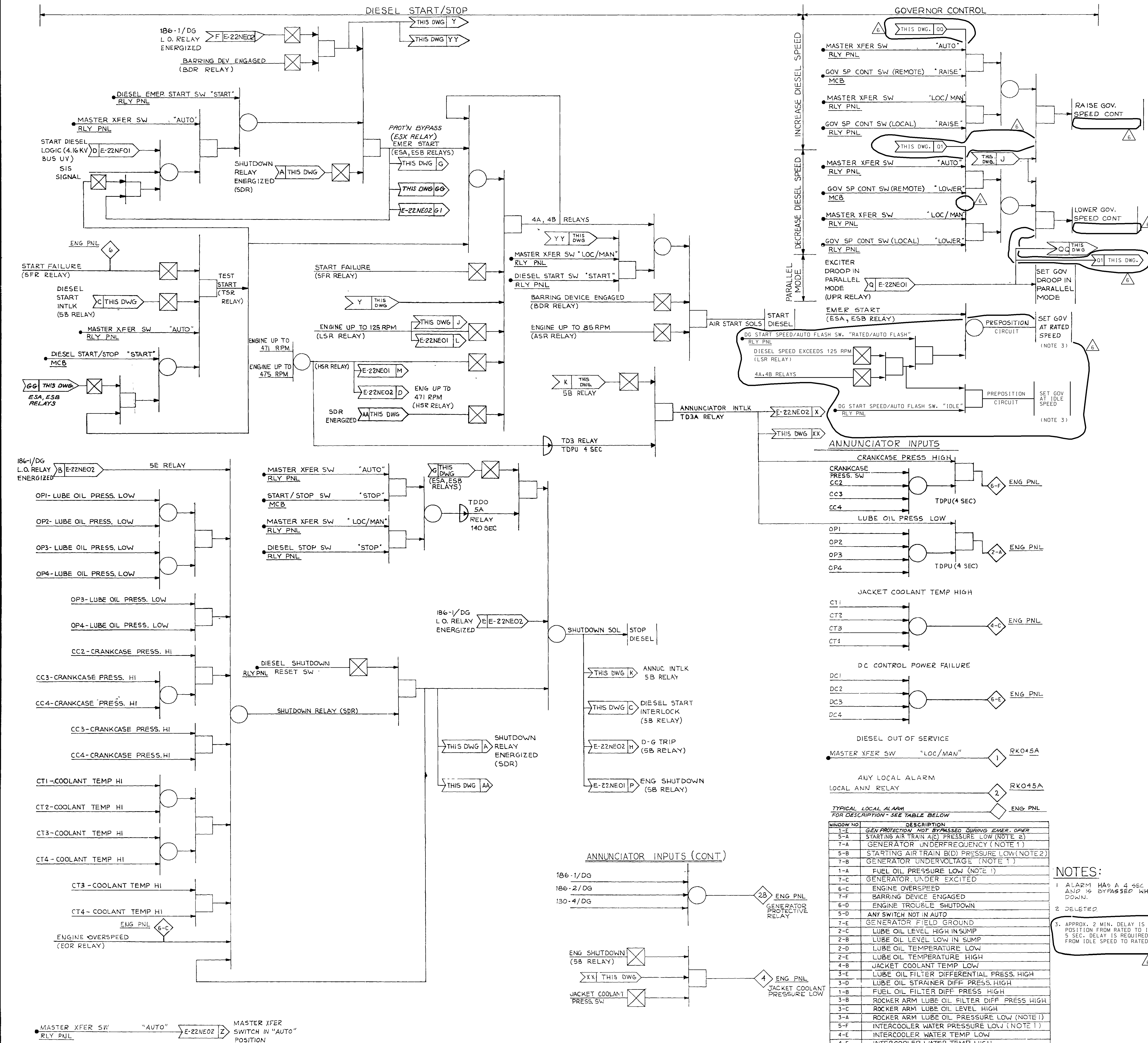
EQUIPMENT	NE01	NE02
MASTER TRANSFER SW (NOTE 1)	KJHS9	KJHS109
DIESEL START/STOP SW (NOTE 1)	KJHS8A	KJHS108A
UNIT PARALLEL SWITCH	NEHS5	NEHS6
EXCITER RESET SWITCH	NEHS23	NEHS24
EXCITER SHUTDOWN SW	NEHS21	NEHS22
VOLT REG SEL SW (REMOTE)	NEHS11A	NEHS12A
VOLT REG SEL SW (LOCAL)	NEHS11B	NEHS12B
VOLT REG AUTO SW (REMOTE)	NEHS13A	NEHS14A
VOLT REG AUTO SW (LOCAL)	NEHS13B	NEHS14B
VOLT REG MAN. SW (REMOTE)	NEHS15A	NEHS16A
VOLT REG MAN. SW (LOCAL)	NEHS15B	NEHS16B
RELAY PANEL - RLY PNL	NE107	NE106
MAIN CONTROL BOARD - MCB	RLO15	RLO15
VOLT CONTROL FREEZE	NB03 E-22NB05 XNB01 E-22NB07	NB04 E-22NB06 XNB02 E-22NB07

NOTES

1. THE MASTER TRANSFER SWITCH AND DIESEL START/STOP SWITCH ARE PART OF THE KJ SYSTEM AND APPEAR ON LOGIC DIAGRAM E-22KJ01.

5	041905	INCORP. RFR 22941A.	MAL	RLW	N/A	TWS
4	080601	INCORP. MP 99-1038C.	SKC	JHK	N/A	AMR
3	060701	INCORP. MP 99-1044A.	MAL	RLW	N/A	AMR
2	092900	INCORP. MP 99-1038B	SKC	JHK	N/A	AMR
1	110890	INCORP. CMP 88-1006 FCN-02.	J	SKC	N/A	AMR
0	081490	INITIAL ISSUE SUPERCEDES E-02NE01 (A) REV 6 REFLECTS TURNOVER TO US ISSUE PER EPP-EE-04024.	MAL	SKC		AMR
NO	DATE	REVISIONS	BY	CHK	DES SUPV	PROG ENGR
SCALE	DATE 11-21-77	DESIGNED DRC	DRAWN J.M.H.	ENGR	ENGR	
BECHTEL						
GAITHERSBURG, MARYLAND						
SNUPPS						
STANDBY GENERATION EXCITATION CONTROL LOGIC DIAGRAM						
FSAR FIGURE 8.3-3						
AS-BUILT			UTILITY DRAWING NO		REV	
JOB NO			BECHTEL DRAWING NO		REV	
10466			E-22NE01 (Q)		5	
DRAWING APPLICABLE TO UNITS						





EQUIPMENT DESCRIPTION	DIESEL KKJO1A	DIESEL KKJO1B
DIESEL START STOP SW	KJHS8A	KJHS108A
GOV. SPEED CONTROL SW (REMOTE)	KJHS7A	KJHS107A
GOV. SPEED CONTROL SW (LOCAL)	KJHS7B	KJHS107B
DIESEL START SW	KJHS1C	KJHS101C
DIESEL STOP SW	KJHS8D	KJHS108D
DIESEL EMERGENCY START	KJHS1D	KJHS101D
DIESEL SHUTDOWN RESET SW	KJHS12	KJHS102
MASTER TRANSFER SW	KJHS9	KJHS109
MAIN CONTROL BD - MCB	RL01S	RL01S
RELAY PANEL - RLY PNL	NE107	NE106
ENGINE PANEL - ENG PNL	KJ121	KJ122
AIR START SOLENOIDS	KJVP1A, 1B	KJVP101A, 101B
SHUTDOWN SOLENOIDS	KJVP18	KJVP1018
DC START SPEED/AUTO FLASH SW	KJHS73	KJHS173

CRANKCASE PRESSURE HIGH	LUBE OIL PRESSURE LOW	<u>ANNUNCIATOR WINDOWS</u>
6-F	2-A	
JACKET COOLANT TEMPERATURE HIGH	DC CONTROL POWER FAILURE	LOCAL <u>ENG PNL</u>
4-C	6-E	
DIESEL OUT OF SERVICE	ANY LOCAL ALARM	REMOTE <u>RKO45A</u>
1	2	

TYPICAL LOCAL ALARM FOR DESCRIPTION - SEE TABLE BELOW		ENG PN#
WINDOW NO	DESCRIPTION	
1-E	GEN PROTECTION NOT BYPASSED DURING EMER OPER	
5-A	STARTING AIR TRIN A(C) PRESSURE LOW (NOTE 2)	
7-A	GENERATOR UNDERFREQUENCY (NOTE 1)	
5-B	STARTING AIR TRIN B(D) PRESSURE LOW(NOTE 2)	
7-B	GENERATOR UNDERVOLTAGE (NOTE 1)	
1-A	FUEL OIL PRESSURE LOW (NOTE 1)	
7-C	GENERATOR UNDER EXCITED	
6-C	ENGINE OVERSPEED	
7-F	BARRING DEVICE ENGAGED	
6-D	ENGINE TROUBLE SHUTDOWN	
5-D	ANY SWITCH NOT IN AUTO	
7-E	GENERATOR FIELD GROUND	
2-C	LUBE OIL LEVEL HIGH IN SUMP	
2-B	LUBE OIL LEVEL LOW IN SUMP	
2-D	LUBE OIL TEMPERATURE LOW	
2-E	LUBE OIL TEMPERATURE HIGH	
4-B	JACKET COOLANT TEMP LOW	
3-E	LUBE OIL FILTER DIFFERENTIAL PRESS. HIGH	
3-D	LUBE OIL STRAINER DIFF. PRESS. HIGH	
1-B	FUEL OIL FILTER DIFF. PRESS. HIGH	
3-B	ROCKER ARM LUBE OIL FILTER DIFF. PRESS. HIGH	
3-C	ROCKER ARM LUBE OIL LEVEL HIGH	
3-A	ROCKER ARM LUBE OIL PRESSURE LOW (NOTE 1)	
5-F	INTERCOOLER WATER PRESSURE LOW (NOTE 1)	
4-E	INTERCOOLER WATER TEMP LOW	
4-F	INTERCOOLER WATER TEMP HIGH	
6-A	DIESEL START FAILURE	
4-D	JACKET COOLANT EXPANSION TANK LEVEL LOW	
1-C	FUEL OIL STRAINER DIFF. PRESS. HIGH	
6-B	DIESEL BEARING TEMP HIGH	
5-E	EXCITER PWR PT FUSE STATUS	
1-F	DCGM01A (DCGM01) VENTILATION SUPPLY FAN BREAKER TRIPPED	

NOTES:

1. ALARM HAS A 4 SEC DELAY TO ENERGIZE AND IS BYPASSED WHEN ENGINE IS SHUT DOWN.
2. DELETED.
3. APPROX. 2 MIN. DELAY IS REQUIRED TO PRE-POSITION FROM RATED TO IDLE SPEED. APPROX. 1 MIN. DELAY IS REQUIRED TO PRE-POSITION FROM IDLE SPEED TO RATED.


4	060701	INCORP. MP 99-1044A.	MAL	RLW	N/A	AMR
5	072299	INCORP. RFR-19498A	DLB	SKC	N/A	AMR
6	011498	INCORP. CMP 95-1021A (FINAL)	HLP	RAM	N/A	AMR
7	101397	INCORP. EDP-22-04024 AND CMP 95-1021A (PARTIAL)	HLP	RAM	N/A	AMR
8	8194	INCORP. RFR-19366A DEC. 0833.	MAL	SKC	N/A	AMR
9	07155	NITALE SUPERCEDES DUG. EXKONIDON. RE- FLECTS TURNOVER TO U.S. INCORP. RFR-00958A	SKC	SKC	N/A	AMR
NO DATE		REVISIONS	BY	CHK	ENGR	PROG
SCALE	2	DATE 11-01-77	DESIGNED	CHKD	ENGR	PROG
			DRYAN	LMH	CHIEF	

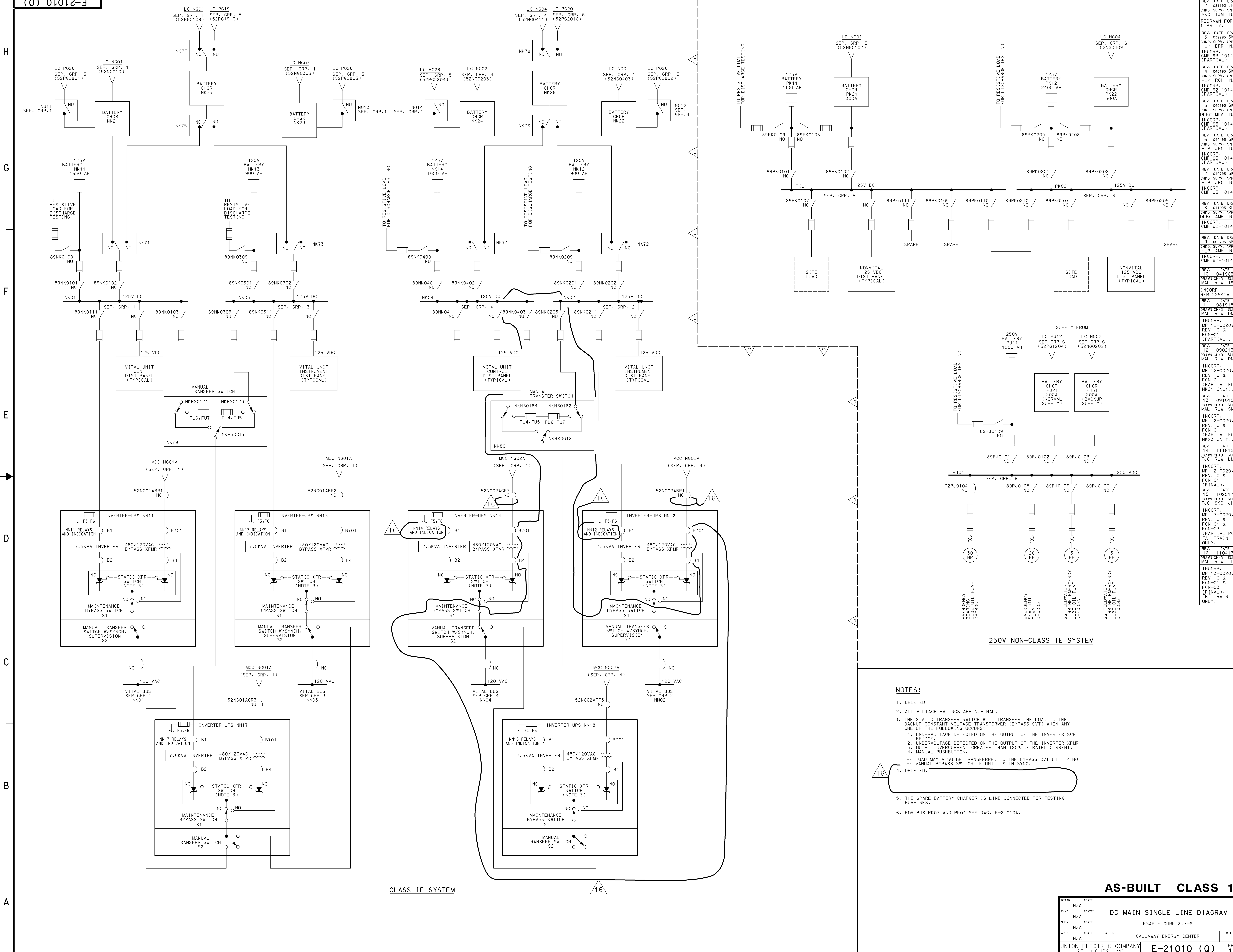
BECHTEL
GAITHERSBURG, MARYLAND

SNUPPS

STANDBY GENERATION ENGINE AND GOVERNOR CONTROL LOGIC DIAGRAM

AS-BUILT	UTILITY DRAWING NO.	

	JOB NO	BECHTEL DRAWING NO	
	10466	E-22KJ01 (Q)	



- NOTES:**
1. DELETED
 2. ALL VOLTAGE RATINGS ARE NOMINAL.
 3. THE STATIC TRANSFER SWITCH WILL TRANSFER THE LOAD TO THE BACKUP CONSTANT VOLTAGE TRANSFORMER (BYPASS CVT) WHEN ANY ONE OF THE FOLLOWING OCCURS:
 1. UNDERVOLTAGE DETECTED ON THE OUTPUT OF THE INVERTER SCR BRIDGE.
 2. UNDERVOLTAGE DETECTED ON THE OUTPUT OF THE INVERTER XFMR.
 3. OUTPUT OVERCURRENT GREATER THAN 120% OF RATED CURRENT.
 4. MANUAL PUSHBUTTON.
 4. DELETED.
- THE LOAD MAY ALSO BE TRANSFERRED TO THE BYPASS CVT UTILIZING THE MANUAL BYPASS SWITCH IF UNIT IS IN SYNC.
5. THE SPARE BATTERY CHARGER IS LINE CONNECTED FOR TESTING PURPOSES.
 6. FOR BUS PK03 AND PK04 SEE DWG. E-21010A.

AS-BUILT CLASS 1			
DC MAIN SINGLE LINE DIAGRAM			
FSAR FIGURE 8.3-6			
DRWN	N/A	DATE	
CHKD	N/A	DATE	
SUPV	N/A	DATE	
APPR	N/A	DATE	
UNION ELECTRIC COMPANY		ST. LOUIS, MO	
E-21010 (Q)		REV.	16

