CAR-2165-
G-ØØ41

VALVE & SPECIALTY SYMBOLS

- RAM SEAL VALVE
- FLOW SIGHT GAGE
- CURB BOX VALVE
- GATE VALVE
- GATE VALVE (DOUBLE DISC)
- NEEDLE VALVE
- GLOBE VALVE
- PLUG VALVE
- DIAPHRAGM VALVE
- BUTTERFLY VALVE
- REVERSE CURRENT VALVE
- CHECK VALVE
- MOTOR OPERATED VALVE
- PISTON OPERATED VALVE
- SOLENOID OPERATED VALVE
- THREE-WAY SOLENOID OPERATED VALVE
- AIR DIAPHRAGM OPERATED VALVE
- SELF CONTAINED REGULATOR
- POST INDICATOR
- VALVE WITH LEAKOFF CONNECTION
- EXTENSION STEM OPERATOR
- SAFETY AND RELIEF VALVE
- ANGLE VALVE
- THREE WAY VALVE
- FOUR WAY VALVE
- PROCESS ACTUATED OPERATOR WITH VALVE POSITIONER
- INSTRUMENT ACTUATED OPERATOR WITH VALVE POSITIONER
- NORMALLY CLOSED VALVE
- NORMALLY OPEN VALVE
- VALVE INSTALLED WITH FLOW OVER SEAT
- PACKLESS VALVE
- BALL VALVE
- FURNISHED BY EQUIPMENT MANUFACTURER OR NSSS VENDOR
- AUTOMATIC AIR VENT
- EQUIPMENT CONNECTION NUMBER
- SAMPLE VESSEL OR BOTTLE
- TURBINE STOP VALVE
- TURBINE GOVERNING CONTROL VALVE
- STOP CHECK VALVE
- FLOW METERING LOW LOSS TUBE OR VENTURI
- FLOW NOZZLE
- GEAR OPERATOR-MANUAL
- ELECTRO-HYDRAULIC OPERATOR
- EXCESS FLOW CHECK VALVE

- GUARD PIPE
- FOOT/FLOAT VALVE
- SLUICE GATE
- STRAINER
- Y-STRAINER
- FILTER
- THERMOWELL
- OPEN DRAIN OR FUNNEL
- STEAM TRAP
- ATMOSPHERIC VENT
- VACUUM BREAKER
- FIRE HYDRANT
- HOSE CONNECTION WITH HOSE(BY FIELD)
- PIPE PLUG
- SCREWED OR SOCKET WELDED CAP
- BUTT WELDED CAP
- FLOW RESTRICTION OR ORIFICE
- BLIND FLANGE OR TEMPORARY CONNECTION
- VESSEL MANWAY
- EXPANSION JOINT
- RUPTURE DISC
- PIPE-TO-TUBING ADAPTER
- EYEWASH & SHOWER
- GAS BOTTLE OR CYLINDER
- SPECTACLE FLANGE
- QUICK DISCONNECT COUPLING
- DIAPHRAGM SEAL
- HEATER STEAM OR ELECTRICAL
- LOOP SEAL (TRAP)
- SPARGER (INSIDE VESSELS)
- SPRAY NOZZLES (INSIDE VESSEL)
- MIXER (AIR OR ELECTRICAL)
- FLANGE CONNECTION (PIPING OR EQUIPMENT)
- JOHNSON SCREEN
- REDUCER
- EDUCTOR
- BLENDER
- FLEXIBLE CONNECTION
- MECHANICAL CONTAINMENT PENETRATION
- TEMPORARY STRAINERS: TEE TYPE, PLATE TYPE, CONE TYPE
- FLOW LIMITER
- THERMAL SLEEVE
- DRAIN POT
- PULSATION DAMPENER
- BREAK-DOWN ORIFICE
- PUMP BEDPLATE DRAIN
- SENSOR (BELLOWS TYPE SEAL)

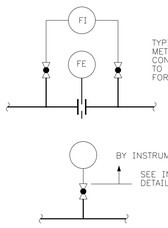
LINE CODING

- MAIN FLOW LINES (OUT OF SYSTEM DASHED)
- SECONDARY FLOW LINES (OUT OF SYSTEM DASHED)
- INSIDE / OUTSIDE — SHIELD WALL PENETRATION
- INSTRUMENT LINES (ELECTRICAL)
- INSTRUMENT LINES (IMPULSE)
- INSTRUMENT LINES (PNEUMATIC)
- FILLED BULB TEMPERATURE DETECTOR TUBE AND/OR CAPILLARY TUBING
- EBASCO / BY OTHERS — SPLIT OF RESPONSIBILITY (NSSS ONLY)
- SS | CS — MATERIAL TRANSITION
- PIPING FURNISHED WITH EQUIPMENT
- ELECTRICAL HEAT TRACING

VALVE & SPECIALTY DESIGNATIONS

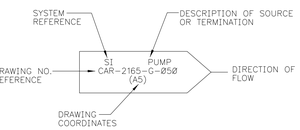
GATE VALVES	V
GLOBE VALVES	V
CHECK VALVES	V
REVERSE CURRENT VALVES	C
THREE-WAY VALVES	W
BUTTERFLY VALVES	B
PLUG VALVES	G
SAFETY AND RELIEF VALVES	R
EXPANSION JOINTS	J
TRAPS	T
STRAINERS	S
STRAINERS - SELF-CLEANING	E
NEEDLE VALVES	N
BALL VALVES	H
ANGLE VALVES	A
DIAPHRAGM VALVES	D
LEVEL CONTROL VALVES	L
PRESSURE CONTROL VALVES	P
TEMPERATURE-CONTROL VALVES	M
FLOW CONTROL VALVES	F
RESTRICTION ORIFICES	U
FLOW LIMITERS	K
MISCELLANEOUS	X
FLEXIBLE METAL HOSE	I
CURB BOX VALVE	Z

INSTRUMENTATION SYMBOLS



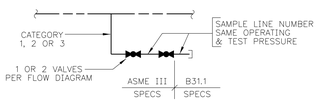
TYPICAL ONLY-ORIFICE TYPE FLOW METER. MAY HAVE FLANGE TAPS, VENA CONTRACTA TAPS OR OTHER. REFER TO ORIFICE SPECIFICATION SHEET FOR INSTALLATION REQUIREMENTS.

REFERENCE BLOCK



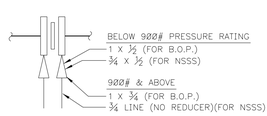
TYPICAL DETAIL

SAFETY CLASS OPEN-ENDED PIPING (DRAIN, VENT, SAMPLE CONN, TEST CONN, TEST VENT, ETC.)



TYPICAL ORIFICE FLANGE CONNECTION

FOR LINE & VALVE NUMBERS SEE RESPECTIVE DIAGRAMS



MEASURED VARIABLE (FIRST LETTER) / INSTRUMENT FUNCTION		CONTROLLING (SECOND AND THIRD LETTER)						MEASURING (SECOND AND THIRD LETTER)											
		RECORDING	INDICATING	NON INDICATING	CONTROL VALVE	SUMMER	SOLENOID	FUNCTION GENERATOR	RECORDING	INDICATING	OBSERVATION GLASS	PRIMARY ELEMENT	TEST POINT	TRANSMITTER	INTEGRATOR (TRANSMITTER)	AMPLIFIER	SAMPLER	INDICATING SWITCH	NON INDICATING SWITCH	ALARMS
		-RC	-IC	-C	-CV	-	-SE	-F	-R	-I	-G	-E	-X OR -W	-T	Q / QT	Am	Sm	IS	-S	-A
CONDUCTIVITY	C	CRC	CIC	-	CCV	-	-	-	CR	CI	-	CE	CX	-	-	-	CSm	CIS	CS	CA
DENSITY	D	DRC	DIC	DC	DCV	-	-	-	DR	DI	-	-	DX	-	-	-	-	DIS	DS	DA
DIFF PRESS	PD	PDRC	PDIC	PDC	PDCV	-	-	-	PDR	PDI	-	-	-	PDT	-	-	-	PDIS	PDS	PDA
FLOW	F	FRC	FIC	FC	FCV	F	FSE	Ff	FR	FI	FG	FE	FX	FT	FQ / FQT	-	-	FIS	FS	FA
MOISTURE	M	MRC	MIC	-	-	-	-	-	MR	MI	-	ME	-	-	-	-	-	-	-	-
HYDROGEN ION COND	pH	pHRC	pHIC	pHC	pHCV	-	-	-	pHR	pHI	-	pHE	pHX	-	-	pHAm	pHSm	-	-	pHA
LEVEL	L	LRC	LIC	LC	LCV	-	LSE	-	LR	LI	LG	LE	LX	LT	-	-	-	LIS	LS	LA
OXYGEN	O2	-	-	-	-	-	-	-	O2R	O2I	-	O2E	-	-	-	-	-	-	-	-
PRESSURE	P	PRC	PIC	PC	PCV	-	PSE	-	PR	PI	-	-	PX	PT	-	-	-	PIS	PS	PA
POSITION	Z	-	-	-	-	-	-	-	ZR	ZI	-	-	-	ZT	-	-	-	-	ZS	ZA
RADIATION	R	-	-	-	-	-	-	-	RR	RI	-	RE / REM	RX	-	-	RAm	RSm	-	RS	RA
SPEED	S	SPC	SIC	SC	-	-	-	-	SR	SI	-	SE	-	-	-	-	-	-	-	-
TEMPERATURE	T	TPC	TIC	TC	TCV	-	-	-	TR	TI	-	TE	TW	TT	-	-	-	TIS	TS	TA
HYDROGEN	H2																			
NITROGEN	N2																			
VIBRATION	V																			
HAND	H		HIC		HCV		HSE												HS	
WEIGHT OR FORCE	W																			
ANALYSIS	A											AE	AX	AT						
TIME	K																			
SELF REGULATING VALVE					RCV															
DIFFERENTIAL LEVEL	LD																		LDS	

MISCELLANEOUS ABBREVIATIONS

- T - CONTAINMENT ISOLATION TRIP SIGNAL PHASE A (S SIGNAL OR MANUAL)
- CA - CONTAINMENT AIR
- L.A.I. - LOCKED AS IS
- ECC - EMERGENCY COOLING CONNECTION
- BD - THERMAL REGENERATION SIGNAL
- BOP - BALANCE OF PLANT
- NR - NOT RELEASED
- NTS - NOT TO SCALE
- * - BY OTHERS
- BF - BY FIELD
- R - REMOTELY CONTROLLED FROM CONTROL ROOM
- ATM - ATMOSPHERE
- F.A.I. - FAIL AS IS
- F.C. - FAIL CLOSED
- F.O. - FAIL OPEN
- L.C. - LOCKED CLOSED
- L.O. - LOCKED OPEN
- N.C. - NORMALLY CLOSED
- N.O. - NORMALLY OPEN
- VH - VENT HEADER
- V - VENT TO ATMOSPHERE
- PV - PLANT VENT
- SSE - SAFE SHUTDOWN EARTHQUAKE
- MFIS - MAIN FEEDWATER ISOLATION SIGNAL
- MSIS - MAIN STEAM ISOLATION SIGNAL
- S - SAFETY INJECTION SIGNAL-PLACED AT EQUIPMENT & VALVE
- IMB - INSIDE MISSILE BARRIER
- OMB - OUTSIDE MISSILE BARRIER
- RR - REACH ROD REQUIRED
- P - CONTAINMENT ISOLATION TRIP PHASE B (HI-HI CONTAINMENT PRESS)
- IRC - INSIDE REACTOR CONTAINMENT
- ORC - OUTSIDE REACTOR CONTAINMENT
- DC - VITAL BATTERY SOURCE OF POWER

EQUIPMENT ABBREVIATIONS

- RWST - REFUELING WATER STORAGE TANK
- SRST - SPENT RESIN STORAGE TANK
- PRT - PRESSURIZER RELIEF TANK
- WHT - WASTE HOLDUP TANK
- CS - CONTAINMENT SUMP
- RHT - RECYCLE HOLDUP TANK
- CCDT - COMPONENT COOLING DRAIN TANK
- FDT - FLOOR DRAIN TANK
- BRP - BORON RECYCLE PANEL
- HX - HEAT EXCHANGER
- BIT - BORON INJECTION TANK
- RCPS - REACTOR CONTROL & PROTECTION SYSTEM
- RCDT - REACTOR COOLANT DRAIN TANK
- RMWST - REACTOR MAKE-UP WATER STORAGE TANK
- CST - CONDENSATE STORAGE TANK
- MSR - MOISTURE SEPARATOR REHEATER
- CRDM - CONTROL ROD DRIVE MECHANISM
- GSC - GLAND STEAM CONDENSER
- RCP - REACTOR COOLANT PUMP

PIPING SYSTEM DESIGNATIONS

SYSTEM LETTER	SYSTEM DESCRIPTION
AC	AUXILIARY STEAM CONDENSATE
AE	AIR EVACUATION
AF	AUXILIARY FEEDWATER
AS	AUXILIARY STEAM
ASI	ALTERNATE SEAL INJECTION
ACD	ACID-CAUSTIC DRAIN
BD	BLOWDOWN
BR	BORON RECYCLE
CA	CAUSTIC & ACID
CB	CONTAINMENT BLDG VACUUM RELIEF (HVAC)
CC	COMPONENT COOLING WATER
CCD	COMPONENT COOLING DRAIN
CE	CONDENSATE
CF	CHEMICAL FEED
CG	CARBON DIOXIDE
CH	CHILLED WATER SUPPLY (HVAC)
CL	CHLORINATION
CM	CONTAINMENT BLDG HYDROGEN CONTROL (HVAC)
CO	COMPRESSED AIR
CP	CONTAINMENT BLDG PURGE (HVAC)
CS	CHEMICAL & VOLUME CONTROL
CT	CONTAINMENT SPRAY
CW	CIRCULATING WATER
CX	CHILLED WATER RETURN (HVAC)
DW	DEMINERALIZED WATER
EA	EMERGENCY AIR
ED	EQUIPMENT DRAIN
ES	EXTRACTION STEAM
FD	FLOOR DRAIN
FM	PRIMARY FILTER MAKE-UP WATER
FO	FUEL OIL
FP	FIRE PROTECTION
FW	FEEDWATER
HD	HEATER DRAIN
HV	HEATER VENTS
HY	HYDROGEN
IA	INSTRUMENT AIR
LO	LUBE OIL
LT	LEAK RATE TESTING
LU	STEAM GENERATOR WET LAY-UP
MD	MISCELLANEOUS DRAINS
MP	MAKE-UP PLANT WATER
MS	MAIN STEAM
NI	NITROGEN
OX	OXYGEN
PM	PRIMARY MAKE-UP WATER
PP	PENETRATION PRESSURIZATION
PW	POTABLE WATER
RC	REACTOR COOLANT
RH	RESIDUAL HEAT REMOVAL
SA	SERVICE AIR
SC	SCREEN WASH
SDG	SHUTDOWN DIESEL GENERATOR
SF	SPENT FUEL POOL COOLING & CLEANUP
SI	SAFETY INJECTION
SP	SAMPLING (NUCLEAR), RADIATION MONITORING
SW	SERVICE WATER
TB	TOWER BLOWDOWN (COOLING TOWER)
VA	VACUUM SYSTEM (LABORATORIES)
VL	VALVE LEAKOFF
WC	WPB COOLING WATER
WCD	WPB COOLING WATER DRAIN
WG	WASTE PROCESSING (GAS)
WL	WASTE PROCESSING (LIQUID)
WS	SECONDARY WASTE TREATMENT
WSD	SECONDARY WASTE TREATMENT DRAIN

EQUIPMENT, VALVES, SPECIALTIES, PIPING & INSTRUMENTS NUMBERING

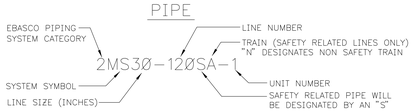
EQUIPMENT



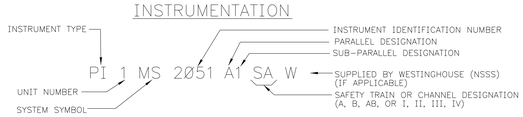
VALVES AND SPECIALTIES



PIPE

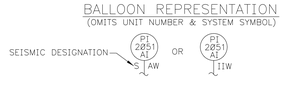


INSTRUMENTATION



BALLOON REPRESENTATION

(OMITS UNIT NUMBER & SYSTEM SYMBOL)

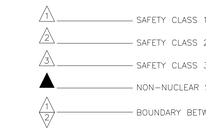


REFERENCE DRAWINGS

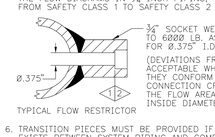
PIPING LINE LIST	CAR-1364-B-ØTØ
VALVE & SPECIALTY LIST	CAR-1364-B-Ø69
INSTRUMENT LIST	CAR-2166-B-432
INSTRUMENT INSTALLATION DETAILS	CAR-2166-B-431

GENERAL NOTES

1. ALL VENTS, DRAINS, AND TEST CONNECTIONS SHALL BE VALVED AS SHOWN ON FLOW DIAGRAM.
2. ALL VALVES PURCHASED WITH LEAKOFF CONNECTIONS SHALL BE PERMANENTLY PIPED TO THE APPROPRIATE DRAIN POINT OR CAPPED (AS REQUIRED).
3. THE SAFETY CLASS BOUNDARIES FOR PIPING AND VALVES ARE DESIGNATED BY THE FOLLOWING FLAGS:



4. SAFETY CLASS EQUIPMENT SHALL BE SHOWN WITH HATCH LINES ON GENERAL ARRANGEMENT DRAWINGS
5. IN SAFETY CLASS 1 PIPING, A FLOW RESTRICTION IS REQUIRED, (WATER LINES) AT LOCATIONS SPECIFICALLY INDICATED ON THE FLOW DIAGRAMS IN ¾ INCH PIPING, TO ALLOW TRANSITION FROM SAFETY CLASS 1 TO SAFETY CLASS 2



(DEVIATIONS FROM THIS DESIGN ARE ACCEPTABLE WHERE NECESSARY PROVIDED THEY CONFORM TO PIPE BRANCH CONNECTION CRITERIA AND RESTRICT THE FLOW AREA BY REDUCING THE INSIDE DIAMETER TO Ø.375".)

TYPICAL FLOW RESTRICTOR

6. TRANSITION PIECES MUST BE PROVIDED IF A SCHEDULE DIFFERENCE EXISTS BETWEEN SYSTEM PIPING AND COMPONENTS. IT IS NOT ACCEPTABLE TO USE COMPONENTS AS THE TRANSITION. THE HEAVIER WALL SCHEDULE MUST BE USED FOR THE TRANSITION PIPE AND ONE END SHALL BE MACHINED TO MATCH THE LESSER WALL SCHEDULE.
7. INSTRUMENTATION SHOWN ON FLOW DIAGRAMS REPRESENT ONLY THE INSTRUMENT PRIMARY ELEMENT. FOR THE COMPLETE INSTRUMENT LOOP AND INTERLOCKS, SEE THE CORRESPONDING Ø FLOW DIAGRAM OR APPROPRIATE INSTRUMENT INSTALLATION DETAILS CAR-2166-B-431. CLASSIFICATION OF INSTRUMENTATION IS DEFINED ON CAR-2166-B-431.
8. FLOW DIAGRAMS PROVIDE A FUNCTIONAL REPRESENTATION OF THE SYSTEM. VALVE AND LINE NUMBERS/SIZES, INSTRUMENTATION DETAILS, CLASS BREAKS AND FLOWPATHS ARE DEPICTED TO PROVIDE AN ACCURATE REPRESENTATION OF DESIGN FUNCTIONS. THE PLANT PHYSICAL ARRANGEMENT MAY DIFFER FROM THAT DEPICTED BY THE FLOW DIAGRAM.

REV	DATE	DESCRIPTION	DWN	CHK	APPR'D
13		INCORPORATED: EC 294610 (A3)			ELECTRONICALLY SIGNED
12		INCORPORATED: EC 78Ø36 (J8,K11)			ELECTRONICALLY SIGNED
11		THIS DRAWING HAS BEEN REVISED PER EC# 59498			ELECTRONICALLY SIGNED
1Ø	3/6/97	THIS DRAWING HAS BEEN ELECTRONICALLY REDRAWN WITHOUT DESIGN CHANGE	LLS	RPP	DLS / DLS

THIS DRAWING HAS BEEN PRODUCED AND IS CONTROLLED ON THE NED CAD/E SYSTEM. ANY REVISIONS TO THIS DOCUMENT SHOULD BE DONE USING THE CAD/E SYSTEM TO ASSURE PROPER CONTROL OF THE ELECTRONIC DRAWING DATABASE.

NUCLEAR SAFETY RELATED (Q-LIST)
YES ☐ NO ☐ PARTIAL ☐ F.P.-Q ☐ R.W.-Q ☐


DUKE ENERGY
NUCLEAR ENGINEERING DEPARTMENT - RALEIGH, N.C.

PLANT: HARRIS NUCLEAR PROJECT - UNIT 1
SCALE: NONE

TITLE: FLOW DIAGRAM LEGEND PIPING & INSTRUMENTATION SYMBOLS

DWG NO. CAR-2165-G-ØØ41

CAR-2165
G-Ø42



TABULATION OF MAIN STEAM DRIP LEG PIPING (B19)(G18)

(I) VALVE NO	(P) VALVE NO	(R) LINE NO	(Z) VALVE NO	(Y) VALVE NO	(X) LINE NO	(W) VALVE NO	(T) VALVE NO	(S) VALVE NO	(A) SOURCE LINE NO	(B) DRIP LEG LINE NO	DETAIL	(C) LINE NO	(D) LINE NO	(E) LINE NO	(F) VALVE NO	(G) VALVE NO	(H) LINE NO	(J) LEVEL SWITCH NO	(K) VALVE NO	(L) LCV VALVE NO	(M) LCV VALVE NO	(N) LINE NO	(O) VALVE NO	(Q) VALVE NO	(AA) VALVE NO	(BB) LINE NO	(CC) VALVE NO	(DD) LINE NO	(EE) VALVE NO	(FF) TRAP NO
—	—	—	—	—	—	—	—	—	5MS24-15-1	5MS12-168-1	2	—	—	5MS2-215-1	—	—	—	LS Ø411A	5MS-V139-1	LCV Ø411A	5MS-L1-1	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	5MS24-14-1	5MS12-167-1	2	—	—	5MS2-214-1	—	—	—	LS Ø411B	5MS-V14Ø-1	LCV Ø411B	5MS-L2-1	—	—	—	—	—	—	—	—	—
						3MS-V1Ø4SB-1			3MS6-223SAB-1	3MS6-166SAB-1	3	3MS2-169SAB-1	3MS2-212SAB-1		3MS-V58SAB-1										3MS-U7SAB-1	3MS¾-3Ø8SAB-1	3MS-V263SAB-1	3MS¾-3Ø1SAB-1	3MS-V252SAB-1	3MS-T4SAB-1
2MS-V189SA-1	2MS-V19ØSA-1	2MS1/2-259SA-1	2MS-V169SA-1	2MS-V168SA-1	2MS1-246SA-1	2MS-V1Ø1SA-1	2MS-V134SA-1	2MS-V129SA-1	2MS34-235SA-1	2MS12-122SA-1	1	2MS2-131SA-1	2MS2-14ØSA-1	5MS2-144-1	2MS-V93SA-1	2MS-V59SAB-1	2MS1-159SA-1	LS Ø3Ø9A-S	5MS-V142-1	LCV Ø3Ø9A	5MS-L4-1	2MS1-154SA-1	2MS-V62SA-1	2MS-V7ØSA-1	5MS-V2Ø8-1	5MS2-264-1	5MS-V199-1	—	—	—
2MS-V191SB-1	2MS-V192SB-1	2MS1/2-26ØSB-1	2MS-V171SB-1	2MS-V17ØSB-1	2MS1-247SB-1	2MS-V1Ø2SB-1	2MS-V135SB-1	2MS-V13ØSB-1	2MS34-236SB-1	2MS12-123SB-1	1	2MS2-132SB-1	2MS2-141SB-1	5MS2-145-1	2MS-V55SB-1	2MS-V6ØSAB-1	2MS1-16ØSB-1	LS Ø3Ø9B-S	5MS-V143-1	LCV Ø3Ø9B	5MS-L5-1	2MS1-155SB-1	2MS-V63SB-1	2MS-V71SB-1	5MS-V2Ø9-1	5MS2-265-1	5MS-V2ØØ-1	—	—	—
2MS-V193SA-1	2MS-V194SA-1	2MS1/2-261SA-1	2MS-V173SA-1	2MS-V172SA-1	2MS1-248SA-1	2MS-V1Ø3SA-1	2MS-V136SA-1	2MS-V131SA-1	2MS34-237SA-1	2MS12-124SA-1	1	2MS2-133SA-1	2MS2-142SA-1	5MS2-146-1	2MS-V56SA-1	2MS-V61SAB-1	2MS1-161SA-1	LS Ø3Ø9C-S	5MS-V144-1	LCV Ø3Ø9C	5MS-L6-1	2MS1-156SA-1	2MS-V64SA-1	2MS-V72SA-1	5MS-V21Ø-1	5MS2-266-1	5MS-V2Ø1-1	—	—	—
						3MS-V1Ø5SAB-1			3MS6-223SAB-1	3MS6-13ØSAB-1	3	3MS2-134SAB-1	3MS2-143SAB-1		3MS-V57SAB-1										3MS-U8SAB-1	3MS¾-3Ø9SAB-1	3MS-V264SAB-1	3MS¾-3Ø2SAB-1	3MS-V253SAB-1	3MS-T5SAB-1
—	—	—	—	—	—	—	—	—	5MS32-4-1	5MS12-125-1	2	—	—	5MS2-148-1	—	—	—	LS Ø31ØA	5MS-V146-1	LCV Ø31ØA	5MS-L8-1	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	5MS32-3-1	5MS12-126-1	2	—	—	5MS2-149-1	—	—	—	LS Ø31ØB	5MS-V147-1	LCV Ø31ØB	5MS-L9-1	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	5MS32-6-1	5MS12-127-1	2	—	—	5MS2-15Ø-1	—	—	—	LS Ø31ØC	5MS-V148-1	LCV Ø31ØC	5MS-L1Ø-1	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	5MS44-8-1	5MS12-128-1	2	—	—	5MS2-151-1	—	—	—	LS Ø41ØA	5MS-V149-1	LCV Ø41ØA	5MS-L11-1	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	5MS44-9-1	5MS12-129-1	2	—	—	5MS2-152-1	—	—	—	LS Ø41ØB	5MS-V15Ø-1	LCV Ø41ØB	5MS-L12-1	—	—	—	—	—	—	—	—	—

NOTES:

1. ELECTRO-HYDRAULIC OPERATOR
2. LOCALLY MOUNTED MANUAL HYDRAULIC OPERATORS FOR USE DURING LOSS OF POWER.

REFERENCE DRAWINGS

PIPING LINE LIST — CAR-1364-B-Ø7Ø
VALVE & SPECIALITY LIST — CAR-1364-B-Ø69
INSTRUMENT LIST — CAR-2166-B-432
FLOW DIAGRAM LEGEND — CAR-2165-G-Ø41

REV	DATE	DESCRIPTION	DWN	CHK	DPPE
38		INCORPORATED: EC# 284723, 279938 (A1Ø,A15)	ELECTRONICALLY SIGNED		
37		INCORPORATED: EC# 749Ø7 (A17,B1Ø,B14,E13-E16)	ELECTRONICALLY SIGNED		
36		INCORPORATED: EC# 61953 (B12)	ELECTRONICALLY SIGNED		
35	9/23/Ø1	INCORPORATED: ESR ØØ-ØØ264 (G11,G12,H1Ø-H12,I1Ø-,I12)	ARM	JWB	DLS
34	12/3Ø/99	INCORPORATED: ESR 95-ØØ153 (D2,H2,K2)	ARM	RPP	DLS

THIS DRAWING HAS BEEN PRODUCED AND IS CONTROLLED ON THE NED CAD/E SYSTEM. ANY REVISIONS TO THIS DOCUMENT SHOULD BE DONE USING THE CAD/E SYSTEM TO ASSURE PROPER CONTROL OF THE ELECTRONIC DRAWING DATABASE.

NUCLEAR SAFETY RELATED (Q-LIST)
YES ■ NO □ PARTIAL ■ F.P.-Q □ R.W.-Q □

CAROLINA POWER & LIGHT COMPANY
NUCLEAR ENGINEERING DEPARTMENT - RALEIGH, N.C.
CP&L
PLANT: HARRIS NUCLEAR PROJECT - UNIT 1
SCALE: NONE

TITLE: FLOW DIAGRAM MAIN STEAM SYSTEM UNIT 1

DWG NO. CAR-2165 G-Ø42

CAR-2165
G-Ø43

HIGH PRESSURE TURBINE

10TH STG
6TH STG
6TH STG

L.P.TURBINE A

L.P.TURBINE B

MOISTURE SEPARATOR-REHEATER 1A-NNS

MOISTURE SEPARATOR-REHEATER 1B-NNS

REHEAT STOP VALVE (TYP)

REHEAT INTERCEPT VALVE (TYP)

REFERENCE DRAWINGS

PIPING LINE LIST — CAR-1364-B-Ø7Ø
VALVE & SPECIALTY LIST — CAR-1364-B-Ø69
INSTRUMENT LIST — CAR-2166-B-432
FLOW DIAGRAM LEGEND — CAR-2165-G-Ø41

LEGEND

⬡ DENOTES VENDORS CONN. ON CONDENSER

□ DENOTES VENDORS CONN. ON TURBINE

NOTE:

1. ISOKINETIC SAMPLING NOZZLE LOCATION (DUAL-NOZZLE MULTI.-PORT TYPE)
2. 6ES-V22-1 IS CLOSED (NOT LOCKED OPEN) DURING NORMAL OPERATION (EC79388)
3. SEE SHEET 1 FOR DETAILS

L.P.HEATER 1 1A-NNS

L.P.HEATER 1 1B-NNS

H.P.HEATER 5 1A-NNS

H.P.HEATER 5 1B-NNS

L.P.HEATER 4 1A-NNS

L.P.HEATER 4 1B-NNS

L.P.HEATER 3 1A-NNS

L.P.HEATER 3 1B-NNS

L.P.HEATER 2 1A-NNS

L.P.HEATER 2 1B-NNS

CONDENSER 1X-NNS

ZONE 1

ZONE 2

L.P. TURBINE A

L.P. TURBINE B

VALVES & TUBING BY I&C

HOTWELL

REV	DESCRIPTION	DWN	CHK	APPROVED
3Ø	INCORPORATED: EC 284723 (B9-B15), MOVED TYPICAL DETAILS TO 5-G-0043 SØ1	ELECTRONICALLY SIGNED AND DATED		
29	INCORPORATED: EC 74907 REV. 27 (E9,E12)	ELECTRONICALLY SIGNED AND DATED		
28	INCORPORATED: EC 74907 REV. 25 (M7,N7)	ELECTRONICALLY SIGNED AND DATED		
27	INCORPORATED: EC 74907 (B2-B4,B1Ø, B11,B13,B14,C2-C4,D3,D4,D9,D1Ø,D12-D14,E3, E9-E15,H1Ø-H15,I1Ø-I15,J1Ø-J15,K1Ø-K14)	ELECTRONICALLY SIGNED AND DATED		
26	INCORPORATED: EC 81209 (H8-H9,G8,G9,G16-G18)	ELECTRONICALLY SIGNED AND DATED		

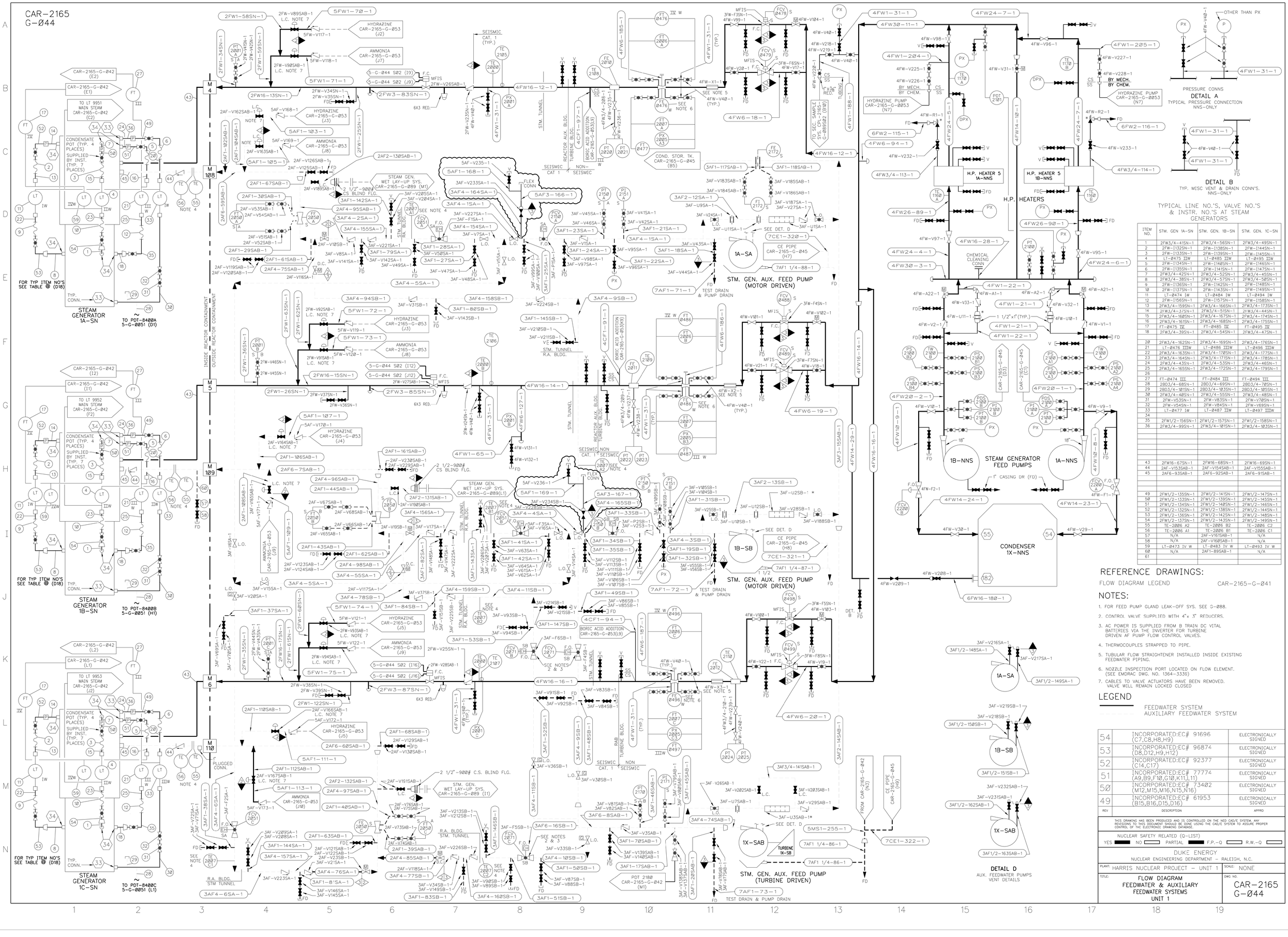
NUCLEAR SAFETY RELATED (Q-LIST)
YES ☐ NO ■ PARTIAL ☐ F.P.-Q ☐ R.W.-Q

DUKE ENERGY

PLANT: HARRIS NUCLEAR PROJECT - UNIT 1
SCALE: NONE

TITLE: FLOW DIAGRAM EXTRACTION STEAM SYSTEM
DWG NO. CAR-2165 G-ØØ43

CAR-2165
G-Ø44



TYPICAL LINE NO.'S, VALVE NO.'S & INSTR. NO.'S AT STEAM GENERATORS

ITEM NO.	STM. GEN 1A-SN	STM. GEN. 1B-SN	STM. GEN. 1C-SN
1	2FW3/4-41SN-1	2FW3/4-56SN-1	2FW3/4-49SN-1
2	2FW-1132SN-1	2FW-1138SN-1	2FW-1144SN-1
3	2FW-1133SN-1	2FW-1139SN-1	2FW-1145SN-1
4	LT-Ø475 IIW	LT-Ø485 IIW	LT-Ø495 IIW
5	2FW-1134SN-1	2FW-1140SN-1	2FW-1146SN-1
6	2FW-1135SN-1	2FW-1141SN-1	2FW-1147SN-1
7	2FW3/4-42SN-1	2FW3/4-52SN-1	2FW3/4-45SN-1
8	2FW3/4-38SN-1	2FW3/4-57SN-1	2FW3/4-58SN-1
9	2FW-1136SN-1	2FW-1142SN-1	2FW-1148SN-1
10	2FW-1137SN-1	2FW-1143SN-1	2FW-1149SN-1
11	LT-Ø474 IW	LT-Ø484 IW	LT-Ø494 IW
12	2FW-1165SN-1	2FW-1157SN-1	2FW-1158SN-1
13	2FW3/4-159SN-1	2FW3/4-166SN-1	2FW3/4-173SN-1
14	2FW3/4-37SN-1	2FW3/4-51SN-1	2FW3/4-44SN-1
15	2FW3/4-168SN-1	2FW3/4-167SN-1	2FW3/4-174SN-1
16	2FW3/4-163SN-1	2FW3/4-168SN-1	2FW3/4-175SN-1
17	FT-Ø475 IV	FT-Ø485 IV	FT-Ø495 IV
18	2FW3/4-39SN-1	2FW3/4-54SN-1	2FW3/4-47SN-1
20	2FW3/4-162SN-1	2FW3/4-169SN-1	2FW3/4-176SN-1
21	LT-Ø476 IIIW	LT-Ø486 IIIW	LT-Ø496 IIIW
22	2FW3/4-163SN-1	2FW3/4-170SN-1	2FW3/4-177SN-1
23	2FW3/4-164SN-1	2FW3/4-171SN-1	2FW3/4-178SN-1
24	2FW3/4-43SN-1	2FW3/4-53SN-1	2FW3/4-46SN-1
25	2FW3/4-165SN-1	2FW3/4-172SN-1	2FW3/4-179SN-1
26			
27	FT-Ø474 III	FT-Ø484 III	FT-Ø494 III
28	2BD3/4-68SN-1	2BD3/4-69SN-1	2BD3/4-70SN-1
29	2BD3/4-101SN-1	2BD3/4-103SN-1	2BD3/4-105SN-1
30	2FW3/4-44SN-1	2FW3/4-55SN-1	2FW3/4-48SN-1
31	2FW-V53SN-1	2FW-V83SN-1	2FW-V70SN-1
32	2FW-V54SN-1	2FW-V84SN-1	2FW-V69SN-1
33	LT-Ø477 IW	LT-Ø487 IIW	LT-Ø497 IIIW
34			
35	2FW1/2-156SN-1	2FW1/2-157SN-1	2FW1/2-158SN-1
36	2FW3/4-99SN-1	2FW3/4-101SN-1	2FW3/4-103SN-1
43	2FW16-67SN-1	2FW16-68SN-1	2FW16-69SN-1
44	2AF-V153SAB-1	2AF-V154SAB-1	2AF-V155SAB-1
45	2AF6-93SAB-1	2AF6-92SAB-1	2AF6-91SAB-1
49	2FW1/2-135SN-1	2FW1/2-141SN-1	2FW1/2-147SN-1
50	2FW1/2-133SN-1	2FW1/2-139SN-1	2FW1/2-145SN-1
51	2FW1/2-134SN-1	2FW1/2-140SN-1	2FW1/2-146SN-1
52	2FW1/2-132SN-1	2FW1/2-138SN-1	2FW1/2-144SN-1
53	2FW1/2-136SN-1	2FW1/2-142SN-1	2FW1/2-148SN-1
54	2FW1/2-137SN-1	2FW1/2-143SN-1	2FW1/2-149SN-1
55	TE-2085 A2	TE-2086 B2	TE-2086 C2
56	TE-2086 A1	TE-2086 B1	TE-2086 C1
57	N/A	2AF-V161SAB-1	N/A
58	N/A	2AF-V162SAB-1	N/A
59	LT-8473 IV W	LT-8483 IV W	LT-8493 IV W
60	N/A	2AF1-89SAB-1	N/A
61			

REFERENCE DRAWINGS:

FLOW DIAGRAM LEGEND CAR-2165-G-Ø41

NOTES:

1. FOR FEED PUMP GLAND LEAK-OFF SYS. SEE G-Ø88.
2. CONTROL VALVE SUPPLIED WITH 4"x 3" REDUCERS.
3. AC POWER IS SUPPLIED FROM B TRAIN DC VITAL BATTERIES VIA THE INVERTER FOR TURBINE DRIVEN AF PUMP FLOW CONTROL VALVES.
4. THERMOCOUPLES STRAIGHTENED TO PIPE.
5. TUBULAR FLOW STRAIGHTENER INSTALLED INSIDE EXISTING FEEDWATER PIPING.
6. NOZZLE INSPECTION PORT LOCATED ON FLOW ELEMENT. (SEE EMDRAC DWG. NO. 1364-3336)
7. CABLES TO VALVE ACTUATORS HAVE BEEN REMOVED. VALVE WILL REMAIN LOCKED CLOSED

LEGEND

FEEDWATER SYSTEM
AUXILIARY FEEDWATER SYSTEM

REV	DESCRIPTION	APPRO
54	INCORPORATED:EC# 91696 (C7,C8,H8,H9)	ELECTRONICALLY SIGNED
53	INCORPORATED:EC# 96874 (D8,D12,H9,H12)	ELECTRONICALLY SIGNED
52	INCORPORATED:EC# 92377 (C14,C17)	ELECTRONICALLY SIGNED
51	INCORPORATED:EC# 77774 (A9,B9,F1Ø,G1Ø,K11,L11)	ELECTRONICALLY SIGNED
5Ø	INCORPORATED:EC# 73402 (M12,M15,M16,N15,N16)	ELECTRONICALLY SIGNED
49	INCORPORATED:EC# 61953 (B15,B16,D15,D16)	ELECTRONICALLY SIGNED

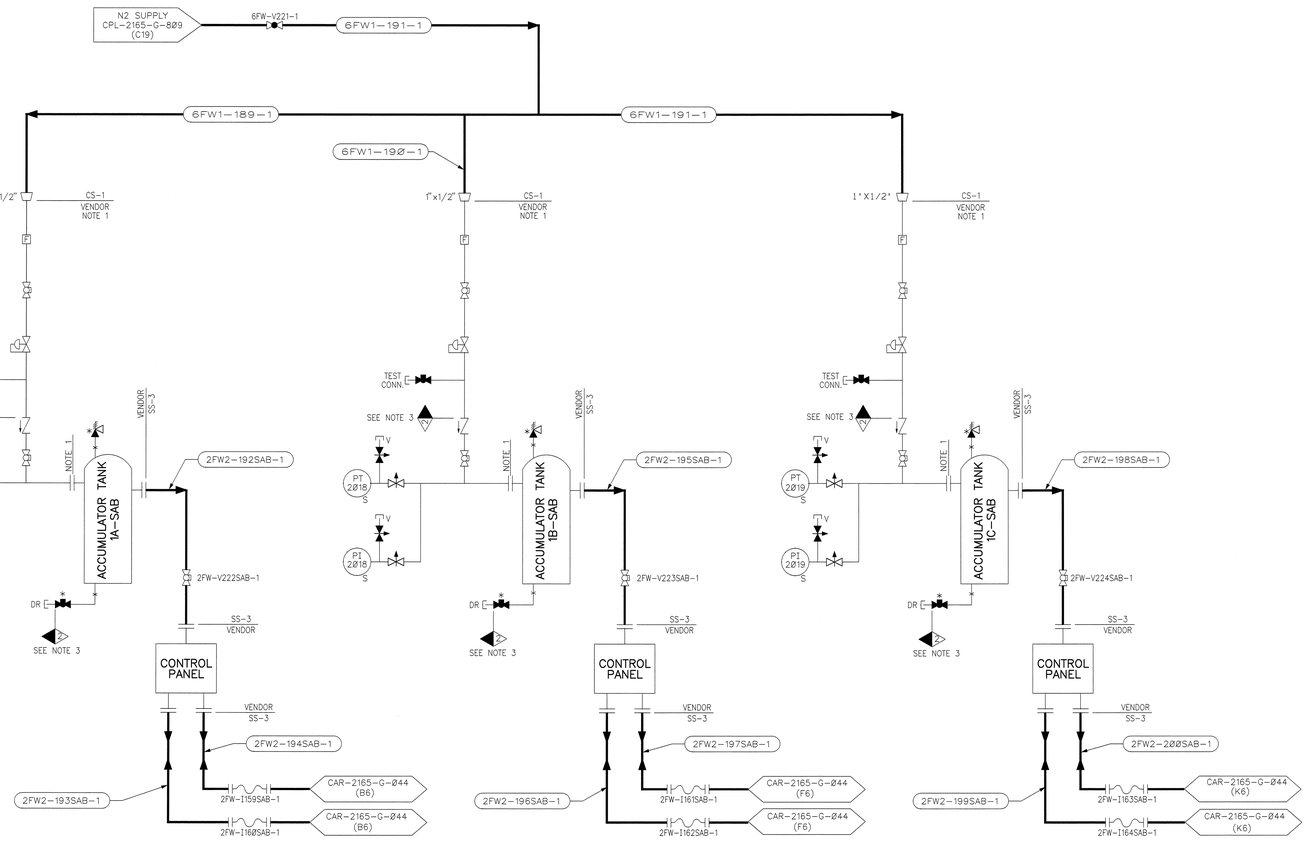
THIS DRAWING HAS BEEN PRODUCED AND IS CONTROLLED ON THE NED CAD/E SYSTEM. ANY REVISIONS TO THIS DOCUMENT SHOULD BE DONE USING THE CAD/E SYSTEM TO ASSURE PROPER CONTROL OF THE ELECTRONIC DRAWING DATABASE.

NUCLEAR SAFETY RELATED (Q-LIST)
YES ■ NO □ PARTIAL ■ F.P.-Q □ R.W.-Q □

DUKE ENERGY
NUCLEAR ENGINEERING DEPARTMENT – RALEIGH, N.C.

PLANT: HARRIS NUCLEAR PROJECT – UNIT 1	SCALE: NONE
TITLE: FLOW DIAGRAM FEEDWATER & AUXILIARY FEEDWATER SYSTEMS UNIT 1	DWG NO. CAR-2165 G-Ø44

CAR-2165
G-Ø44 SØ2



NOTES:
1. VENDOR SUPPLIED PIPING AND COMPONENTS MOUNTED ON ACCUMULATOR TANK PANEL.
2. FOR NOTES AND REFERENCE DRAWINGS SEE 5-G-Ø44
3. WITH THE EXCEPTION OF THE ACCUMULATORS AND ASSOCIATED RELIEF VALVES, ALL COMPONENTS AND PIPING DOWNSTREAM OF THE INLET SIDE OF THE CHECK VALVES, INCLUDING THE CONTROL PANELS, ARE SAFETY CLASS 2, NON-ASME. THE ACCUMULATORS AND RELIEF VALVES ARE ASME III, CLASS 2. REFERENCE EC 79837 AND CPL-HNP1-M-Ø32

REV	DATE	DESCRIPTION	DWN	CHK	DPPE
1		REVISED PER EC# 79837 (G17-G19)	ELECTRONICALLY SIGNED		
Ø	5/4/ØØ	INITIAL ISSUE PER ESR 97-ØØ233	ARM	RPP	DLS

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NUCLEAR SAFETY RELATED (Q-LIST)
YES ■ NO □ PARTIAL ■ F.P.-Q □ R.W.-Q □

CAROLINA POWER & LIGHT COMPANY
NUCLEAR ENGINEERING DEPARTMENT - RALEIGH, N.C.

PLANT: HARRIS NUCLEAR PROJECT - UNIT 1

SCALE: NONE

TITLE: FLOW DIAGRAM
FEEDWATER & AUXILIARY
FEEDWATER SYSTEMS
UNIT 1

DWG NO. CAR-2165
G-Ø44 SØ2

CAR-2165
G-Ø45

CST RELIEF VALVE CHART				
#			Ø	AZIMUTH
7CE4-356-1		3"SS NOZZLE	1½" CONN.	23°
7CE4-357-1		3"SS NOZZLE	1½" CONN.	128°
7CE4-358-1		3"SS NOZZLE	1½" CONN.	218°
7CE4-359-1		3"SS NOZZLE	1½" CONN.	308°

DETAIL C

STEAM GENERATOR FEED PUMPS

CONDENSATE STORAGE TANK 1X-SAB SC-3

CONDENSER 1X-NNS

L.P. HEATER 1A-NNS

L.P. HEATER 1B-NNS

L.P. HEATER 4 1A-NNS

L.P. HEATER 4 1B-NNS

L.P. HEATER 3 1A-NNS

L.P. HEATER 3 1B-NNS

L.P. HEATER 2 1A-NNS

L.P. HEATER 2 1B-NNS

CONDENSATE TRANSFER PUMP 1X-NNS

CHEM. ADDITION TANK

CONDENSATE POT BY I&C

CONDENSATE VACUUM PUMPS

CONDENSATE BOOSTER PUMPS 1A-NNS 1B-NNS

CONDENSATE PUMPS 1A-NNS 1B-NNS

STEAM GENERATOR AUXILIARY FEED PUMPS 1A-SA 1B-SB 1X-SAB

GLAND STEAM CONDENSER 1X-NNS

CNDS POLISHER

MOISTURE SEPARATOR

CONDENSATE VACUUM PUMP EFFLUENT TREATMENT SYSTEM

DETAIL A
TYPICAL MISC. VENTS & DRAINS FOR NNS PIPING ONLY

TYPICAL DETAIL
FOR AIR EVACUATION & CONDENSATE DIFFERENTIAL PRESSURE SWITCHES

DETAIL B
TYPICAL INSTRUMENT CONN. FOR NNS PIPING ONLY

NOTES:

1. TEMPORARY STRAINERS FOR INITIAL FLUSHING WILL NOT IMPACT OPERATION.
2. SEE TYPICAL DETAILS ON THIS DWG. FOR INSTRUMENT DRAINS & VENT LINE AND VALVE NUMBERS.
3. REPLACE BLIND FLANGES WITH SPOOLPIECE WHENEVER WET LAY-UP SYSTEM IS TO BE USED DURING PLANT SHUT-DOWN. FLG. RATING ON SPOOLPIECE TO MATCH TIE IN SYSTEM.
4. FLAG PERTAINS TO SAFETY CLASS BOUNDARY FOR NITROGEN SYSTEM ONLY. THE TANK, TANK NOZZLE AND NOZZLE EXTENSION ARE ALL ASME III CLASS 3.
5. TEMPORARY HOSE TO BE USED DURING DRAINAGE OF TANK OUTSIDE OF TANK AREA THRU SPOOL PIECE IN WALL AT COLUMN CZ.
6.
7. NITROGEN SPARGER REMAINS INSTALLED, BUT IS NOT FUNCTIONAL. PIPING IS CAPPED UPSTREAM OF VALVE 3N1-V1695N-1 AND CAN NOT RECEIVE ANY NITROGEN SUPPLY.

REFERENCE DRAWINGS

FLOW DIAGRAM LEGEND CAR-2165-G-Ø41

REV	DESCRIPTION	APPROVED
69	INCORPORATED: EC# 91696 (H7,15-17) & EC 91684 (Ø8,Ø13,Ø14)	ELECTRONICALLY SIGNED
68	INCORPORATED: EC# 90892 (F3,13,J3,L9)	ELECTRONICALLY SIGNED
67	INCORPORATED: EC# 91589 (H10,11Ø)	ELECTRONICALLY SIGNED
66	INCORPORATED: EC# 82546 (M10-13)	ELECTRONICALLY SIGNED AND DATED
65	INCORPORATED: EC# 78502 (C7)	ELECTRONICALLY SIGNED AND DATED
64	INCORPORATED: EC# 79998 (J3)	ELECTRONICALLY SIGNED AND DATED
63	INCORPORATED: EC# 75901 (I12)	ELECTRONICALLY SIGNED AND DATED
62	INCORPORATED: EC# 75591 (E24,G18).	ELECTRONICALLY SIGNED AND DATED

THIS DRAWING HAS BEEN PRODUCED AND IS CONTROLLED ON THE MCD CADVE SYSTEM. ANY MANUAL CHANGES MADE TO THIS DRAWING MUST BE MADE USING THE CADVE SYSTEM TO ASSURE PROPER CONTROL OF THE ELECTRONIC DRAWING DATABASE.

NUCLEAR SAFETY RELATED (Q-LIST)
YES ■ NO □ PARTIAL ■ F.P.-Q □ R.W.-Q □

DUKE ENERGY
NUCLEAR ENGINEERING DEPARTMENT – RALEIGH, N.C.

PLANT: HARRIS NUCLEAR PROJECT – UNIT 1 SCALE: NONE

TITLE: FLOW DIAGRAM CONDENSATE & AIR EVACUATION SYSTEMS

DWG. NO.: CAR-2165 G-Ø45

CAR-2165
G-Ø46

MOISTURE SEPARATOR REHEATER 1A-NNS

MOISTURE SEPARATOR REHEATER 1B-NNS

HP HEATER 5 1A-NNS

HP HEATER 5 1B-NNS

LP HEATER 4 1A-NNS

LP HEATER 4 1B-NNS

LP HEATER 3 1A-NNS

LP HEATER 3 1B-NNS

LP HEATER 2 1A-NNS

LP HEATER 2 1B-NNS

LP HEATER 1 1A-NNS

LP HEATER 1 1B-NNS

CONDENSER 1X-NNS

HEATER DRAIN PUMP 1A-NNS

HTR. DRN. PUMP 1B-NNS

HD PUMP 1A SEAL WATER CAR-2165-G-Ø88(C4)

HD PUMP 1B SEAL WATER CAR-2165-G-Ø88(D4)

TO SAMPLING ASSEMBLY CAR-2165-G-Ø89 (A15)

TO SEC. SAMPLING SAMPLE COND. RACK 1X-NNS CPL-2165-G-Ø895Ø2 (B10)

SEE DET "F"(N5) FOR HTR DRAIN PUMPS DISCH. HDR MATERIALS

HD PUMP DISCH VENT

HD PUMP DISCH. VENT

DETAIL D
(A17,B13,D14,D16 E4,E7,G4,G7

DETAIL B1

DETAIL B2

DETAIL B
TYPICAL INSTRUMENT CONNECTION (UNLESS OTHERWISE NOTED)
ALSO SEE DETAIL B1 & B2 (F19,G19,H19)
(USE FOR SYSTEMS 5 & 6 AS APPLICABLE)

DETAIL C
MISC. VENTS & DRAINS (UNLESS OTHERWISE NOTED, USE FOR SYS. 5 OR 6 AS APPLICABLE)

DETAIL F (15)
NOTE: DRAIN LINES, INSTRUMENT TAPS ETC REMAIN AS CARBON STEEL.

DETAIL A
HEATER, MS & MSR. DRAIN TANK TRIM
MSR(TUBE SIDE)DRN. TANK USE CATEGORY 5 LINES & VALVES ONLY
SEE DET. E FOR HEATER 4 1A-NNS & 1B-NNS CONT. (M13)

DETAIL E
HEATER 4 1A-NNS & 1B-NNS VENT & DRAIN TRIM.

NOTES:

1. SEE TYP. DETAILS ON THIS DWG. FOR INSTRUMENT, DRAINS & VENT LINE AND VALVE NUMBERS.
2. CONTROL VALVE SUPPLIED WITH REDUCERS.
3. PIPING BY I&C, VALVES SUPPLIED BY MECHANICAL.
5. VALVES 5HV-F1-1 & 5HV-F2-1 WERE MODIFIED VIA FCR-M-1943 TO FAIL CLOSED ON LOSS OF AIR PRESSURE, BUT THEY WILL FAIL OPEN ON LOSS OF ELECTRICAL POWER TO THE SOLENOID VALVES.
6. VALVES 6HD-C1-1 & 6HD-C2-1 HAVE BEEN MODIFIED TO REMOVE THEIR DISC AND OPERATORS. SHAFTS AND LEVER ARMS ARE MECHANICALLY RESTRAINED.

LEGEND

DRAINS

VENTS

REFERENCE DRAWINGS

FLOW DIAGRAM LEGEND CAR-2165-G-Ø41

TABULATION FOR DETAIL "A" & "E"

EQUIPMENT		VALVE QUANTITIES				LEVEL SWITCHES				LEVEL CONTROLLERS		LEVEL GAUGES	L.S. FOR EXT. STM. SHUTOFF	LEVEL TRANSMIT
		6HD-V43	5HD-V38	6HD-V41	5HD-V39	LO LEVEL LS-	HIGH LEVEL LS-	HI-HI-LEVEL LS-	LO-LO-LEVEL LS-	LC-	LC-	LG-	LS-	LT-
HEATERS	1-1A	12		28		1550A	1540A	1541A		1550A	1551A	1550A	1542A	1550A
	1-1B	12		28		1550B	1540B	1541B		1550B	1551B	1550B	1542B	1550B
	2-1A	12		28		1450A	1440A	1441A		1450A	1451A	1450A	1442A	1450A
	2-1B	12		28		1450B	1440B	1441B		1450B	1451B	1450B	1442B	1450B
	3-1A	12		28		1350A	1340A	1341A		1350A	1351A	1350A	1342A	1350A
	3-1B	12		28		1350B	1340B	1341B		1350B	1351B	1350B	1342B	1350B
	4-1A	12		28		1250A	1240A	1241A	1251A	1250A	1251A	1250A	1242A	1250A
	4-1B	12		28		1250B	1240B	1241B	1251B	1250B	1251B	1250B	1242B	1250B
	5-1A	12		28		1150A	1140A	1141A		1150A	1151A	1150A	1142A	1150A
	5-1B	12		28		1150B	1140B	1141B		1150B	1151B	1150B	1142B	1150B
DRAIN TANK MSR	1A		12		18	Ø450A	Ø440A	Ø441A		Ø450A	Ø451A	Ø450A		Ø450A
DRAIN TANK MS	1B		12		18	Ø450B	Ø440B	Ø441B		Ø450B	Ø451B	Ø450B		Ø450B
	1A	8		14		Ø650A	Ø640A	Ø641A		Ø650A		Ø650A		Ø650A
	1B	8		14		Ø650B	Ø640B	Ø641B		Ø650B		Ø650B		Ø650B

REV	DESCRIPTION	APPROVED
43	INCORPORATED: EC 279938 (E1,C4,C7,E10)	ELECTRONICALLY SIGNED
42	INCORPORATED: EC 87011 (G3-G7) AND EC 93054 (C3,C7,K17-K19)	ELECTRONICALLY SIGNED AND DATED
41	INCORPORATED: EC#74907 (E1,E4,E6,E10)	ELECTRONICALLY SIGNED AND DATED

THIS DRAWING HAS BEEN PRODUCED AND IS CONTROLLED ON THE NED CAD/E SYSTEM. ANY REVISIONS TO THIS DOCUMENT SHOULD BE DONE USING THE CAD/E SYSTEM TO ASSURE PROPER CONTROL OF THE ELECTRONIC DRAWING DATABASE.

NUCLEAR SAFETY RELATED (Q-LIST)
YES ☐ NO ■ PARTIAL ☐ F.P.-Q ☐ R.W.-Q ☐

DUKE ENERGY

PLANT: HARRIS NUCLEAR PROJECT – UNIT 1

SCALE: NONE

TITLE: FLOW DIAGRAM HEATER DRAIN & VENT SYSTEMS

DWG NO. 5-G-Ø046

CAR-2165
G-Ø47

EMERGENCY SERVICE WATER INTAKE SCREENING STRUCTURE
(AUX. RESERVOIR)

EMERGENCY SERVICE WATER & COOLING TOWER MAKE-UP WATER INTAKE STRUCTURE
(MAIN RESERVOIR)

EMERGENCY SERVICE WATER PUMPS

CONTMT. FAN COOLER AH-3 (1A-SA) (1B-SA)

CONTMT. FAN COOLER AH-1 (1A-SB) (1B-SB)

CONTMT. FAN COOLER AH-2 (1A-SA) (1B-SA)

CONTMT. FAN COOLER AH-4 (1A-SB) (1B-SB)

CONTMT FAN COIL UNIT AH-37 (1A-NNS) (1B-NNS)

CONTMT FAN COIL UNIT AH-38 (1A-NNS) (1B-NNS)

CONTMT FAN COIL UNIT AH-39 (1A-NNS) (1B-NNS)

CONTAINMENT FAN COIL UNIT

CONTAINMENT FAN COOLER

CHARGING PUMP LUBE OIL COOLER (TYP. 3)

CHARGING PUMP GEAR COOLER (TYP. 3)

SW BOOSTER PUMP 1A-SA

SW BOOSTER PUMP 1B-SB

COMPONENT C.W. HEAT EXCH. 1A-SA

COMPONENT C.W. HEAT EXCH. 1B-SB

CVCS CHILLERS-NNS

REACTOR AUXILIARY BUILDING

TURBINE BUILDING

UNIT 2 TANK BLDG

UNIT 1 TANK BLDG.

INSIDE REACTOR CONTAINMENT

OUTSIDE REACTOR CONTAINMENT

EQUIP. ITEM	AH-37	AH-38	AH-39
A	7SW6-333-1	7SW6-347-1	7SW6-346-1
B	7SW4-521-1	7SW4-525-1	7SW4-529-1
C	7SW4-523-1	7SW4-527-1	7SW4-531-1
D	7SW2 1/2-654-1	7SW2 1/2-658-1	7SW2 1/2-662-1
E	7SW2 1/2-655-1	7SW2 1/2-659-1	7SW2 1/2-663-1
F	7SW2 1/2-656-1	7SW2 1/2-660-1	7SW2 1/2-664-1
G	7SW2 1/2-657-1	7SW2 1/2-661-1	7SW2 1/2-665-1
H	7SW6-318-1	7SW6-315-1	7SW6-289-1
I	7SW4-522-1	7SW4-526-1	7SW4-530-1
J	7SW4-524-1	7SW4-528-1	7SW4-532-1
K	7SW2 1/2-666-1	7SW2 1/2-670-1	7SW2 1/2-674-1
L	7SW2 1/2-667-1	7SW2 1/2-671-1	7SW2 1/2-675-1
M	7SW2 1/2-668-1	7SW2 1/2-672-1	7SW2 1/2-676-1
N	7SW2 1/2-669-1	7SW2 1/2-673-1	7SW2 1/2-677-1

DETAIL 7 (B16-B19)

EQUIP. NO. ITEM	AH-1	AH-2	AH-3	AH-4
A	2SW1Ø-58SB-1	2SW1Ø-32SA-1	2SW12-34SA-1	2SW12-55SB-1
B	2SW1-61SB-1	2SW1-62SA-1	2SW1-62SB-1	2SW1-63SB-1
C	2SW-V486SB-1	2SW-V492SA-1	2SW-V498SA-1	2SW-V504SB-1
D	2SW6-584SB-1	2SW6-592SA-1	2SW6-600SA-1	2SW6-608SB-1
E	2SW6-585SB-1	2SW6-593SA-1	2SW6-601SA-1	2SW6-609SB-1
F	2SW1-618SB-1	2SW1-624SA-1	2SW1-630SA-1	2SW1-636SB-1
G	2SW-V488SB-1	2SW-V494SA-1	2SW-V500SA-1	2SW-V506SB-1
H	2SW4-455SB-1	2SW4-461SA-1	2SW4-452SA-1	2SW4-467SB-1
I	2SW1-619SB-1	2SW1-625SA-1	2SW1-631SA-1	2SW1-637SB-1
J	2SW-V489SB-1	2SW-V495SA-1	2SW-V501SA-1	2SW-V507SB-1
K	2SW6-587SB-1	2SW6-595SA-1	2SW6-603SA-1	2SW6-611SB-1
L	2SW4-586SB-1	2SW4-594SA-1	2SW4-602SA-1	2SW4-610SB-1
M	2SW1-620SB-1	2SW1-626SA-1	2SW1-632SA-1	2SW1-638SB-1

DETAIL 8 (B8,B9,B12,B13) TABLE CONTINUES AT (N6)

CONTINUATION OF TABLE FROM (N4)

EQUIP. NO. ITEM	AH-1	AH-2	AH-3	AH-4
N	2SW-H498SB-1	2SW-V496SA-1	2SW-V502SA-1	2SW-V508SB-1
O	2SW4-456SB-1	2SW4-462SA-1	2SW4-449SA-1	2SW4-468SB-1
P	2SW1-621SB-1	2SW1-627SA-1	2SW1-633SA-1	2SW1-639SB-1
Q	2SW-V491SB-1	2SW-V497SA-1	2SW-V503SA-1	2SW-V509SB-1
R	2SW1Ø-51SB-1	2SW1Ø-35SA-1	2SW1Ø-35SA-1	2SW1Ø-56SB-1
S	2SW1-617SB-1	2SW1-623SA-1	2SW1-629SA-1	2SW1-635SB-1
T	2SW-V487SB-1	2SW-V493SA-1	2SW-V499SA-1	2SW-V505SB-1
U	2SW6-588SB-1	2SW6-596SA-1	2SW6-604SA-1	2SW6-612SB-1
V	2SW4-459SB-1	2SW4-465SA-1	2SW4-453SA-1	2SW4-471SB-1
W	2SW4-589SB-1	2SW4-597SA-1	2SW4-605SA-1	2SW4-613SB-1
X	2SW6-591SB-1	2SW6-599SA-1	2SW6-607SA-1	2SW6-615SB-1
Y	2SW4-590SB-1	2SW4-598SA-1	2SW4-606SA-1	2SW4-614SB-1
Z	2SW4-459SB-1	2SW4-464SA-1	2SW4-452SA-1	2SW4-470SB-1

TABLE CONTINUES AT (N9)

CONTINUATION OF TABLE FROM (N6)

EQUIP. NO. ITEM	AH-1	AH-2	AH-3	AH-4
AA	2SW3/4-694SB-1	2SW3/4-702SA-1	2SW3/4-710SA-1	2SW3/4-718SB-1
AB	2SW3/4-695SB-1	2SW3/4-703SA-1	2SW3/4-711SA-1	2SW3/4-719SB-1
AC	2SW3/4-696SB-1	2SW3/4-704SA-1	2SW3/4-712SA-1	2SW3/4-720SB-1
AD	2SW3/4-697SB-1	2SW3/4-705SA-1	2SW3/4-713SA-1	2SW3/4-721SB-1
AE	2SW3/4-698SB-1	2SW3/4-706SA-1	2SW3/4-714SA-1	2SW3/4-722SB-1
AF	2SW3/4-699SB-1	2SW3/4-707SA-1	2SW3/4-715SA-1	2SW3/4-723SB-1
AG	2SW3/4-700SB-1	2SW3/4-708SA-1	2SW3/4-716SA-1	2SW3/4-724SB-1
AH	2SW3/4-701SB-1	2SW3/4-709SA-1	2SW3/4-717SA-1	2SW3/4-725SB-1

DETAIL 6 (I8,I9,I10)

LINE NO. (A)	LINE NO. (B)	VALVE NO (C)	(D)	LINE NO. (E)	(F)
3SW6-82SA-1	3SW1-379SA-1	3SW-V363SA-1	3SW-U7SA-1	7SW1-1721-1	24"
3SW6-80SB-1	3SW1-382SB-1	3SW-V366SB-1	3SW-U8SB-1	7SW1-1722-1	24"
3SW8-128SA-1	3SW1-380SA-1	3SW-V364SA-1	3SW-U9SA-1	7SW1-1723-1	54"
3SW8-338SB-1	3SW1-381SB-1	3SW-V365SB-1	3SW-U10SB-1	7SW1-1724-1	52"

DETAIL 1 — TYPICAL EXCEPT WHERE NOTED OTHERWISE

DETAIL 2

DETAIL 3

DETAIL 4

DETAIL 5

SOURCE LINE NO.	LINE NO. (E)	VALVE NO (F)
7SW1-689-1	7SW¾-730-1	7SW-V546-1
7SW1-690-1	7SW¾-731-1	7SW-V547-1
7SW1-691-1	7SW¾-732-1	7SW-V548-1
7SW1-692-1	7SW¾-733-1	7SW-V549-1

DRAIN TAB (I16,J16)

CVCS CHILLER	LINE NO. (C)	LINE NO. (D)
1A-NNS	7SW1-689-1	7SW1-690-1
1B-NNS	7SW1-691-1	7SW1-692-1

RELIEF VALVE TAB (H16,J16)

REFERENCE DRAWINGS:

FLOW DIAGRAM LEGEND CAR-2165-G-041
FLOW DIAGRAM-CIRCULATING & SERVICE WATER SYSTEMS SHEET 2 CAR-2165-G-048
FLOW DIAGRAM RAD MONITOR CAR-2165-G-105

NOTES:

1. TEMPORARY STRAINER FOR INITIAL FLUSHING, REMOVE BEFORE START-UP(H15)
2. CONTROL/OTRON TRANSDUCERS ARE MOUNTED TO THE PIPING FOR OBTAINING FLOW RATE MEASUREMENTS.
3. VALVE MOTOR HAS NO POWER CABLES TO IT AND IS USED MANUALLY ONLY.
4. 3SW-V-5323A-1 AND 3SW-V-534SA-1 CLOSED WHEN CSIP 1C-SAB IS POWERED FROM "B" ELECTRICAL BUS. 3SW-V-5333B-1 AND 3SW-V-5335B-1 CLOSED WHEN CSIP 1C-SAB IS POWERED FROM "A" ELECTRICAL BUS.
5. VALVE LINE-UP MAY VARY. ONLY ONE TRAIN OF SUPPLY/RETURN VALVES MAY REMAIN OPEN FOR PASS AND CVCS CHILLERS.
6. VALVE MATERIAL IS STAINLESS STEEL.
7. PLUGGED CONNECTION TYPICAL OF 4 CONNS. PER EACH INLET/OUTLET LINE (32 CONNS. PER COOLER)
8. 4" SYSTEM DRAIN
10. EXPANSION JOINTS ARE STAINLESS STEEL. PIPING IS CARBON STEEL.
11. LINE ENCAPSULATES REMOVED DRAIN LINE 3SW1-2675A-1; LINE ATTACHED TO 30" HEADER BY FULL-PENETRATION WELD BUT IS NOT A 4" BRANCH CONNECTION; PIPE CAP INCLUDES ½" THREADED PLUG; REF. EC 74428
12. LINE REDUCES TO 3.5" PIPE THROUGH PENETRATION LOCATED AT A-245 C43-W5. SEE DETAIL ON DRAWING 5-G-Ø1Ø2.
13. VALVES 3SW-V2375A-1, -V2638SB-1, -V266SA-1, & V267SB-1 ARE PERMANENTLY SHUT WITH MOTIVE AIR REMOVED AS PART OF THE LONG TERM MOTOR BOUNDARY FOR THE CVCS CHILLERS (EC9Ø655).

LEGEND

SUPPLY
RETURN

91	INCORPORATED: EC486320(C8,D13,D14,I10,J10)	ELECTRONICALLY SIGNED
9Ø	INCORPORATED: EC 293477 (D1,E2) EC 299131 (F14,F16)	ELECTRONICALLY SIGNED
89	INCORPORATED: EC 484085 (C12)	ELECTRONICALLY SIGNED
REV	DESCRIPTION	APPROVED

THIS DRAWING HAS BEEN PRODUCED AND IS CONTROLLED ON THE NED CAD/E SYSTEM. ANY REVISIONS TO THIS DOCUMENT SHOULD BE DONE USING THE CAD/E SYSTEM TO ASSURE PROPER CONTROL OF THE ELECTRONIC DRAWING DATABASE.

NUCLEAR SAFETY RELATED (Q-LIST)
YES ■■■■ NO PARTIAL ■■■■ F.P.-Q ▭▭▭ R.W.-Q ▭▭▭

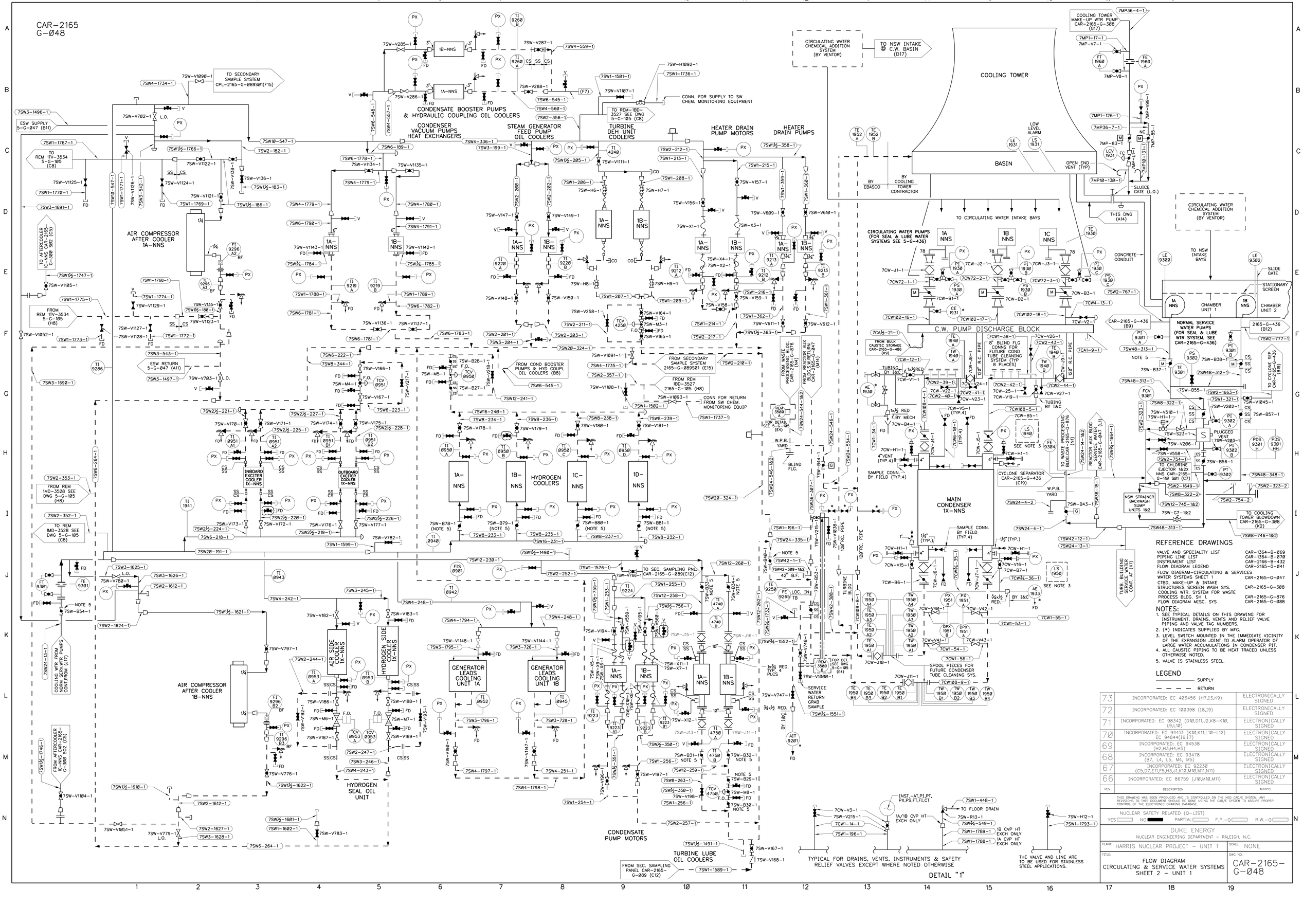
DUKE ENERGY
NUCLEAR ENGINEERING DEPARTMENT – RALEIGH, N.C.

PLANT: HARRIS NUCLEAR PROJECT – UNIT 1 SCALE: NONE

TITLE: FLOW DIAGRAM CIRCULATING & SERVICE WATER SYSTEMS SHEET 1-UNIT 1

DWG NO. CAR-2165 G-Ø47

CAR-2165
G-Ø48



REFERENCE DRAWINGS

VALVE AND SPECIALITY LIST	CAR-1364-B-869
PIPING LINE LIST	CAR-1364-B-870
INSTRUMENT LIST	CAR-2166-B-432
FLOW DIAGRAM LEGEND	CAR-2165-G-041
FLOW DIAGRAM-CIRCULATING & SERVICES WATER SYSTEMS SHEET 1	CAR-2165-G-047
CTBD, MAKE-UP & INTAKE STRUCTURES SCREEN WASH SYS.	CAR-2165-G-308
COOLING WTR SYSTEM FOR WASTE PROCESS BLDG. SH 1.	CAR-2165-G-876
FLOW DIAGRAM MISC. SYS	CAR-2165-G-888

NOTES:

1. SEE TYPICAL DETAILS ON THIS DRAWING FOR INSTRUMENT, DRAINS, VENTS AND RELIEF VALVE PIPING AND VALVE TAG NUMBERS.
2. (*) INDICATES SUPPLIED BY MFG.
3. LEVEL SWITCH MOUNTED IN THE IMMEDIATE VICINITY OF THE EXPANSION JOINT TO ALARM OPERATOR OF LARGE WATER ACCUMULATIONS IN CONDENSER PIT.
4. ALL CAUSTIC PIPING TO BE HEAT TRACED UNLESS OTHERWISE NOTED.
5. VALVE IS STAINLESS STEEL.

LEGEND

SUPPLY

RETURN

REV	DESCRIPTION	APP'D
73	INCORPORATED: EC 406456 (H7,I3,K9)	ELECTRONICALLY SIGNED
72	INCORPORATED: EC 10Ø398 (I8,I9)	ELECTRONICALLY SIGNED
71	INCORPORATED: EC 98342 (D1Ø,D11,J2,K8-K1Ø, L9,L1Ø)	ELECTRONICALLY SIGNED
7Ø	INCORPORATED: EC 94413 (K1Ø,K11,L1Ø-L12) EC 94844(I6,I7)	ELECTRONICALLY SIGNED
69	INCORPORATED: EC 94538 (H2,H3,H4,H5)	ELECTRONICALLY SIGNED
68	INCORPORATED: EC 93478 (B7, L4, L5, M4, M5)	ELECTRONICALLY SIGNED
67	INCORPORATED: EC 9223Ø (C5,D7,E11,F5,H3,J1,K1Ø,M1Ø,M11,N11)	ELECTRONICALLY SIGNED
66	INCORPORATED: EC 86759 (J1Ø,M1Ø,M11)	ELECTRONICALLY SIGNED

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NUCLEAR SAFETY RELATED (Q-LIST)

YES ☐ NO ■ PARTIAL ☐ F.P.-Q ☐ R.W.-Q ☐

DUKE ENERGY
NUCLEAR ENGINEERING DEPARTMENT – RALEIGH, N.C.

PLANT: HARRIS NUCLEAR PROJECT – UNIT 1	SCALE: NONE
TITLE: FLOW DIAGRAM CIRCULATING & SERVICE WATER SYSTEMS SHEET 2 – UNIT 1	DWG NO. CAR–2165–G–Ø48

CAR-2165
G-049S01

DWST FLANGED CONN. CHART			
A			AZIMUTH
7DW3-548-1			60°
7DW3-549-1			150°
7DW3-550-1			240°
7DW3-551-1			330°

FROM SERVICE AIR CAR-2165-G-188 (D1)

7SAI-347-1-4

MAKE UP WATER DEMINERALIZER CAR-2165-G-110 S02 (F1)

7DW6-188-1-4

LCV

7FM-B9-1

7FM6-63-1

7FM6-75-1

EH

7FM-B8-1

AIS 9519

7FM-V38-1

7FM3/4-77-1

7FM4-87-1

7FM-V37-1

7FM-V26-1

7FM6-70-1

7SAI-348-1-4

7SA-V378-1-4

7FM-V48-1

2B

PDI 9518 B2

7FM-V25-1

7FM6-72-1

7SA-V382-1-4

7FM-V29-1

7FM-V24-1

POST FILTRATION FILTERS

7FM6-69-1

7FM-V49-1

7FM4-74-1

7SAI-349-1-4

7SA-V377-1-4

1B

PDI 9518 1B

7FM-V23-1

7FM6-71-1

7SA-V381-1-4

7FM-V28-1

7FM-V22-1

FQ 9518 B

FLOWMETER TOTALIZERS

7FM-V46-1

7FM9-73-1

7FM4-67-1

7FM6-68-1

FS 9517

7FM4-67-1

7FM-V33-1

7FM3-60-1

7FM4-67-1

7FM-X2-1

BACK FLUSH TO SETTLING BASIN VIA 7FM12-23-1-4 CAR-2165-G-110S02 (H5)

7FM6-58-1

7FM-B4-1

7FM-V31-1

6"

8"

7FM-B6-1

7FM6-59-1

7FM-B5-1

7FM-V32-1

6"

8"

7FM-B7-1

PI 9516

A

B

7FM1-78-1

7FM-V39-1

7FM6-57-1

7FM6-56-1

UPFLOW FILTER CLEAR-WELL TANK 1-4X-NNS CAR-2165-G-110S02 (G1)

7FM10-4-1-4

FILTER FEED PUMPS

7FM6-6-1-4

UPFLOW FILTER CLEAR-WELL TANK 1-4X-NNS CAR-2165-G-110S02 (H1)

TYPICAL FILTER DETAIL

TO ATMOS.

7FM2-80-1

MECH. I&C

7FM-R1-1

6"

7FM-V40-1

12"

7FM1-82-1

5"

7FM1-79-1

POST FILTRATION FILTER

PDI

12"

6"

BLIND FLANGE

7FM2-81-1

7FM-V41-1

7FM-V40-1

DRAIN

MECH. I&C.

FILTER-1A: 7FM-H1-1
FILTER-2A: 7FM-H2-1
FILTER-1B: 7FM-H3-1
FILTER-2B: 7FM-H4-1

PRETREATED WATER STORAGE TANK 1X-NNS 500,000 GAL

7FM1-110-1

7FM-V65-1

7FM-V66-1

7FM-V67-1

7FM-V68-1

LS 9550 B

LI 9550 B

7FM1-114-1

7FM1-111-1

7FM1-112-1

7FM1-113-1

7FM1-109-1

TW 9550 B

7FM-V64-1

LTI 9550 B

7FM½-115-1

SAMPLE 3/8"

7FM-V71-1

7FM-V70-1

BY FIELD BY EBASCO

7FM-B13-1

SS

CS

SS

7FM-V43-1

7FM-B12-1

7FM-B14-1

7FM6-93-1

7FM4-108-1

7FM-V69-1

FLEX CONNECTION

TO STORM DRAIN

7FM8-90-1

7FM-B11-1

7DW6-537-1-4

7FM6-92-1

7DW-V421-1-4

7DW8-247-1-4

7FM3-91-1

7DW3¼-486-1-4

7DW-V271-1-4

1X¾ RED.

OVERFLOW TO STORM DRAIN

7DW½-527-1-4

7DW-V438-1-4

7DW8-191-1-4

7DW-V16-1

RAW WATER FEED PUMPS CAR-2165-G-110 S02 (D2)

7FM2-55-1

7DW3-208-1-4

7DW-B8-1-4

7FM10-88-1

7DW8-189-1-4

7DW10-467-1-4

7DW6-188-1-4

7DW6-193-1-4

TO RAW WATER FEED PUMPS CAR-2165-G-110S02 (E1)

7FM-10-89-1

7FM6-83-1

7FM6-76-1

FROM LOW SODIUM MIXED BED DEMIN. 5-G-0110 S02 (N11)

CS

SS

7FM2-119-1

POTABLE WATER TRANSFER PUMPS CAR-2165-G-110S02 (H2)

7DW-B12-1-4

7DW-H152-1

4X3

3X2

7DW1-474-1-4

7DW1-224-1-4

7DW-V194-1-4 (TYP)

7DW1-224-1-4 (TYP)

LS 9551 A

7DW-V194-1-4 (TYP)

SIPHON BREAKER

7DW8-192-1-4

7DW8-248-1-4

LS 9550 A

LI 9550 A

LS 9550 A1

BY FIELD BY EBASCO

7DW-V413-1-4

7DW-V272-1-4

7DW-V188-1-4

7DW1-645-1

1 x ½

7DW1-209-1-4

7DW-V420-1-4

7DW¾-487-1-4

7DW¾-558-1-4

7DW1-557-1-4

HOSE CONN (TYP)

STORM DRAIN

SPARGER (TYP)

TW 9550 A

7DW-B9-1-4

7DW-B7-1-4

7DW-B20-1-4

7DW-B6-1-4

7DW-B18-1-4

7DW-B5-1-4

FC

3"

LCV 9551 A

7DW8-198-1-4

DEMINERALIZED WATER STORAGE TANK 1-4A NNS 500,000 GAL

7DW-V171-1-4

TO STORM DRAIN

FLEX CONNECTION

7DW4-197-1-4

SS/CS

GNI-V171-1

GNI-V172-1

GNI-V178-1

FI 8035

GNI-V173-1

GNI1-247-1

GNI1-250-1

GNI1-257-1

GNI-V179-1

GNI-P12-1

GNI-S2-1

GNI½-251-1

6NI-V177-1

N2 SUPPLY CAR-2165-G-058 (D-3)

GNI-V174-1

7DW6-196-1-4

7DW-V214-1-4

PS 9560

7DW1-219-1-4

7DW8-201-1-4

7DW3-207-1-4

7DW1-221-1-4 (TYP.)

7DW-V178-1-4

FT 9561

FE 9561

7DW1-216-1-4

7DW-V183-1-4

7DW-V270-1-4

7DW1-214-1-4

7DW-V184-1-4

DR

7DW3-496-1-4

7DW3-498-1-4

3"

PI 9560 B

1-4B-NNS

PI 9560 A

1-4A-NNS

DEMINERALIZED WATER TRANSFER PUMPS

½"

7DW-V180-1-4

7DW3-523-1-4

7DW3-522-1-4

7DW-V177-1-4

7DW-V303-1-4

TO DEMIN SAMPLE/ ANALYZER PANEL

MECH. I&C

7DW1-222-1-4

7DW1-220-1-4

7DW1-337-1-4

7DW-V174-1-4

7DW-V173-1-4

7DW-F1-1-4

FCV 9560

F.O.

7DW2-306-1-4

7DW-V176-1-4

7DW-V175-1-4

7DW2-305-1-4

7DW-B13-1-4

7DW-B14-1-4

7DW6-204-1-4

7DW-F2-1-4

FLEX CONNECTION

7DW6-541-1-4

7DW6-205-1-4

FT 9560

FE 9560

FCV 9562

7DW-V302-1-4

7DW1-336-1-4

7DW-V390-1-4

7DW2-415-1-4

7DW6-205-1-4

7DW6-203-1-4

7DW4-230-1-4

TO AUX. BOILER CAR-2165-G-134 (C2)

7DW1½-33-1&4

7DW-V30-1&4

TO SERVICE BLDG. "BY FACILITIES"

7DW1½-335-1&4

FROM NF OUTLET 1364-098399 S01

DEMINERALIZED WATER CAR-2165-G-049S02 (E1)

7DW6-1-1&2

TO UPFLOW FILTER SYSTEM CAR-2165-G-110S02 (I4)

8PW4-188-1

8PW-R1-1

8PW3-187-1

8PW-V120-1

8PW2-185-1

HI

LS 9587

LS 9588

PS 9589

LO

8PW-V121-1

8PW1-186-1

8PW2-181-1

CS BR

8PW2-182-1

8PW-V119-1

8PW2-184-1

8PW-V118-1

8PW2-183-1

OPERATIONS BUILDING "BY FACILITIES"

8PW2-179-1

8PW2-180-1

8PW-V117-1

PCV 9586

8PW-V115-1

8PW-V113-1

POTABLE WATER BOOSTER PUMP 1X-NNS

3"

8PW-V112-1

8PW2-178-1

8PW-V116-1

8PW-P11-1

HYDROPNEUMATIC TANK (OPERATIONS) 1X-NNS

FROM HYDROPNEUMATIC TANK 1-4X-NNS CAR-2165-G-110 S02 (K4)

8PW4-150-1-4

WTB YARD

8PW4-14-1-4

CS COPPER

8PW2-107-1-4

8PW-V48-1-4

TO WATER TREATMENT BLDG. CAR-2168-G-592 "BY FACILITIES"

8PW4-32-1-4

8PW1-154-1-4

CHEMICAL STORAGE "BY FACILITIES"

8PW-V93-1-4

8PW2½-155-1-4

8PW1½-118-3&4

8PW1½-118-1&2

8PW-V70-1&2

WAREHOUSE "BY FACILITIES"

8PW2½-117-1-4

8PW-V97-1-4

IN PROCESSING BUILDING "BY FACILITIES"

8PW3-11-1&4

3X2" RED

¾"

SERVICE BLDG. "BY FACILITIES"

ESWIS-BULLET RESISTANT ENCLOSURE "BY FACILITIES"

8PW¾-243-1

8PW1½-176-1-4

8PW¾-238-1-4

RECREATION AREA PICNIC SHELTER "BY FACILITIES"

8PW-V168-1-4

8PW-V172-1

MOBILE EQUIPMENT SHOP

8PW-V110-1-4

"BY FACILITIES" 8PW-V166-1-4

8PW-V171-1

8PW-V167-1-4

RECREATION AREA REST ROOMS "BY FACILITIES"

8PW2-239-1-4

8PW1½-215-1

HOSE CONN (TYP)

SEWAGE TREATMENT LAB & EYE WASH STATIONS ("BY FACILITIES")

8PW-V150-1

8PW1½-119-1-4

8PW-V68-1-4

8PW3-124-1-4

POTABLE WATER ("BY FACILITIES")

BACKFLOW PREVENTER

8PW-H24-1

SECURITY COMPLEX TRAINING ("BY FACILITIES")

8PW-H23-1

SEWAGE TREATMENT LAB "BY FACILITIES"

TO FHB "M" AREA CP&L - FPE & CD DWG.D-3113 (C1) "BY FACILITIES"

8PW2-V53-1-4

8PW2-177-1&2

8PW3-173-1&2

TO FHB "K" AREA CP&L-FPE & CD DWG D-3110 (A4) "BY FACILITIES"

8PW-P21-1&2

WPB YARD

8PW4-9-1-4

WPB CAR-2168-G-661S01 (C1) "BY FACILITIES"

8PW-V51-1-4

WPB CAR-2168-G-661S02 (J1)

8PW2-185-1-4

8PW4-114-1&2

8PW2½-112-1&2

8PW-V64-1&2

AUXILIARY BLDG. CAR-2168-G-603 (M10)

8PW3-18-1&2

YARD TANK BLDG.

EMERGENCY SHOWER & EYEWASH AT CAUSTIC ACID STORAGE TANKS IN YARD

8PW-V65-1&2

8PW3-116-1&2

YARD INSIDE BLDG.

8PW3-13-1&2

TURBINE BLDG. CAR-2168-G-605 (B2) "BY FACILITIES"

8PW4-9-1-4

8PW4-32-1-4

8PW4-34-1-4

8PW-V111-1

8PW2½-125-1-4

8PW1½-240-1

8PW-V169-1

OUTAGE TRAILER HOOK-UP "BY FACILITIES"

8PW1½-123-1&4

8PW2½-121-1-4

SECURITY BLDG. CAR-2168-G-598 S01 (B14) "BY FACILITIES"

8PW-V107-1&2

8PW2-171-1&2

SECURITY BLDG. CAR-2168-G-598 S01 (B7) "BY FACILITIES"

8PW-V100-1-4

8PW3-5-1-4

ADMINISTRATION BUILDING "BY FACILITIES"

8PW3-22-1-4

8PW-V60-1-4

8PW3-160-1-4

8PW-V56-1-4

3" PLUG

8PW3-152-1-4

FUEL HANDLING BLDG UNITS 1&2 CAR-2168-G-578S01 (J13) "BY FACILITIES"

8PW3-165-1-4

8PW2-17-1-4

BLD FLG.

8PW2½-146-1-4

BLD FLG.

8PW3-149-1-4

8PW4-31-1-4

BACKFLOW PREVENTER 8PW-X3-1&2 SEE NOTE 6

BY PLUMBING

8PW-V78-1&2

8PW2-15-1&2

8PW3-157-1-4

8PW-V145-1

EMERGENCY SHOWER AND EYEWASH AT NSWIS

8PW2-131-1

DIESEL GEN.1B-SB JACKET WATER MAKEUP CAR-2165-G-133 (A19)

8PW2-130-1

DIESEL GEN.1A-SA JACKET WATER MAKEUP CAR-2165-G-133 (A11)

8PW½-207-1

NSW PUMPS 1A&1B-NNS SEALS & BEARINGS SUPPLY CAR-2165-G-436(C9)

8PW2-126-1&2

CIRC WTR PUMPS 1A,1B,1C-NNS SEALS & BEARINGS SUPPLY CAR-2165-G-436(M8)

8PW3-98-1&2

2" BLD.FLG.

8PW-V74-2

8PW1½-174-1

8PW-V108-1

EMERGENCY SHOWER & EYEWASH AT COOLING TOWER

8PW2-115-1

8PW2-115-2

NOTES

2. ALL BRANCH PIPES FOR HOSE CONNECTIONS TO BE THREADED ENDS.
3. HOSE & HOSE CONNECTIONS TO BE SUPPLIED BY FIELD.
4. INLET LINES TO BE EXTENDED INSIDE TANK.
5. ALL PIPE EXTENDED INSIDE TANK HAVE A HIGH POINT TAP TO PREVENT BACK-SIPHONAGE.
6. FIELD PURCHASE SEE DWG-2168-G-578 S05
7.
8. AUTOMATIC MODULATION OF THE VALVE HAS BEEN DISABLED BY LOCKING CLOSED THE IA SUPPLY.

* INDICATES EQUIPMENT TO BE SUPPLIED BY A VENDOR.

5-G-049 S01 & 5-G-049 S02 SUPERSEDE DRAWING 5-G-049

REFERENCE DRAWINGS

FLOW DIAGRAM LEGEND	CAR-2165-G-041
PRIMARY & DEMIN. WATER SYSTEMS-UNITS 1&2	CAR-2165-G-299

REV	DESCRIPTION	APPR'D
40	INCORPORATED: EC# 91684 (C9,C17,H11)	ELECTRONICALLY SIGNED
39	INCORPORATED: EC# 94964 (N3-N7)	ELECTRONICALLY SIGNED
38	INCORPORATED: EC# 91086 (N4-N8)	ELECTRONICALLY SIGNED
37	INCORPORATED: EC# 58517 (C1,E2-E6,F2-F6,G3-G6,N1)	ELECTRONICALLY SIGNED
36	INCORPORATED: EC# 79280 R3 (B15,G17-G19)	ELECTRONICALLY SIGNED
35	INCORPORATED: EC# 79280 (A6,A7,A13-A15,B15,G17-G19)	ELECTRONICALLY SIGNED
34	INCORPORATED: EC# 55908 (M6,M7,M8,N7,N8)	ELECTRONICALLY SIGNED
33	INCORPORATED: EC# 66252 (A6, A14)	ELECTRONICALLY SIGNED
32	INCORPORATED: EC# 64923 (F15, G15)	ELECTRONICALLY SIGNED
31	INCORPORATED: EC# 63707 (N10)	ELECTRONICALLY SIGNED

THIS DRAWING HAS BEEN PRODUCED AND IS CONTROLLED ON THE NED CAD/E SYSTEM. ANY REVISIONS TO THIS DOCUMENT SHOULD BE DONE USING THE CAD/E SYSTEM TO ASSURE PROPER CONTROL OF THE ELECTRONIC DRAWING DATABASE.

NUCLEAR SAFETY RELATED (Q-LIST)
YES ☐ NO ■ PARTIAL ☐ F.P.-Q ☐ R.W.-Q ☐

DUKE ENERGY
NUCLEAR ENGINEERING DEPARTMENT – RALEIGH, N.C.

PLANT: HARRIS NUCLEAR PROJECT – UNIT 1
SCALE: NONE

TITLE: FLOW DIAGRAM POTABLE & DEMINERALIZED WATER SYSTEMS UNIT 1

DWG NO. CAR-2165-G-49S01

CAR-2165-G-Ø49 SØ2

CONCENTRATES PUMP CONVECTION TANK 1&2A-NNS

½" TUBING — BY I&C — BY MECH

BEARING SEAL RETURN CONCENTRATES PUMP 1 & 2A-NNS CAR-2165-G-814 (L6)

BEARING SEAL SUPPLY CONCENTRATES PUMP 1 & 2A-NNS CAR-2165-G-814 (L6)

2" x 1" REDUCER

6DW-V5Ø1-1 — 6DW¾-594-1 — 6DW½-596-1 — 6DW-V499-1 — 6DW½-612-1 — 6DW¾-614-1 — P1 8932 — LG 8944 — 6DW-V498-1 — 6DW-V5Ø2-1 — 6DW¾-613-1 — 6DW1-611-1 — NITROGEN SYSTEM CAR-2165-G-Ø58 (A4) — 6NI1-263-1 — 6DW1-61Ø-1 — 6DW-R22-1 — 6DW¾-6Ø9-1 — 6DW-V5Ø3-1 — 6DW1-615-1 — 6DW½-6Ø2-1 — THIS DWG (G14) — 6DW1-6Ø8-1 — 6DW-V5Ø8-1 — 6DW-V496-1 — 6DW1-595-1 — 7DW-V497-1 — 7DW1-593-1 — PCV 8933

TO REM 3542 CAR-2165-G-105 (F1) — 7DW1-352-1&2

TO LINE FLUSH IN SEC WASTE SYS CAR-2165-G-Ø9Ø (G18) — 7DW1-287-1&2

TO REM 3530 & 3541 CAR-2165-G-105 (E1) — 7DW1-349-1&2

HOSE CONN AT SEC WASTE SAMPLE TANK PUMP AREA UNIT 1 — 7DW1-321-1&2 — 7DW-V21Ø-1&2

DEMINERALIZED WATER CAR-2165-G-Ø49SØ1 (E8) — 7DW-B15-1&2

7DW1-623-1 — TO HVAC CHILLER MAKE-UP CAR-2168-G-498 SØ2 (J1) — 7DW1-627-1 — 7DW1-347-1 — TO REM #3501A CAR-2165-G-105 (D1) — 7DW1-62Ø-1 — 7DW1-63Ø-1 — 7DW-V532-1 — 7DW1-621-1 — 7DW-V531-1 — CS SS — TO HVAC CHILLER MAKE-UP CAR-2168-G-499SØ2 (J1) — 7DW1-631-1 — 7DW-V534-1 — 7DW-V533-1 — CPAL VENDOR

7DW2-353-1 — TO TURBINE BLDG CAR-2165-G-105 (F1)

7DW6-1-1&2 — 7DW-V6-1 — 7DW3-6-1 — TO UNIT 1 REACTOR AUX BLDG CAR-2165-G-299 (J2)

7DW-V425-1&2 — TO HOT SHOP RAB EL 236.ØØ' — 7DW3-5ØØ-1&2 — 7DW-V17-1 — 7DW-V2-1 — 7DW-V211-1 — 7DW-V1Ø5-1&2

7DW1-58-1&2 — 7DW1-348-1 — 7DW4-294-1&2

TO LINE FLUSH IN WASTE MONITOR TKS PUMPS DISCHARGE 2165-G-816 (M12)

7DW-V276-1&2 — 7DW1-257-1&2 — TO SAMPLE SINK SAMPLE ROOM #10 CAR-2165-G-429 (C15)

7DW6-2-1 — TO CONDENSATE STORAGE TANK 1X-SAB CAR-2165-G-845 (D11) — 7DW-V216-1 — FD — 7DW1-237-1 — LCV 7111 — NOTE 8 — L.C. F.C. — 7DW-L4-1 — 7CT2-87-1 — 7DW4-24-1 — TO REFUELING WATER STORAGE TANK 1X-SAB CAR-2165-G-858 (D18)

7WL2-95-1&2 — 7DW3-529-1 — RMWST BYPASS CAR-2165-G-299 (B4)

TREAT LAUNDRY TANK PUMP CAR-2165-G-825SØ1 (N14) — 7DW4-3-1 — RMWST CAR-2165-G-299 (A4) — 7WL2-953-1-4 — WPS WASTE MONITOR TANK PUMP CAR-2165-G-816 (M14) — POST ACCIDENT SAMPLING SKID #2 2165-G-Ø52 (J8) — 7DW-V369-1 — 7DW¾-487-1

7DW1-397-1&2 — TO REM #3525 CAR-2165-G-105 (C1)

7DW4-31-1&2 — TO REM #3501B CAR-2165-G-105 (D1) — 7DW1-236-1&2 — FD — 7DW-V212-1&2

REACTOR AUXILIARY BUILDING
FUEL HANDLING BUILDING

TYP FOR 18 CONNS APPROX 30' APART, FROM HEADER ABOVE EL 286.ØØ' ALONG COLUMN LINE N CONN NEAREST CASK LOADING POOL FOR CASK WASHDOWN

7DW-G149-1-4 (TYP) — 7DW1-93-1-4 (TYP) — 7DW-V259-1-4 — 3" — 7DW½-286-1-4

CONNS IN SERV VALVE BOXES AT FUEL POOLS & TRANS CANAL IN UNIT 1 AREA

7DW-G15Ø-1&4 (TYP) — L.C. — 7DW1-91-1&4 (TYP) — 7DW2-249-1&4 — 7DW1-97-1 — 7DW-G154-1 — TUBING BY I&C — 7DW-P9-1 — 3/8" — 3/8" — 3/8" — TO UPENDER PIPING — UNIT #1 FUEL TRANSFER SYS CONT PANEL — 7DW½-151-1

CONNS IN SERV VALVE BOXES AT FUEL POOLS & TRANS CANAL IN UNIT 1 AREA

7DW3-26-1&4 — 7DW-V118-1-4 — 7DW-V4Ø1-2&3 — 7DW-V116-1&2 — 7DW3-28-1&2 — 7DW3-26-2&3 — 7DW4-296-1-4 — 7DW3-297-1-4 — 7DW4-96-1-4 — 7DW-G153-1-4 — EMERGENCY COOLING WATER HOSE CONNECTIONS FOR FUEL CASK HOSE RACK WITH 75' HOSE TO BE LOCATED MIDWAY — TO FHB CASK DECON & SPRAY SYS CAR-2168-G-578SØ4 (K1)

7DW-V231-2&3 — 7DW-V232-2&3 — FD — 7DW1-251-2&3 — 7DW-G154-2 — 7DW-G15Ø-2&3 (TYP) — 7DW1-91-2&3 (TYP)

CONNS IN SERV VALVE BOXES AT FUEL POOLS & TRANS CANAL IN UNIT 2 AREA

7DW1-168-1&4 — 7DW2-18-2&3 — 7DW1-168-2&3 — FILTER BACKWASH SYS CAR-2165-G-847 (B6) — 7DW-G156-1&4 — TO REFUEL WTR PURIF SYS UNIT 1 CAR-2165-G-Ø62 (F2) — 7DW2-18-1&4 — 7DW-G156-2&3 — FILTER BACKWASH SYS CAR-2165-G-847 (B14) — TO REFUEL WTR PURIF SYS UNIT 2 CAR-2165-G-Ø62 (H2)

SECONDARY WASTE PROCESSING ELEV 261.ØØ

DET A — 7DW¾-559-1 — DW SUPPLY TO MOBILE SOLID. MANIFOLD CAR-2165-G-826 (G2)

TO RADWASTE SOLIDIFICATION SYS CAR-2165-G-826 (J1) — 7DW2-241-1-4 — 7DW-V217-1-4

7DW-V286-1-4 — 7DW1½-4Ø8-1-4 — DET B — DR — V

DR — DET C — 7DW-V261-1-4 — 7DW1½-289-1-4 — 7DW-V3-1&2 — 7DW1½-29Ø-1-4 — 7DW1-361-1-4 — 7DW-V262-1-4 — TO SAMPLE SINK #8 CAR-2165-G-429 (E1Ø) — 7DW1-291-1-4 — TO REM 3544 CAR-2165-G-105 (I1)

7DW3-7-1-4 — 7DW2-32Ø-1-4 — 7DW-U4-1 — 7DW1-49Ø-1-4 — 7DW-P6-1 — 7DW-R12-1 — 7DW1½-493-1 — 7DW1-491-1 — MECH PLB — ED — 7DW1-492-1 — TO PLUMBING CAR-2168-G-662SØ1 (K1) — 2" DW

7DW3-239-1-4 — 7DW3-239-1-4

WASTE PROCESSING ELEV 261.ØØ

7DW1-31Ø-1-4 — TO SAMPLE SINK #9 CAR-2165-G-429 (A19) — 7DW-V277-1-4 — 7DW1-315-1-4 — TO RADWASTE SOLIDIFICATION SYS CAR-2165-G-826 (D1) — 7DW-V282-1-4 — 7DW1½-386-1-4 — 7DW3-39Ø-1-4 — 7DW-V289-1-4 — TO VOLUME REDUCTION SYSTEM CAR-2165-G-846SØ2 (A2) — 7DW-P25-1 — 7DW-V355-1-4 — 7DW1-388-1-4 — TO VOLUME REDUCT PUMPS GLAND SEAL CAR-2165-G-846SØ2 (B19) — TO WPB COOLING WATER SURGE TANK CAR-2165-G-876 (D4)

WASTE PROCESSING ELEV 291.ØØ

SECONDARY WASTE PROCESSING ELEV 216.ØØ'

TO AUXILIARY STEAM DESUPERHEATER CAR-2165-G-186 (I3) — 7DW1-323-3&4 — 7DW-V37-1&2

TO RO CONC EVAP ANTIFOAM ADD SKID CAR-2165-G-825SØ3 (K1) — 7DW1-324-1-4 — 7DW-V288-1-4

TO REM 3500A CAR-2165-G-105 (H1) — DET B — 7DW-V419-1 — 7DW1-381-1

TO RO CONCENTRATE EVAPORATOR 1-4A CAR-2165-G-825SØ2 (J1) — 7DW1½-66-1-4 — 7DW-V197-1-4

TO SAMPLE SINK #6 CAR-2165-G-429 (A1Ø) — 7DW1-254-1&2 — 7DW-V256-1&2

TO FILTER BACKWASH SYSTEM CAR-2165-G-849SØ1 (D7) — 7DW1-145-1-4 — 7DW-V195-1-4 — 7DW1-19-1-4

L&HS POLYELECTROLYTE FEED TANK 1-4X CAR-2165-G-825SØ1 (E8) — 7DW1-174-1-4 — 7DW-V285-1-4

TO AUX STEAM DESUPERHEATER CAR-2165-G-186 (I3) — 7DW1-323-1&2 — 7WL-V224-1-4 — TO RO CONC EVAP 1-4B CAR-2165-G-825SØ3 (L1) — 7DW½-245-1-4

7DW-V225-1-4 — TO RO CLEANING SKID CAR-2165-G-825SØ2 (K8) — 7DW1-246-1-4 — MFTDS POLYMER SKID 1364-897532 (F1) — MFTDS MIXING SKID CAR-2165-G-866 (M2) — 7DW-P31-1 — 7DW-V463-1 — 7DW-V539-1 — 7DW-V54Ø-1 — 7DW1-564-1 — 7DW-V495-1 — THIS DWG (D9) — 7DW1-6Ø8-1

7DW1-319-1-4 — TO TREATED L&HS STORAGE TANK CAR-2165-G-825SØ1 (M12) — 7DW1-356-1-4 — TO REM 3540 CAR-2165-G-105 (G1) — 7DW1-347-1-4 — 7DW-V256-3&4 — TO SAMPLE SINK #7 CAR-2165-G-429 (D5) — 7DW1-254-3&4 — 7DW1-199-1-4 — TO FILTER BACKWASH SYSTEM CAR-2165-G-849SØ2 (117) — 7DW1-146-1-4 — 7DW-V11-1 — 7DW1-19-1-4

7DW2-38-1&2 — 7DW-V4-1&2 — 7DW2-8-1-4 — DR — DET C — 7DW4-31-3&4 — 7DW2-38-3&4 — 7DW-V4-3&4 — DET C — DR

WASTE PROCESSING ELEV. 236.ØØ'

7DW-V5-1&2 — 7DW2-39-1&2 — TO SECONDARY WASTE HOLD-UP TANKS SHOT POT CAR-2165-G-Ø9Ø (M1) — 7DW2-8-1-4 — 7DW-G57-1-4 — 7DW-V264-1&2 — 7DW-V264-3&4 — DET A — 7DW1-56Ø-1 — TO SECONDARY WASTE FILTERS CAR-2165-G-847 (G5) — 7DW1-316-1&4 — TO SW EVAP PACKAGE 1&2X-NNS CAR-2165-G-Ø9Ø (H13) — 7DW1-293-1&2 — 7DW1-293-3&4 — TO SECONDARY WASTE EVAPORATOR PACKAGE 3&4X-NNS CAR-2165-G-48Ø (H13)

SECONDARY WASTE PROCESSING ELEV. 236.ØØ'

TO FD POLYELECTROLYTE TANK 1&2X CAR-2165-G-816 (L9) — 7DW1-244-1&2

WASTE PROCESSING ELEV 211.ØØ' — V — DR — DET B — DET C

7DW-V223-1&2 — 7DW1-244-3&4 — TO FD POLYELECTROLYTE FEED TANK 3&4X CAR-2165-G-866 (D8) — 7DW-V223-3&4

TO WPB FILTER BACK-WASH RECEIVING TANK CAR-2165-G-849SØ1 (N13)

7DW-V255-1&2 — TO SAMPLE SINK #2 CAR-2165-G-429 (H7) — 7DW1-253-1&2 — 7DW1-253-3&4 — 7DW-V255-3&4 — TO SAMPLE SINK #4 CAR-2165-G-429 (H14)

7DW-V196-1&2 — TO WPS WASTE EVAP CONC TANK PUMP SUCT CAR-2165-G-827 (L7) — 7DW1-59-1&2 — 7DW2-9-1-4 — 7DW2-65-1-4 — 7DW-V164-1-4

7DW1-24Ø-1-4 — 7DW¾-168-1-4 — TO FILTER BACKWASH TRANS TK PUMP SUCTION CAR-2165-G-849SØ2 (N1Ø) — TO DECON FACILITY EL 211.ØØ' HOT WTR HTR CAR-2168-G-662SØ3 (K3) — 7DW2-1Ø-1-4 — 7DW-V12-1-4 — 7DW-V279-1-4 — 7DW-V287-1-4 — TO SPENT RESIN TRANS PUMP A SEALS CAR-2165-G-815 (H1) — TO SPENT RESIN TRANS PUMP B SEALS CAR-2165-G-815 (H1) — 7DW¾-269-1-4 — 7DW2-234-1-4 — 7DW¾-267-1-4 — 7DW-V2Ø3-3&4 — 7DW1-187-3&4 — TO SECONDARY WASTE TREATMENT SYSTEM CAR-2165-G-48Ø (N14) — 7DW1-187-1&2 — TO SECONDARY WASTE TREATMENT SYSTEM CAR-2165-G-Ø9Ø (N14) — 7DW-V28Ø-1&2 — 7DW-V378-1&2 — 7DW-V344-3&4 — 7DW1-471-1-4 — DR — 7DW-V41Ø-1-4 — 7DW1-36Ø-3&4 — TO REM 3543B CAR-2165-G-105 (H1) — TO REM 3543A CAR-2165-G-105 (H1) — 7DW1-359-1&2

TO SECONDARY WASTE HOLD-UP TANKS SHOT POT CAR-2165-G-Ø9Ø (M1) — 7DW1-318-1-4 — 7DW-V11-1-4 — HOSE CONNECTION (TYP 41 PLACES) — DETAIL A

7DW1-317-1-4 — 7DW-V283-1-4 — VENT (TYP 13 PLACES) — DETAIL B

7DW1-318-1-4 — 7DW-V284-1-4 — DRAIN (TYP 5 PLACES) — DETAIL C

FOR NOTES AND REFERENCES SEE DWG CAR-2165-G-Ø49 SØ1

REV	DATE	DESCRIPTION	CHK	DWN	APPR'D
24	6/23/Ø1	INCORPORATED: ESR 95-ØØ425 R3Ø (K7-K1Ø)	ARM	RPP	DLS
23	6/23/Ø1	INCORPORATED: ESR 95-ØØ425 (K6,K8,K9,M7) REMOVED "CONSTRUCTION HOLD" (N7,N8)	ARM	RPP	DLS
22	6/23/98	THIS DRAWING HAS BEEN ELECTRONICALLY REDRAWN WITH DESIGN CHANGE	LLS	RPP	DLS
		INCORPORATED: ESR-98ØØ194 (F3)			

THIS DRAWING HAS BEEN PRODUCED AND IS CONTROLLED ON THE NED CAD/E SYSTEM. ANY REVISIONS TO THIS DOCUMENT SHOULD BE DONE USING THE CAD/E SYSTEM TO ASSURE PROPER CONTROL OF THE ELECTRONIC DRAWING DATABASE.

NUCLEAR SAFETY RELATED (Q-LIST)
YES ☐ NO ■ PARTIAL ☐ F.P.-Q ☐ R.W.-Q ☐

CAROLINA POWER & LIGHT COMPANY
NUCLEAR ENGINEERING DEPARTMENT – RALEIGH, N.C.

CP&L

PLANT: HARRIS NUCLEAR PROJECT – UNIT 1
SCALE: NONE

TITLE: FLOW DIAGRAM POTABLE & DEMINERALIZED WATER SYSTEMS UNIT 1

DWG NO. CAR-2165-G-Ø49 SØ2

CAR-2165
G-Ø5Ø

SPRAY NOZZLE (TYP.)

STRAIGHT BRANCH ARRANGEMENT

90° BRANCH ARRANGEMENT

ARR'GT.	(A) SOURCE LINE NO'S	NO. OF NOZZLES	(B) BRANCH LINE NO'S
STRAIGHT BRANCH	2CT4-59SA-1	19	2CT1-148SA-1
	2CT6-60SA-1	72	
	2CT4-61SB-1	19	2CT1-150SB-1
	2CT6-62SB-1	36	
90° BRANCH	2CT4-59SA-1	15	2CT1-149SA-1
	2CT4-61SB-1	15	2CT1-151SB-1
	2CT6-62SB-1	36	

DETAIL 1

[HDR. HAS-19 STR. BRANCH ARR'GTS. AND 15 90° BRANCH ARR'GTS.]

2CT4-59SA-1

SEE DETAIL 1 (C2)

2CT6-6ØSA-1

[HDR. HAS-72 STR. BRANCH ARR'GTS.]

2CT6-163SA-1

BLIND FLG. (NOTE 7)

FD & TEST CONN.

2CT-V98SA-1

2CT-V84SA-1 L.O.

2CT8-1ØSA-1

2CT-V27SA-1

2CT1-46SA-1

2CT-V28SA-1

2CT-V29SA-1

2CT1-85SA-1

FD & TEST CONN.

DOME AREA

TE 7542 A SA, TE 7542 B SA, TE 7542 C SA

TE 7541 A SB, TE 7541 B SB, TE 7541 C SB

PT 716Ø A SA, PT 716Ø B SB

ANNULUS AREA

SECONDARY SHIELD WALL

PRESSURE & TEMPERATURE INSTRUMENTATION IN DOME & ANNULUS AREAS

[HDR. HAS-19 STR. BRANCH ARR'GTS. AND 15 90° BRANCH ARR'GTS.]

2CT4-61SB-1

SEE DETAIL 1 (C2)

[HDR. HAS-36 STR. BRANCH ARR'GTS. AND 36 90° BRANCH ARR'GTS.]

2CT6-62SB-1

2CT-V87SB-1 L.O.

2CT6-162SB-1

BLIND FLG. (NOTE 7)

FD & TEST CONN

2CT-V65SB-1

2CT8-15SB-1

2CT-V51SB-1

2CT1-55SB-1

2CT-V52SB-1

2CT-V53SB-1

FD & TEST CONN

2CT11-86SB-1

INSIDE REACTOR CONTAINMENT

OUTSIDE REACTOR CONTAINMENT

OPENS ON CSAS SIGNAL

2CT-V25SA-1 (NOTE 4) (NOTE 6)

FITTINGS & VALVES BY I&C

FT 7122 A SA

FE 7122 A S

FT 7132 A

7CT1-72-1

7CT-V97-1 (TYP)

2CT6-14SA-1

2CT1-146SA-1

2CT-V166SA-1

2CT-V167SA-1

2CT-V22SA-1

2CT-V23SA-1

7CT1-166-1

AIR TEST & TEST VENT

2CT1-45SA-1

2CT-V21SA-1

CAVITATING VENTURI 1A-SA

2CT-V113SA-1

2CT-V19SA-1

2CT1-1ØØSA-1

2CT1-23SA-1

2CT-V24SA-1

2CT1-42SA-1

2CT-V11SA-1

PT 7131 A S

PT 7130 A S

2CT1-74SA-1

2CT1-41SA-1

2CT8-1ØSA-1

LOCAL SAMPLE

2CT-V26SA-1

2CT-V17SA-1

2CT-V18SA-1

2CT1-4ØSA-1

PT 7128 A S

2CT-V114SA-1

2CT-V115SA-1

2CT1-12SA-1

2CT12-4SA-1

2CT1-143SA-1

2CT-V182SN-1 ¾ x ½ RED.

2CT-V1Ø5A-1

6CT1-171-1

CONTAINMENT SPRAY PUMP 1A-SA SC-2 (NOTE 3)

2CT-S1SA-1 NOTE 2

2CT1-153SA-1

2CT1-31SA-1

2CT-V66SA-1

2CT-V111ØSA-1

2CT-R6SA-1 L.C.

2CT¾-142SA-1

2CT-V16SA-1

2CT1-43SA-1

2CT-V9SA-1

2CT2-11SA-1

EDUCTOR 2CT-X1SA-1 SC-2

2CT2-1Ø6SA-1

2CT-V14SA-1

2CT1-44SA-1

2CT2-161SA-1

2CT-U5SA-1

FX 7153 S

3CT½-176SB-1

3CT-V187SB-1 NOTE 1Ø

3CT-V186SA-1

2CT1-175SB-1

NOTE 1Ø

OUTSIDE TANK BLDG

INSIDE TANK BLDG

EMERGENCY NaOH ADDITION

3CT-V95SN-1 L.C.

2CT2-34SA-1

3CT-V184SA-1

2CT2-27SA-1

3CT-V92SA-1 L.C.

2CT2-39SN-1

3CT-V93SB-1 L.C.

2CT2-27SA-1

OPENS ON CSAS SIGNAL, CLOSES ON LOW LEVEL IN NaOH TANK

3CT-V85SA-1

FE 7152 TS

3CT-V195SB-1

3CT1-17ØSB-1

3CT2-3ØSB-1

3CT-V185SB-1

3CT2-36SB-1

2CT1-51SB-1

2CT-V35SB-1

2CT-V36SB-1

2CT2-185SB-1

EDUCTOR 2CT-X2SB-1 SC-2

2CT2-16SB-1

2CT-V38SB-1

2CT1-5ØSB-1

2CT-V31SB-1

2CT2-16ØSB-1

2CT-U4SB-1

3CT-V88SB-1

3CT-V197SB-1

3CT½-181SB-1

3CT1-7ØSAB-1

2CT-R7SB-1 L.C.

2CT¾-144SB-1

2CT12-3SA-1

2CT1-145SB-1

2CT-V3SB-1

2CT12-6SB-1

2CT-V5SB-1

AIR TEST & TEST VENT

7CT1-167-1

2CT-V47SB-1

FITTINGS & VALVES BY I&C

FT 7122 B SB

FE 7122 B S

2CT-V46SB-1

2CT1-53SB-1

2CT-V43SB-1

OPENS ON CSAS SIGNAL

2CT1-147SB-1

2CT-V168SB-1

2CT-V169SB-1

CAVITATING VENTURI 1B-SB

FE 7132 B

2CT1-54SB-1

2CT8-15SB-1

2CT1-52SB-1

2CT-V44SB-1

2CT-V33SB-1

2CT1-49SB-1

2CT-V32SB-1

2CT-V4BSB-1

2CT1-48SB-1

PT 7131 B S

PT 7130 B S

2CT-V2ØSB-1

2CT-V39SB-1

2CT1-76SB-1

2CT-V41SB-1

LOCAL SAMPLE

2CT-V183SN-1 ¾" x ½" RED

2CT-S2SB-1 (NOTE 2)

2CT1-154SB-1

2CT1-155SB-1

6CT1-172-1

7CT6-21-1

PT 7128 B S

2CT-V4ØSB-1

2CT1-47SB-1

2CT-V116SB-1

2CT-V117SB-1

2CT1-13SB-1

2CT12-6SB-1

2CT-V1Ø8SB-1

2CT-V1Ø9SB-1

2CT1-32SB-1

CONTAINMENT SPRAY PUMP 1B-SB SC-2 (NOTE 3)

2CT-V49SB-1 (NOTE 4) (NOTE 6)

2CT6-19SB-1

7CT1-72-1

7CT-V97-1 (TYP.)

LE 716Ø A S A

LE 716Ø B S B

TE 7133 A S A

TE 7133 B S B

WALL

SUMP 1A

SUMP 1B

49 47 48 50

IRC ORC

SEE DRAWING 5-G-81Ø (M2) FOR CONT.

RECIRC. SUMPS

1B-SB

2CT-V7SB-1

2CT-J2SB-1 EXP. JOINT

NOTE 5

2CT12-7SB-1

7CT1-1Ø9-1

2CT1-1Ø2SB-1

2CT-V126SB-1 L.C.

2CT-V127SB-1

CONTAINMENT SPRAY VALVE CHAMBERS SC-2

1A-SA

2CT-V6SA-1

2CT-J1SA-1 EXP. JOINT

NOTE 5

2CT12-3SA-1

2CT1-35SA-1

2CT-V121SA-1

2CT-V12ØSA-1 L.C.

7CT1-11Ø-1

3CT-X3SAB-1

3CT-X4SAB-1

3CT2-1Ø7SAB-1

VACUUM BREAKERS

3CT2-1Ø8SAB-1

PT 7154 S

NaOH FILL CONN

3NI-V128SAB-1

TO RM ATMOS.

3CT-R1SAB-1

7CT1¼-18-1

3CT1-17SAB-1

3CT-V143SAB-1

3CT1-2SAB-1

3CT-V76SAB-1

7NI1-152-1

7NI-P6-1

7NI-V126-1

NITROGEN CAR-2165-G-Ø58 (J9)

7NI1-189-1

7NI-V131-1

7NI1-178-1

7NI-V129-1

FD

PI 7151

7NI1-152-1

3NI-V127SAB-1

3NI-V176SAB-1

3NI1-177SAB-1

3CT-V56SAB-1

3CT2-24SAB-1

3CT2-25SAB-1

3CT2-115SAB-1

7NI1-19Ø-1

7NI-V132-1

3CT-V18ØSAB-1

LT 7166 S B

LT 715Ø S A

3CT-V67SAB-1

3CT-V181SAB-1

3CT-V68SAB-1

2CT2-165SAB-1

2CT2-66SAB-1

3CT1½-174SAB-1

3CT1½-173SAB-1

3CT1-68SAB-1

3CT-V81SAB-1 L.O.

3CT-V14ØSAB-1

3CT-V79SAB-1

3CT-V8ØSAB-1

7CT1-116-1

ED

LOCAL SAMPLE

3CT1-114SAB-1

2CT2-26SAB-1

LOCATE ABOVE MIN. WATER LEVEL IN TECH. SPEC.

VENT

LT 7116

7CT8-99-1

SIS HYDROTEST SYS. CAR-2165-G-81Ø (A18)

7S12-279-1

REFUELING WATER STORAGE TANK 47Ø,ØØØ GAL. 1X-SAB SC-2

SEE NOTES 8 & 9

7CT-V58-1 L.O.

7CT6-21-1

7CT2-87-1

DEMINERALIZED WTR CAR-2165-G-Ø49SØ2 (F4)

7CT-U1-1

7CT-V94-1 L.O.

7CS3-79Ø-1

CHARGING PUMP DISCH CAR-2165-G-8Ø4 (M1)

TE 711Ø S

2CT-V59SAB-1 L.C.

FUNNEL

BOTTOM EL.261'-6

2CT1-156SA-1

2CT-V174SA-1

LT ØØ9Ø W

LT ØØ91 II

2CT-V175SA-1

2CT-V176SB-1

LT ØØ92 III W

LT ØØ93 IV

2CT-V177SB-1

2CT1-97SB-1

2CT-V1Ø6SB-1

LT 711Ø S

BY I&C

7CT4-164-1

CONT. ON CAR-2165-G-811 (A1Ø)

7CT8-117-1

2CT4-88SAB-1

2CT1-157SA-1

2CT1-158SB-1

2CT1-159SB-1

2CT-V54SAB-1

2CT-V55SAB-1

TO SAMPLE SINK #1Ø CAR-2165-G-429 (D11)

2CT2-9ØSAB-1

2CT-V144SAB-1

LC

SIS HYDRO TEST PUMP SUCT. CAR-2165-G-81Ø (B18)

7SI2-276-1

2CT14-79SA-1

2SI14-255SA-1

2CT12-4SA-1

2CT-V2SA-1

SIS RHR PUMP A CAR-2165-G-81Ø (C19)

2CT24-1SAB-1

2CT-V188SA-1

2CT-V189SA-1

2CT1½-177SA-1

SIS RHR PUMP A & B OUTLETS CAR-2165-G-81Ø (C18)

2S18-265SA-1

2CT8-65SA-1

2CT1½-178SA-1

2CT8-77SA-1

2CT-V19ØSA-1

2CT-V191SA-1

2CT2-28SAB-1

2CT-V8SA-1

SIS RHR PUMP B CAR-2165-G-81Ø (E19)

2CT14-9SB-1

2SI14-256SB-1

2CT16-8SAB-1

2CT-V192SA-1

2CT-V193SA-1

2CT12-75SA-1

2CT½-179SA-1

CVCS CHARGING PUMPS CAR-2165-G-8Ø5 (K14)

SFP PUMP SUCTION CAR-2165-G-3Ø5 (E12)

7SF12-63-1

2CT-V15SA-1

2CT8-77SA-1

2CT-V194SA-1

2CT-V195SA-1

2CT1-18ØSA-1

DR

2CT12-65B-1

2CT-V3SB-1

HYDRO TEST CONN.

3CT¾-168SAB-1

3CT-V865AB-1

3CT2-5SAB-1

"T" NOTE 1

2CT-V145SB-1

7CT-D2-1

7CT-D3-1

7CT1-113-1

7CT4-73-1

SFPCCS, PURIF. PUMP DISCHARGE CAR-2165-G-Ø62 (B16)

7CT-D1-1

7CT1-111-1

ED

NOTES

1. OVERIDE TO CLOSE ON "T" SIGNAL DURING TESTING.
2. TEMPORARY STRAINER FOR INITIAL FLUSHING. REMOVE BEFORE STARTUP.
3. PUMP STARTS ON CSAS (CONTAINMENT SPRAY ACTUATION SIGNAL) IN CASE OF COINCIDENT LOSS OF OFFSITE POWER PUMP WILL START IN THE SECOND LOAD BLOCK OF THE EMERGENCY GENERATOR.
4. VALVE NORMALLY CLOSED WITH THE CIRCUIT BREAKER LOCKED OPEN TO ENSURE NO POWER TO ACTUATE THE MOTOR OPERATOR ON THE VALVE.
5. DURING TESTING, LOCK CIRCUIT BREAKER OPEN TO KEEP THE VALVE IN CLOSED POSITION.
6. WITH A GIVEN TRAIN IN THE TEST MODE CLOSE THE RESPECTIVE TRAIN VALVES ON "T" SIGNAL.
7. DRAIN CONNECTION TO REFUELING CAVITY DURING CHECK VALVE TESTING.
8. HEAT TRACING ON THE TANK IS PROVIDED BY MEANS OF HOPPER HEATERS FOR FREEZE PROTECTION AND TEMPERATURE MAINTENANCE.
9. THE TANK IS PROVIDED WITH THERMAL INSULATION AND PROTECTIVE ALUMINUM JACKETTING AROUND THE WHOLE CIRCUMFERENCE AND UP TO A HEIGHT OF TWENTY-THREE (23) FEET FROM BOTTOM OF THE TANK.
10. THREADED NIPPLE & CAP TO BE PROVIDED FOR OPERATIONS TO INSTALL TEMPORARY GAUGE AT TIME OF TESTING.

REFERENCE DRAWINGS

LIST OF DRAWINGS	CAR-1364-B-125
PIPING LINE LIST	CAR-1364-B-ØTØ
VALVE & SPECIALTY LIST	CAR-1364-B-Ø69
INSTRUMENT LIST	CAR-2166-B-432
FLOW DIAGRAM LEGEND	CAR-2165-G-Ø41

REV	DATE	DESCRIPTION	DWN	CHK	APPRVD
27		INCORPORATED: EC# 74287 (H1Ø,H11,H12)		ELECTRONICALLY SIGNED	
26		INCORPORATED: EC# 50619 (H11)		ELECTRONICALLY SIGNED	
25	5/4/Ø3	THIS DWG HAS BEEN ELECTRONICALLY REDRAWN WITH DESIGN CHANGE. INCORPORATED EC# 50961 (G14, G15, H13, H14, H15, I14, I15, J15); AND EC# 51596 (F15, F16)	JAP	WKD	CHG

THIS DRAWING HAS BEEN PRODUCED AND IS CONTROLLED ON THE NED CAD/E SYSTEM. ANY REVISIONS TO THIS DOCUMENT SHOULD BE DONE USING THE CAD/E SYSTEM TO ASSURE PROPER CONTROL OF THE ELECTRONIC DRAWING DATABASE.

NUCLEAR SAFETY RELATED (Q-LIST)
YES ■ NO □ PARTIAL ■ F.P.-Q □ R.W.-Q □

CAROLINA POWER & LIGHT COMPANY
NUCLEAR ENGINEERING DEPARTMENT - RALEIGH, N.C.

CP&L

PLANT: HARRIS NUCLEAR PROJECT - UNIT 1

SCALE: NONE

TITLE: FLOW DIAGRAM CONTAINMENT SPRAY SYSTEM UNIT 1

DWG NO. CAR-2165 G-ØØ5Ø

CAR-2165-G-Ø51

STEAM GENERATOR 1A-SN

STEAM GENERATOR 1B-SN

STEAM GENERATOR 1C-SN

2BD2-65SN-1 | 2BD2-1SN-1 | 2BD2-2SN-1 | 2BD4-2SN-1 | 2BD4-3SN-1 | 2BD1-4SN-1 | 2BD3-218SN-1 | 2BD3/4-25SN-1 | 2BD3/4-10ISN-1 | 2FW3/4-40SN-1 | 2BD3/4-68SN-1 | 2BD-V66SN-1 | 2BD-V74SN-1 | 2BD-V75SN-1 | 2BD-V67SN-1 | 2BD-V3SN-1 | 2BD-V115SN-1 | 2BD-V116SN-1 | 2BD-P6SB-1 F.C. | 2SP3/4-8ØSN-1 | 2SP-V89SN-1 | 2SP-V89SB-1 S F.C. | 2SP-V117SN-1 | 2SP-V91SB-1 S F.C. | 2SP3/4-77SN-1 | LT Ø477 | PDT 84ØØ A S | NOZZ. 33 | NOZZ. 32 | NOZZ. 31 | NOZZ. 3Ø | IMB | OMB | IRC | ORC | BY MECH | BY I&C | M 54 | M 51 | S F.C. | 2SP-V12ØSA-1 | 2BD-V11SA-1 | 3BD1-215SN-1 | 2BD-V183SN-1 | 3BD-V186SN-1 | 2BD-V22SN-1 | 2BD-V23SN-1 | 2BD1-37SN-1 | 2BD1-212SN-1 | ED | CS LAS | 3BD2-123SN-1 | 3BD-V1ØSSN-1 L.C. | 3BD4-13SN-1 | 3BD-V12SN-1 | 3BD-V84SN-1 | 3BD1-77SN-1 | 3BD-V85SN-1 | 3BD1-3ØSN-1 | 3BD-V135SN-1 | PT 8405 A1 SA | PT 8405 A1 S | PT 8405 A2 SA | PT 8405 A2 SB | 5BD4-74-1 | 5BD-V138-1 | 5BD-V137-1 | DR CS LAS | 5BD-V28-1 | 5BD4-19-1 | 5BD-V3Ø-1 | FCV 8405 A F.C. | 5BD-P9-1 | 6BD4-137-1 | 5BD-V29-1 | 5BD1-36-1 | 5BD6-14Ø-1 | 6BD6-126-1 | 6BD6-16-1 | 6BD6-22-1 | TO FLASH TANK 1X-NNS CPL-2165-G-Ø51SØ2 (E1) | TO STM. GEN. WET LAY-UP SYS. 2165-G-Ø89 (M14) | 2 1/2"- 9ØØ# C.S. BLD. FLG. | STEAM GEN. 1A SAMPLING TO SAMP. COND RACK CPL-2165-G-Ø89SØ2 (B3) | STEAM GEN. 1A SAMPLING TO SAMPLE PANEL CAR-2165-G-Ø52 (E16) | AUXILIARY BUILDING TURBINE BUILDING

2BD2-66SN-1 | 2BD2-5SN-1 | 2BD4-6SN-1 | 2BD4-7SN-1 | 2BD1-8SN-1 | 2BD3/4-26SN-1 | 2BD3-219SN-1 | 2BD3/4-10ØSN-1 | 2FW3/4-55SN-1 | 2BD3/4-68SN-1 | 2BD3/4-69SN-1 | 2BD-V76SN-1 | 2BD-V77SN-1 | 2BD-V69SN-1 | 2BD-V6SN-1 | 2BD-V117SN-1 | 2BD-V118SN-1 | 2BD-P7SB-1 F.C. | 2SP3/4-79SN-1 | 2SP-V84SN-1 | 2SP-V85SB-1 S F.C. | 2SP-V118SN-1 | 2SP-V86SB-1 S F.C. | 2SP3/4-76SN-1 | LT Ø487 | PDT 84ØØ B S | NOZZ. 33 | NOZZ. 32 | NOZZ. 31 | NOZZ. 3Ø | IMB | OMB | IRC | ORC | BY MECH | BY I&C | M 55 | M 52 | S F.C. | 2SP-V121SA-1 | 2BD-V15SA-1 | 2BD-V184SN-1 | 3BD-V187SN-1 | 3BD1-216SN-1 | 2BD-V24SN-1 | 2BD-V25SN-1 | 2BD1-38SN-1 | 2BD1-213SN-1 | ED | CS LAS | 3BD2-124SN-1 | 3BD-V189SN-1 L.C. | 3BD4-14SN-1 | 3BD-V16SN-1 | 3BD-V175N-1 | 3BD1-78SN-1 | 3BD-V82SN-1 | 3BD-V83SN-1 | 3BD1-31SN-1 | PT 8405 B1 SA | PT 8405 B1 S | PT 8405 B2 SA | PT 8405 B2 SB | 5BD6-142-1 | 5BD4-75-1 | FCV 8405 B | 5BD-V31-1 | 5BD-P1Ø-1 | 5BD-V32-1 | 5BD-V133-1 | 5BD-V134-1 | DR | 6BD6-127-1 | 6BD6-23-1 | TO FLASH TANK 1X-NNS CPL-2165-G-Ø51SØ2 (E1) | 5BD1-36-1 | 5BD-V33-1 | 5BD4-2Ø-1 | 6BD4-138-1 | 6BD6-17-1 | TO STM. GEN. WET LAY-UP SYS. 2165-G-Ø89 (K14) | 2 1/2"- 9ØØ# C.S. BLD. FLG. | STEAM GEN. 1B SAMPLING TO SAMP. COND RACK CPL-2165-G-Ø89SØ2 (B3) | STEAM GEN. 1B SAMPLING TO SAMPLE PANEL CAR-2165-G-Ø52 (E16) | AUXILIARY BUILDING TURBINE BUILDING

2BD2-67SN-1 | 2BD2-9SN-1 | 2BD4-9SN-1 | 2BD4-11SN-1 | 2BD1-12SN-1 | 2BD3/4-27SN-1 | 2BD3-22ØSN-1 | 2BD3/4-105SN-1 | 2FW3/4-48SN-1 | 2BD3/4-7ØSN-1 | 2BD-V78SN-1 | 2BD-V79SN-1 | 2BD-V71SN-1 | 2BD-V9SN-1 | 2BD-V119SN-1 | 2BD-V120SN-1 | 2BD-P8SB-1 F.C. | 2SP3/4-78SN-1 | 2SP-V79SN-1 | 2SP-V8ØSB-1 S F.C. | 2SP-V119SN-1 | 2SP-V81SB-1 S F.C. | 2SP3/4-75SN-1 | LT Ø497 | PDT 84ØØ C S | NOZZ. 33 | NOZZ. 32 | NOZZ. 31 | NOZZ. 3Ø | IMB | OMB | IRC | ORC | BY MECH | BY I&C | M 56 | M 53 | S F.C. | 2SP-V122SA-1 | 2BD-V19SA-1 | 2BD-V185SN-1 | 3BD-V188SN-1 | 3BD1-217SN-1 | 2BD-V26SN-1 | 2BD-V27SN-1 | 2BD1-39SN-1 | 2BD1-214SN-1 | ED | CS LAS | 3BD-V11ØSN-1 L.C. | 3BD4-15SN-1 | 3BD-V8ØSN-1 | 3BD1-73SN-1 | 3BD-V2ØSN-1 | 3BD-V81SN-1 | 3BD1-32SN-1 | 3BD-V21SN-1 | 3BD2-125SN-1 | PT 8405 C1 SA | PT 8405 C1 S | PT 8405 C2 SA | PT 8405 C2 SB | 5BD4-76-1 | 5BD-V35-1 | FCV 8405 C F.C. | 5BD-P11-1 | 6BD4-139-1 | 5BD-V36-1 | 5BD-V135-1 | 5BD-V34-1 | 5BD4-21-1 | 5BD-V136-1 | DR LAS CS | 5BD1-36-1 | 6BD6-18-1 | 6BD6-24-1 | TO FLASH TANK 1X-NNS CPL-2165-G-Ø51SØ2 (F1) | 6BD6-128-1 | 5BD6-141-1 | 2 1/2"- 9ØØ# C.S. BLD. FLG. | TO STM. GEN. WET LAY-UP SYS. 2165-G-Ø89 (J14) | STEAM GEN. 1C SAMPLING TO SAMP. COND RACK CPL-2165-G-Ø89SØ2 (B4) | STEAM GEN. 1C SAMPLING TO SAMPLE PANEL CAR-2165-G-Ø52 (F16) | AUXILIARY BUILDING TURBINE BUILDING

REFERENCE DRAWINGS:

FLOW DIAGRAM LEGEND	CAR-2165-G-Ø41
FEEDWATER AND AUX FEEDWATER SYSTEMS	CAR-2165-G-Ø44
SAMPLING SYSTEM	CAR-2165-G-Ø52
EMF PIPING & INST DIAGRAM	1364-Ø33329
STM. GEN. BLOWDOWN HEAT RECOVERY & CLEAN-UP SYSTEM	CPL-2165-G-Ø51 SØ2

REV	DATE	DESCRIPTION	DWN	CHK	APPROVED
3Ø		INCORPORATED: EC 66533 (C5, H5, L5)			ELECTRONICALLY SIGNED & DATED
29	9/23/Ø1	INCORPORATED: ESR 97-ØØ8Ø8 (AS CIRCLED)	JWB	RPP	DLS

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NUCLEAR SAFETY RELATED (Q-LIST)
YES ■ NO □ PARTIAL ■ F.P.-Q □ R.W.-Q □

CAROLINA POWER & LIGHT COMPANY
NUCLEAR ENGINEERING DEPARTMENT - RALEIGH, N.C.

PLANT: HARRIS NUCLEAR PROJECT - UNIT 1

SCALE: NONE

TITLE: FLOW DIAGRAM STEAM GENERATOR BLOWDOWN SYSTEM

DWG NO. CAR-2165 G-Ø51

CPL-2165
G-051S02

FW HTR # 3
1A-NNS

FW HTR # 3
1B-NNS

SGB
DRAIN
TANK
1X-NNS

ATM
OUTDOORS

RELIEF VALVE
6CE-R25-1 OUTLET
CPL-2165-G-045S01
(J10)

FLASH
TANK
1X-NNS

BLOWDOWN
REGENERATIVE
HEAT EXCHANGER
1X-NNS

CONDENSER
1X-NNS

CONDENSATE
MIXING NOZZLE

RESIN TRAP
1X-NNS

RESIN TRAP
1A-NNS

RESIN TRAP
1B-NNS

RESIN TRAP
1C-NNS

BLOWDOWN PARTICULATE
FILTERS

1A-NNS

1B-NNS

DEMIN BED
1A-NNS

DEMIN BED
1B-NNS

DEMIN. BED
1C-NNS

BLOWDOWN DEMINERALIZERS

DET. B
(TYPICAL EQUIP. DRAIN)

REFERENCE DRAWINGS:

FLOW DIAGRAM – STEAM GENERATOR BLOWDOWN SYSTEM — CAR-2165-G-051

NOTES:

1. REDUCERS ARE SUPPLIED BY LEVEL-CONTROL VALVE VENDOR.
2. * VENDOR SUPPLIED

REV	DATE	DESCRIPTION	DWN	CHK	DPE	DPPE
5		INCORPORATED: EC# 61953 (C3,C10,C13)	ELECTRONICALLY SIGNED			
4	11/18/98	INCORPORATED: ESR-960Ø163 (B6-B8,C6-C8)	ARM	RPP	N/A	DLS
3	8/5/96	INCORPORATED: ESR-960Ø256 (D4,D5,E5,F4-F6)	LLS	RPP	NRB	DLS
2	8/30/95	INCORPORATED: ESR-940Ø033 (AS CIRCLED)	LLS	RPP	GOW	DPK
1	8/4/95	INCORPORATED: ESR-940Ø033 (PARTIAL TURNOVER PER REV. 5) (G10-G15,H10-H15)	LLS	RPP	GOW	DPK
Ø	4/24/94	ISSUED FOR PCR-6224	GRS	RPP	MMP	MMP FOR WAS

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NUCLEAR SAFETY RELATED (Q-LIST)
YES ☐ NO ☐ PARTIAL ■ F.P.-Q ☐ R.W.-Q ■

CAROLINA POWER & LIGHT COMPANY
NUCLEAR ENGINEERING DEPARTMENT – RALEIGH, N.C.

CP&L

PLANT: HARRIS NUCLEAR PROJECT – UNIT 1

SCALE: NONE

TITLE: FLOW DIAGRAM
STEAM GENERATOR
BLOWDOWN HEAT RECOVERY
& CLEAN UP SYSTEM

DWG NO. CPL-2165
G-051 SØ2

CAR–2165
G–Ø52

PRIMARY SAMPLING PANEL 1A–NNS
FLOW DIAGRAM–(1364–6774 & 6781)
PANEL ARRGT–(1364–6782)

PRIMARY SAMPLING PANEL 1B–NNS
FLOW DIAGRAM–(1364–6694)
PANEL ARRGT–(1364–6692)

REACTOR COOLANT POST–ACCIDENT SAMPLING SYSTEM
FLOW DIAGRAM–(1364–52455)

NOTES:

1. TAPS AVAILABLE FOR BORON ANALYZER IF FUTURE NEEDS DICTATE.
2. TUBING FROM THE RCS HOT LEGS TO THE GROSS FAILED FUEL DETECTOR (GFFD) SHOULD BE ROUTED IN ACCORDANCE WITH THE LAYOUT ON DWG CAR–2166–G–551 SØ2. HOWEVER VARIATIONS IN THE ROUTING ARE PERMITTED PROVIDING NOTES 3 AND 4 ARE SATISFIED.
3. THE TUBING RUNS FROM EITHER LOOP 2 OR LOOP 3 RCS HOT LEG SHOULD BE APPROXIMATELY EQUAL TO ALLOW THE SAME DELAY TIME FROM EACH LOOP. SEE CALCULATION NSSS–ØØ44 FOR LENGTHS AND DELAY TIMES. A TOLERANCE OF +/–1Ø FEET IS PROVIDED.
4. TUBING FROM M–78A TO THE FIRST SUPPORT UPSTREAM OF M–78A MUST BE ROUTED AND SUPPORTED AS SHOWN ON CAR–2166–G–551 SØ2. FOR APPROXIMATELY TEN (1Ø) FEET ON THE DOWNSTREAM SIDE OF PENETRATION M78A, THE RUN MUST BE ROUTED EXACTLY AS SHOWN ON CAR–2166–G–551 SØ2.
5. VALVES BY INSTRUMENTATION (BM #3Ø41).
6. CLASS BREAK AT FLOW REDUCER PER NOTE 5 OF DRAWING CAR–2165–G–ØØ41.

REFERENCE DRAWINGS

VALVE AND SPECIALTY LIST	CAR–1364–B–Ø69
PIPING LINE LIST	CAR–1364–B–Ø78
INSTRUMENT LIST	CAR–2166–B–432
FLOW DIAGRAM LEGEND	CAR–2165–G–Ø41

REV	DATE	DESCRIPTION	DWN	CHK	DPE	DPPE
3Ø		INCORPORATED: EC 4Ø633Ø (19)	ELECTRONICALLY SIGNED			
29		INCORPORATED: EC 298244 (B2–B3,C2–C3,G18–G19)	ELECTRONICALLY SIGNED			
28		INCORPORATED: EC# 88769 & 8877Ø (M8)	ELECTRONICALLY SIGNED			
27		INCORPORATED: EC# 89555 (K13, K14)	ELECTRONICALLY SIGNED			
26		INCORPORATED: EC# 68189 (D2, H18)	ELECTRONICALLY SIGNED			
25	1Ø/19/Ø4	INCORPORATED: EC# 5Ø779 (C1)	JAP	RPP	N/A	CRW
24	12/3Ø/99	INCORPORATED: ESR–95ØØ153 (F13–F16,G13–G16)	ARM	RPP	N/A	DLS
23	11/11/97	INCORPORATED: ESR–97ØØ669 (B5)	LLS	RPP	JHT	WMP
22	3/25/96	INCORPORATED:ESR–95Ø0857 (C3,C4)	LLS	RPP	TBB	SHS
21	6/6/94	INCORPORATED:PCR–695Ø (H9, L1Ø, L11)	GRS	LLS	MMP	WAS
2Ø	1Ø/8/93	THIS DRAWING HAS BEEN ELECTRONICALLY REDRAWN WITH DESIGN CHANGE	GRS	RPP	MMP	WAS
		INCORPORATED:PCR–6161 FR–Ø5, FR–Ø6 (16–11Ø,J6,J8,J9,K8,L7,L8,L9)				

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NUCLEAR SAFETY RELATED (Q–LIST)
YES ■ NO □ PARTIAL ■ F.P.–Q □ R.W.–Q □

DUKE ENERGY
NUCLEAR ENGINEERING DEPARTMENT – RALEIGH, N.C.

PLANT: HARRIS NUCLEAR PROJECT – UNIT 1 SCALE: NONE

TITLE: FLOW DIAGRAM SAMPLING SYSTEM–(NUCLEAR)

DWG NO. CAR–2165 G–Ø52

CAR-2165
G-058

NITROGEN STORAGE
SEE EMDRAC DWG. 1364-6149

HYDROGEN STORAGE
SEE EMDRAC DWG. 1364-50989

OXYGEN STORAGE
SEE EMDRAC DWG. 1364-5692

CARBON DIOXIDE STORAGE
SEE EMDRAC DWG. 1364-6703

TO CONC. PUMP 1&2A CONVEC. TK CAR-2165-G-849 S02 (B9)

FROM NITROGEN SUPPLY THIS DWG. (J6)

FROM NITROGEN SUPPLY THIS DWG. (J6)

CONDENSER IX-NNS

ZONE 1 ZONE 2

ZONE 1 ZONE 2

THIS DWG. (F7)

DWST CAR-2165-G-049501 (C-17)

YARD DRAINS SEE NOTE 1

VENT TO ATMOS

YARD DRAIN SEE NOTE 1

TO LABS EL. 276.00' WPB

TO LABS (15 REQ'D)

TO LABORATORY EL. 276.00' WPB

WASTE PROCESS BUILDING

WPS FILTER BW N_2 ACCUM 1-4B-NNS CAR-2165-G-849 S02 (G16)

TO GAS ANALYZER RACK 1&2A

TO GAS ANALYZER RACK 1&2B

WPS CATALYTIC RECOMBINER PACKAGE NO. 1 CAR-2165-G-818 (A18)

WPS CATALYTIC RECOMBINER PACKAGE NO. 2 CAR-2165-G-818 (A14)

WPS CATALYTIC RECOMBINER PACKAGE NO. 1 CAR-2165-G-818 UNITS 1 & 2 (A17)

WPS CATALYTIC RECOMBINER PACKAGE NO. 2 CAR-2165-G-818 UNITS 1 & 2 (A12)

WPS GAS DECAY TANKS CAR-2165-G-818 UNITS 1 & 2 (F17)

WPS FILTER BW N_2 ACCUM 1-4A-NNS CAR-2165-G-849 S01 (A12)

SEC WASTE FILT. BW N_2 ACCUM. CAR-2165-G-847 (F1)

R.O. CONCENTR. EVAP. 1-4A INSTR. RACK. CAR-2165-G-825 S02 (J6)

R.O. CONCENTR. EVAP. 1-4B INSTR. RACK. CAR-2165-G-825 S03 (J6)

CST CAR-2165-G-845 (E7)

RWMST 2165-G-845 (D7)

TANK BLDG.

TO CONDENSER SPARGING THIS DWG. (C6)

TO IGTS PRESSURIZATION TK. CAR-2165-G-080 (J11)

TO CONDENSER SPARGING THIS DWG. (A6)

LIQUID NITROGEN TANK IX-NNS

THIS DWG. (A4)

REACTOR CONTAINMENT BUILDING UNIT 1

SIS ACCUMULATOR TANKS CAR-2165-G-809 (C19)

RCS PRESS. RELIEF TK. CAR-2165-G-801 (A14)

CSS CONT. SPRAY ADD. TK CAR-2165-G-845 (B4)

CVCS VOL. CON. TK. CAR-2165-G-845 (C6)

CVCS VOL. CON. TK. CAR-2165-G-845 (C6)

CVCS VOL. CON. TK. CAR-2165-G-845 (C6)

REACTOR AUXILIARY BUILDING

RAB FILTER BW NITROGEN ACCUM. CAR-2165-G-829 (E9)

FUEL HANDLING BUILDING

FH BLDG FILTER B.W. NITROGEN ACCUM. CAR-2165-G-847 (F10)

WPB SPENT RESIN STORAGE TKS CAR-2165-G-815 (J18)

TURBINE BLDG

TURBINE GEN CAR-2165-G-088 (H10)

TURBINE GEN CAR-2165-G-088 (H10)

TO SECONDARY WASTE EVAP. PACKAGE 34X-NNS CAR-2165-G-480 (L18)

TO SECONDARY WASTE EVAP. PACKAGE 12X-NNS CAR-2165-G-090 (L18)

TO ELECT PENET CAR 2165-G-106 (H1)

TO ATMOS.

TO POST-ACC. SAMPLING SYS SKID NO.2 CAR-2165-G-052 (I10)

THIS PWG (I9)

FROM LAB. TABLES

FROM LABORATORIES EL. 276.00' WPB

CONT. BY FIELD (TYP. 3 PLACES)

FROM LABORATORIES EL. 261.00' WPB

BY CP&L

BY VENDOR (1364-96456)

VACUUM SEPARATOR IX-NNS

VACUUM PUMP IX-NNS

VACUUM TANK IX-NN5

DEMINERALIZED WATER (BY PLUMBING CAR-2168-G-G-6750 (D-5)

WPB LABORATORY VACUUM SYSTEM

NOTES

1. DRAIN ALL LOW POINTS OF YARD PIPING, PER DETAIL "A"
2. GUARD PIPE FOR ALL UNDERGROUND PORTION OF HYDROGEN SYSTEM. END GUARD PIPE WITH VENT AT EACH POINT HYDROGEN LINE COMES ABOVE GRADE

6NI1-167-1&2	6NI-V124-1&2 FOR PI-8010
7HY1-6-1&2	7HY-V5-1&2 FOR PI-8020
70X1-3-1&2	70X-V4-1&2 FOR PI-8030
6NI1-213-1&2	6NI-V147-1&2 FOR PS-8010
7HY1-47-1&2	7HY-V30-1&2 FOR PS-8020
70X1-19-1&2	70X-V9-1&2 FOR PS 8030

DETAIL "D"

DETAIL A

DETAIL B

DETAIL F

DETAIL C

REFERENCE DRAWINGS

FLOW DIAGRAM LEGEND CAR-2165-G-041

REV	DATE	DESCRIPTION	DWN	CHK	APPR'D
24	7/10/02	INCORPORATED: ESR 00-00391 (J12)	JWB	RPP	DLS
23	10/26/99	THIS DRAWING HAS BEEN ELECTRONICALLY REPRODUCED WITH DESIGN CHANGE ADMINISTRATIVE REVISIONS: DELETED PRESSURE SWITCH, REVISED VALVE POSITION TO CLOSED (K9) (REF: CR 96-03515) RELOCATED 6NI-V161-1&2, PS-8020 AND PI-8020 (I9,J7,J8) (REF: CR 99-01007-2)	ARM	RPP	DLS

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NUCLEAR SAFETY RELATED (Q-LIST)
YES ☐ NO ■ PARTIAL ☐ F.P.-Q ☐ R.W.-Q ☐

CAROLINA POWER & LIGHT COMPANY
NUCLEAR ENGINEERING DEPARTMENT - RALEIGH, N.C.

CP&L

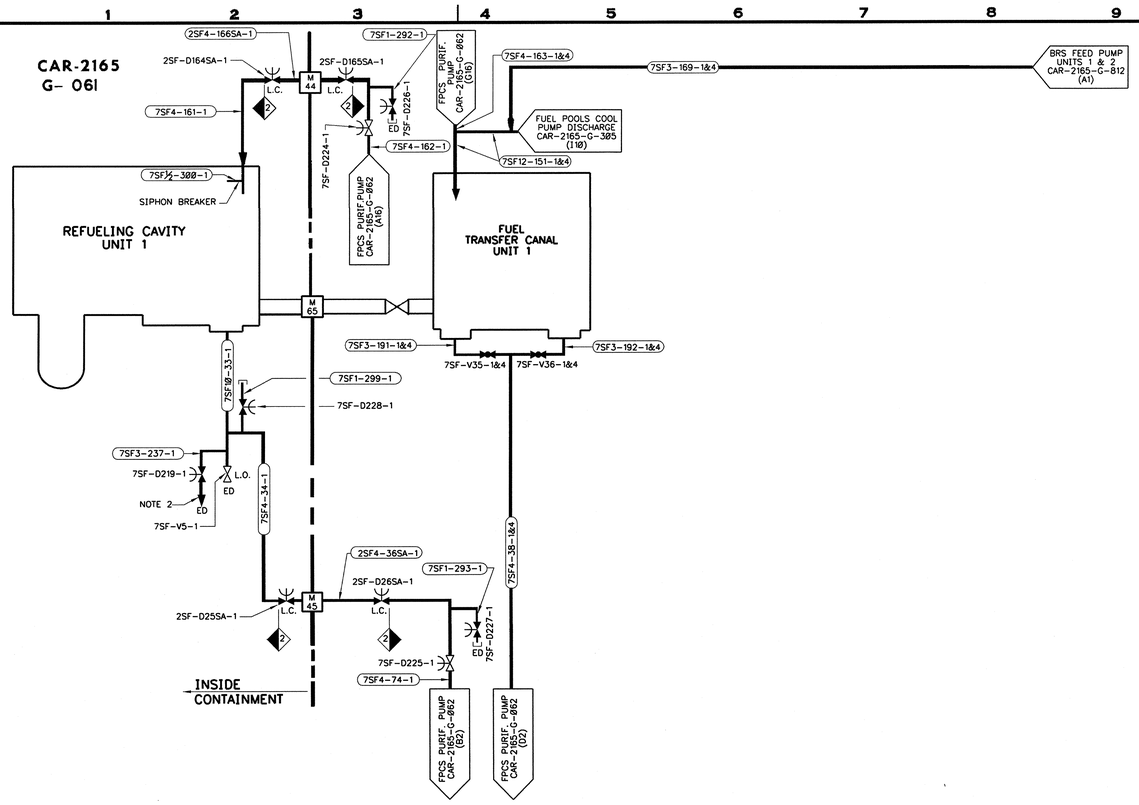
PLANT: HARRIS NUCLEAR PROJECT - UNIT 1

SCALE: NONE

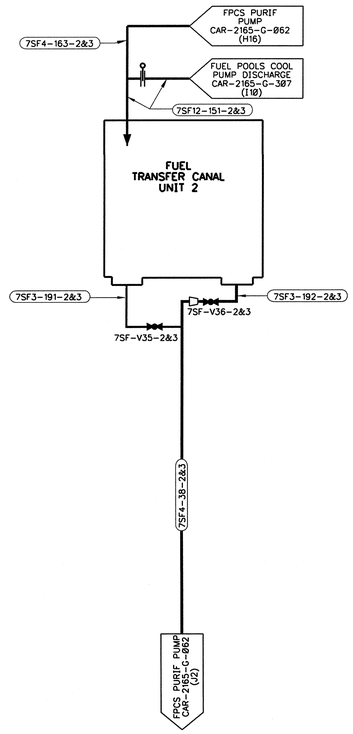
TITLE: FLOW DIAGRAM MISCELLANEOUS GAS SYSTEMS UNIT 1

DWG NO. CAR-2165-G-058

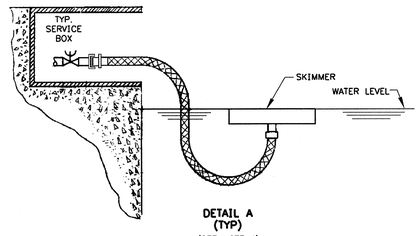
CAR-2165
G- 061



REFUELING CAVITY & TRANSFER CANAL CLEAN-UP
UNIT 1

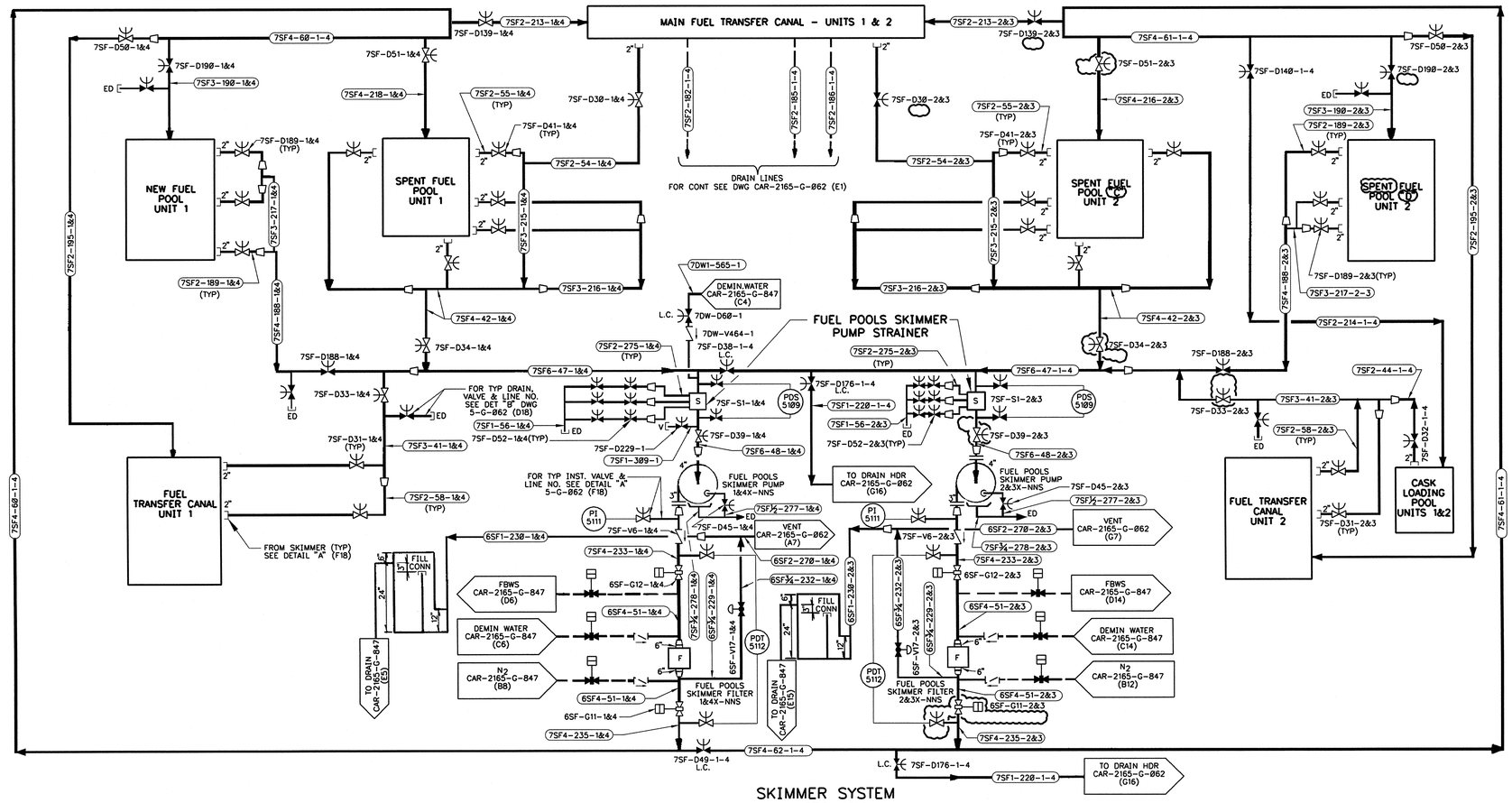


FUEL TRANSFER CANAL CLEAN-UP
UNIT 2



DETAIL A
(TYP)
(SEE NOTE 4)

SKIMMER REQUIREMENTS	
NO. REQ'D	SOURCE DESCRIPTION
1Ø	SPENT FUEL POOLS
6	NEW FUEL POOLS
1	CASK LOADING POOL
2	MAIN FUEL TRANSFER CANAL
4	FUEL TRANSFER CANALS



SKIMMER SYSTEM
UNITS 1&2

NOTES:

1. TEMPORARY STRAINER FOR INITIAL FLUSHING; REMOVE BEFORE START-UP.
2. DRAIN PROVIDED FOR CAVITY DECONTAMINATION WASHDOWN-TO BE USED FOLLOWING REFUELING.
3. SEE TYPICAL DETAILS ON DWG. CAR-2165-G-062 FOR INSTRUMENTS, DRAINS & VENTS, LINE AND VALVE NUMBERS.
4. 2" FLEXIBLE HOSE TRI-NUCLEAR CORP. SPIRALITE 14Ø OR EQUAL; MAX. HOSE LENGTH PER STATION TO BE 5'-Ø."

REFERENCE DRAWINGS:

FLOW DIAGRAM LEGEND	CAR-2165-G-Ø41
FUEL POOLS CLEAN UP SYS.(SH.2)	CAR-2165-G-Ø62
FUEL POOLS COOLING (UNIT 1)	CAR-2165-G-385
FUEL POOLS COOLING (UNIT 2)	CAR-2165-G-3Ø7
FHB FILTER BACKWASH SYSTEM	CAR-2165-G-847

REV	DATE	DESCRIPTION	DWN	CHK	APPR'D
17	6/23/81	THIS DRAWING HAS BEEN ELECTRONICALLY REPRODUCED WITH DESIGN CHANGE INCORPORATED: ESR 95-ØØ425 (AS CIRCLED) REMOVED "CONSTRUCTION HOLD"	ARM	RPP	DLS

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NUCLEAR SAFETY RELATED (Q-LIST)
YES ■ NO □ PARTIAL ■ F.P.-Q □ R.W.-Q □

CAROLINA POWER & LIGHT COMPANY
NUCLEAR ENGINEERING DEPARTMENT - RALEIGH, N.C.

CP&L

PLANT: HARRIS NUCLEAR PROJECT - UNIT 1
SCALE: NONE

TITLE: FLOW DIAGRAM
FUEL POOLS CLEAN-UP SYSTEMS
SHEET - 1
UNIT 1

DWG NO. CAR-2165-G-Ø61

RECEIVED
HNP
DOCUMENT CONTROL

CAR-2165
G-062

FUEL POOLS & REFUELING WATER PURIFICATION PUMPS

FUEL POOLS DEMINERALIZER

FUEL POOLS DEMINERALIZER FILTER

DETAIL B
TYPICAL DRAINS, VENTS & SAMPLES

DETAIL A
TYPICAL INSTRUMENT CONN.

NOTES:

FOR NOTES AND REFERENCE DWGS. SEE DWG. CAR-2165-G-061

1. THE INTERNALS ARE REMOVED FROM THE FUEL POOL AND REFUELING WATER PURIFICATION FILTERS.

REV	DATE	DESCRIPTION	DWN	CHK	APP'D
14		INCORPORATED: EC# 65089 (A8,L8,I17-I19)	ELECTRONICALLY SIGNED		
13	6/23/01	THIS DRAWING HAS BEEN ELECTRONICALLY REPRODUCED WITH DESIGN CHANGE. INCORPORATED: ESR 95-00425 (AS CIRCLED) REMOVED "HOLD CONSTRUCTION"	ARM	RPP	DLS

THIS DRAWING HAS BEEN PRODUCED AND IS CONTROLLED ON THE NED CAD/E SYSTEM. ANY REVISIONS TO THIS DOCUMENT SHOULD BE DONE USING THE CAD/E SYSTEM TO ASSURE PROPER CONTROL OF THE ELECTRONIC DRAWING DATABASE.

NUCLEAR SAFETY RELATED (Q-LIST)
YES ☐ NO ☐ PARTIAL ■ F.P.-Q ☐ R.W.-Q ■

CAROLINA POWER & LIGHT COMPANY
NUCLEAR ENGINEERING DEPARTMENT - RALEIGH, N.C.

CP&L

PLANT: HARRIS NUCLEAR PROJECT - UNIT 1

SCALE: NONE

TITLE: FLOW DIAGRAM
FUEL POOL CLEAN-UP SYSTEMS
SHEET 2
UNIT 1

DWG NO. CAR-2165-G-062

CAR-2165
G-Ø63

TANK CAR UNLOADING QUICK DISCONNECT CPLG. 7FO-X3-1-4

TRUCK UNLOADING QUICK DISCONNECT CPLG. 7FO-X4-1-4

7FO-V4-1-4

7FO-V6-1-4

7FO-S4-1-4

7FO-S5-1-4

7FO-V196-1-4

7FO-V1-1-4

SPILL CURB

7FO3-3-1-4

7FO3-4-1-4

7FO-V14Ø-1-4

7FO-V51-1-4

7FO3-115-1&2

7FO-R1-1-4

7FO-V2Ø4-1&2

7FO3-116-1&2

7FO4-178-1&2

FLAME ARRESTER (BY FIELD TYP)

7FO3-15-1&2

7FO3-16-1&2

7FO4-179-1&2

RED. FLG. (TYP.)

7FO-V2Ø5-1&2

7FO1-177-1

7FO1-177-2

3F01-169SB-1&2

SAMPLE CONN.

3FO-V29ØSB-1&2

3F01-284SB-1&2

LT 2431 B S

3FO-V2Ø1SB-1&2

MAIN FUEL OIL STORAGE TANKS

1&2A 175,ØØØ GAL.

1&2B 175,ØØØ GAL.

7FO1-161-1-4

7FO1-176-1

7FO¾-157-1-4

7FO1-176-2

7FO1-18Ø-1&2

7FO4-174-2

7FO4-174-1

7FO4-182-1&2

7FO1-181-1&2

7FO4-175-2

3FO4-4ØSA-2

3FO4-41SB-2

7FO4-183-1&2

3FO4-11SB-1&2

3FO-V16SB-1&2

7FO1-111SB-1

7FO1-22-1-4

7FO-V132-1-4(TYP)

7FO3-2-1-4

7FO-V9-1-4

7FO-V13-1-4

7FO4-6-1-4

7FO4-125-1-4

7FO4-126-1-4

7FO1-21-1-4 (TYP)

7FO-V28-1-4(TYP)

7FO4-23-1-4

7FO-S1-1-4

7FO3-251-1-4

7FO6-1-1-4

7FO-V2-1-4

7FO-V8-1-4

7FO-V253-1-4

7FO1-239-1-4

7FO1-2Ø-1-4

7FO-V133-1-4(TYP)

7FO3-1Ø8-1-4

DIESEL FUEL OIL UNLOADING PUMP 1-4A-NNS

DIESEL FUEL OIL UNLOADING PUMP 1-4B-NNS

3F01-283SA-1&2

3FO-V2ØØSA-1&2

3F01-168SA-1&2

SAMPLE CONN.

3FO-V289SA-1&2

7FO-V197-1-4(TYP)

7FO1-156-1-4 (TYP)

7FO4-99-1-4

7FO1-24Ø-1-4

7FO-V254-1-4

7FO1-21-1-4

7FO-V12-1-4

7FO-V13-1-4

3FO4-9SA-1&2

3FO-V14SA-1&2

7FO½-285-1&2

3FO3-48SA-1

3FO-V18SA-2

7FO4-175-1

3FO3-41SB-1

3FO-V19SB-1

3FO-V18SB-2

7FO½-286-1&2

3FO-V294-1&2

3" x 2" BUSH. 2" HOSE ADAPT. W/CAP FLEX CONN

SAMPLE

3F01-109SA-1

1¼" N.P.T. (TYP.)

3FO-S2SA-1

3F01-52SA-1

3FO-V32SA-1

3FO-V143-SA-1

3F01½-253SA-1

3FO-V25SSA-1

3FO-V21SA-1

3FO-U1SA-1

3F01½-232SA-1

2x1½ RED (TYP.)

1½ (TYP)

3F01-17ØSA-1

FUEL OIL TRANSFER PUMPS SC-3

1A-SA

1" (TYP)

3F01-58SA-1

VENT

3FO-V136SA-1

3FO-V35SA-1

3FO2-42SA-1

3F01-54SA-1

3FO-V23SA-1

3FO-R2SA-1

3FO¾-158SA-1

3FO-V25SA-1

F.O. STORAGE AREA

YARD

DIESEL GENERATOR BLDG.

TO DIESEL GEN. DAY TANK 1A-SA CAR-2165-G-133 (F10)

3FO-S3SB-1

3F01-53SB-1

3FO-V34SB-1

3FO-V144SB-1

3F01½-259SB-1

3FO-V29SB-1

3FO-V22SB-1

3FO-U2SB-1

3F01½-233SB-1

3F01-173SB-1

FUEL OIL TRANSFER PUMPS SC-3

1B-SB

3F01-59SB-1

VENT

3FO-V138SB-1

3FO-V36SB-1

3FO2-43SB-1

3F01-55SB-1

3FO-V24SB-1

3FO-R3SB-1

3FO¾-159SB-1

3FO-V26SB-1

TO DIESEL GEN. DAY TANK 1B-SB CAR-2165-G-133 (F14)

REFERENCE DRAWINGS:

LIST OF DRAWINGS	CAR-1364-B-125
VALVE AND SPECIALTY LIST	CAR-1364-B-Ø69
PIPING LINE LIST	CAR-1364-B-Ø7Ø
INSTRUMENT LIST	CAR-2166-B-432
FLOW DIAGRAM LEGEND	CAR-2165-G-Ø41

REV	DATE	DESCRIPTION	DWN	CHK	DPE	DPPE
18		INCORPORATED: EC 91698	ELECTRONICALLY SIGNED & DATED			
17		INCORPORATED: EC 64916 (B8,B9)	ELECTRONICALLY SIGNED & DATED			
16	2-16-Ø2	INCORPORATED: ESR 95-ØØØ27 (G2,G7)	JWB	WFL	DLS	
15	12/6/93	THIS DRAWING HAS BEEN ELECTRONICALLY REDRAWN WITHOUT DESIGN CHANGE	GRS	RPP	DPK	WAS

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NUCLEAR SAFETY RELATED (Q-LIST)
YES ■ NO □ PARTIAL ■ F.P.-Q □ R.W.-Q □

DUKE ENERGY
NUCLEAR ENGINEERING DEPARTMENT – RALEIGH, N.C.

PLANT: HARRIS NUCLEAR PROJECT – UNIT 1
SCALE: NONE

TITLE: FLOW DIAGRAM DIESEL FUEL OIL SYSTEM UNIT 1

DWG NO. CAR-2165 G-Ø63



REV	DATE	DESCRIPTION	DWN	CHK	APPR'D
25		INCORPORATED: EC# 77774 (C4-C7,D4-D7,H13-H18, I13-I19,J13-J19,K13-K19,L13-L17,M13-M17,N13-N17)	ELECTRONICALLY SIGNED		
24		INCORPORATED: EC# 61953 (C18,G11,I11)	ELECTRONICALLY SIGNED		
23	2/7/02	THIS DRAWING HAS BEEN ELECTRONICALLY REPRODUCED AND REVISED WITH DESIGN CHANGE. INCORPORATED: ESR 96-00296 (D19), 97-00807 (J2,J4,J5)	JWB	WFL	DLS

PROFESSIONAL ENGINEER: N/A

QUALITY LEVEL: SAFETY RELATED IN PART ONLY

CAROLINA POWER & LIGHT COMPANY
NUCLEAR ENGINEERING DEPARTMENT

CP&L

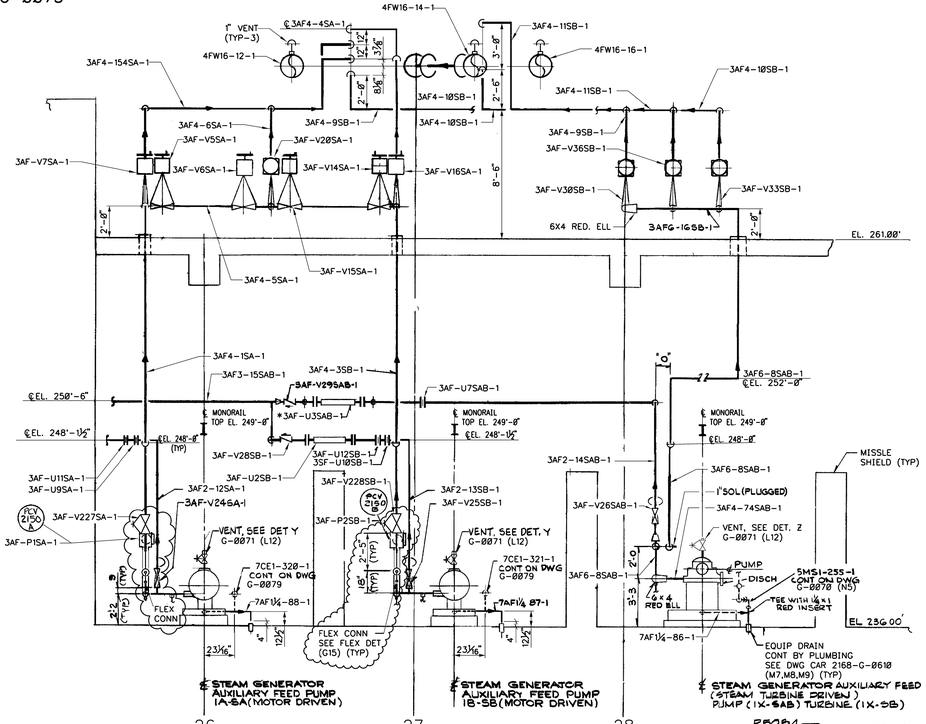
PLANT: HNP

SCALE: AS NOTED

TITLE: FEEDWATER PIPING PLANS - SHEET - 2

PLANT DWG NO.: CAR-2165-G-0072

CAR-2165
G-0073

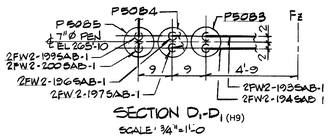


SECTION A-A G-0071 (N3,E17,J17)
SCALE: ¼"-1'-0

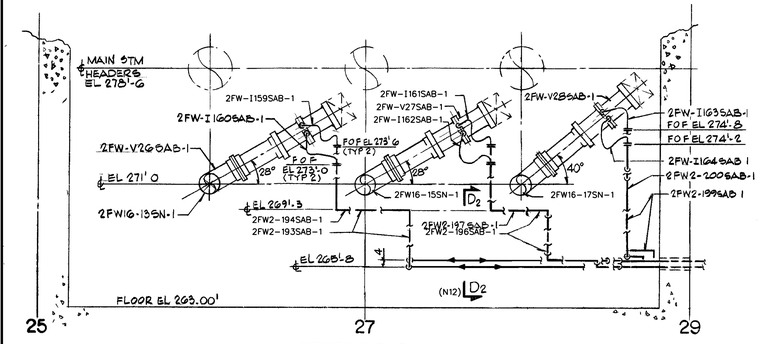
STEAM GENERATOR AUXILIARY FEED PUMP 1A-SA (MOTOR DRIVEN)

STEAM GENERATOR AUXILIARY FEED PUMP 1B-SB (MOTOR DRIVEN)

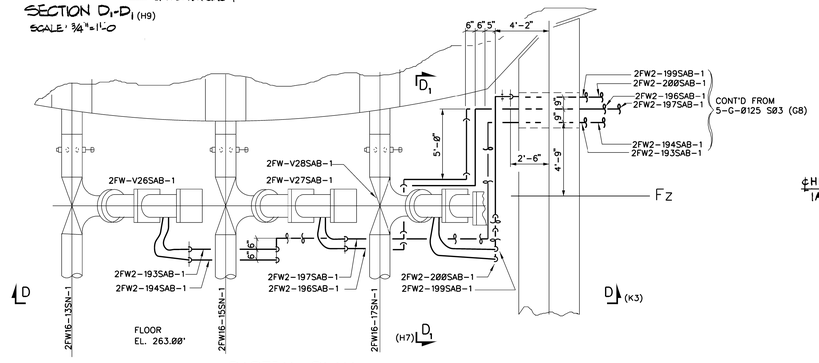
STEAM GENERATOR AUXILIARY FEED PUMP (STEAM TURBINE DRIVEN) PUMP (1X-SAB) TURBINE (1X-SB)



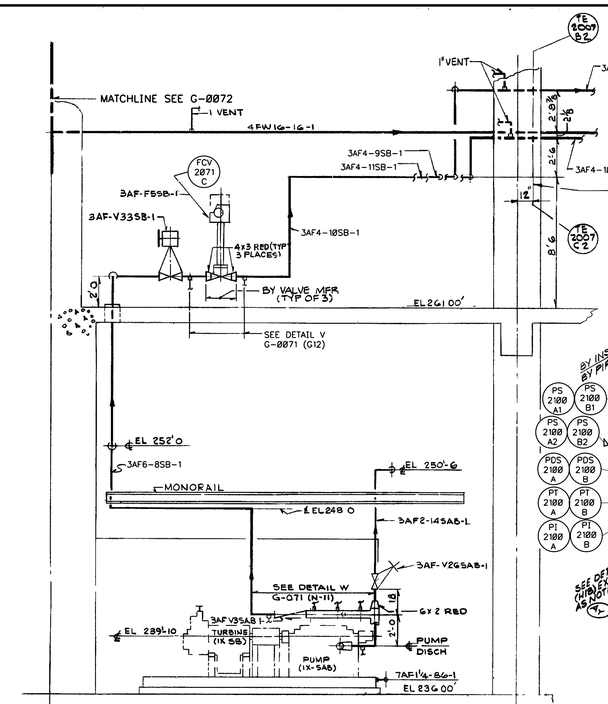
SECTION D1-D1 (H9)
SCALE: ¾"=1'-0



SECTION D-D G-0071 (17)
THIS DWG (K9)
SCALE ½"=1'-0

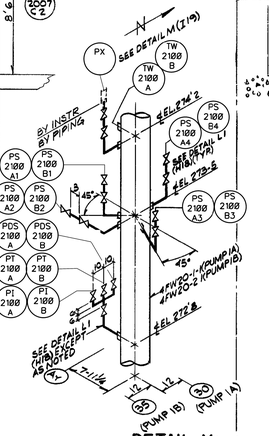


PARTIAL PLAN 5-G-0071 (G7)
NITROGEN SUPPLY TO 16" FEEDWATER VALVE ACTUATORS
SCALE: 1/4"=1'-0

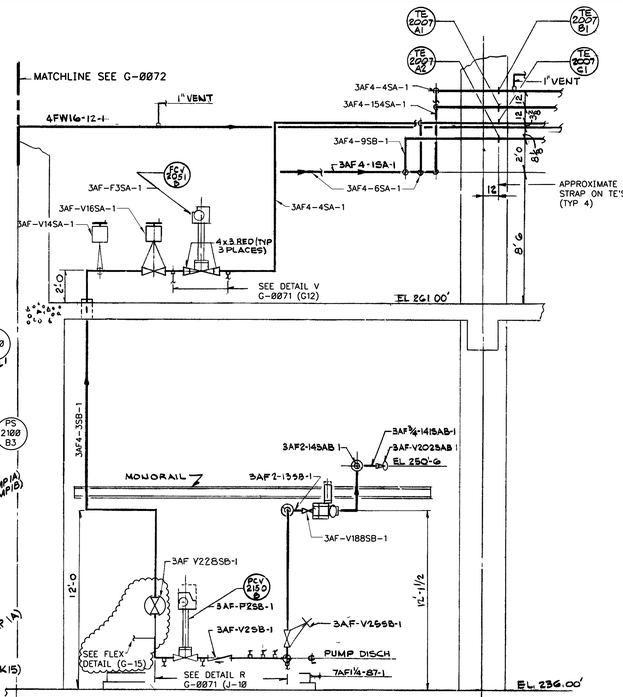


STEAM GENERATOR AUXILIARY FEED PUMP (STEAM TURBINE DRIVEN)

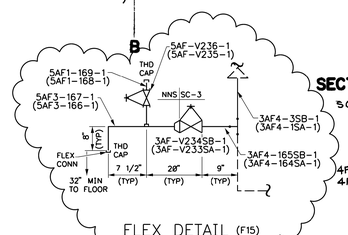
SECTION B-B G-0071 (N7,F17,J17)
SCALE: ¼"=1'-0



DETAIL Y (K15)
NO SCALE

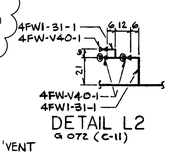


STEAM GENERATOR AUXILIARY FEED PUMP 1B SB (MOTOR DRIVEN)

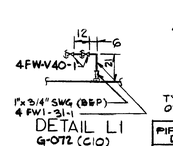


SECTION C-C
SCALE ¼"-0 G-0071 (N5,F14,J14)

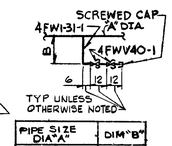
FLEX DETAIL (F15)
(A TRAIN)



DETAIL L2
G-072 (C-11)

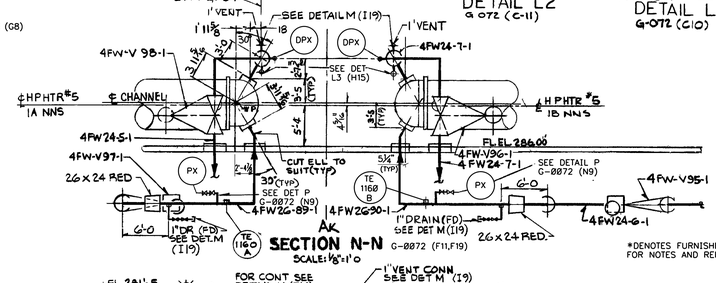


DETAIL L1
G-072 (C10)



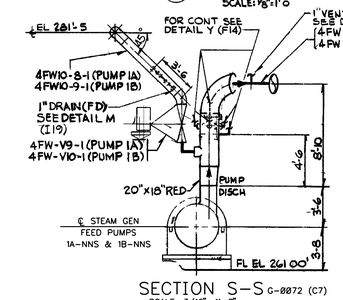
PIPE SIZE DIA "A"	DIM "B"
6"	12"
10"	15"
16"	18"
20"	21"
24"	21"
26"	24"
30"	24"

DETAIL M

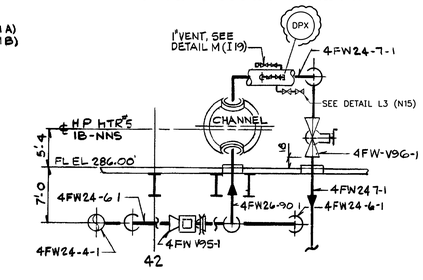


SECTION N-N G-0072 (F11,F19)
SCALE: ⅛"=1'-0

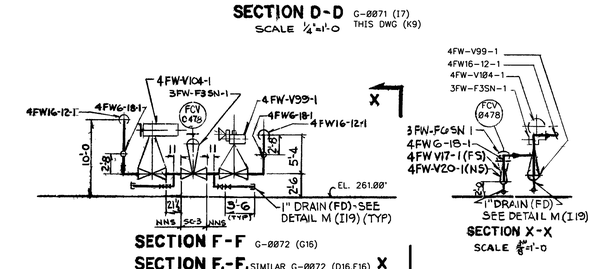
*DENOTES FURNISHED BY VENDOR
FOR NOTES AND REFERENCE DRAWINGS SEE G-0071



SECTION S-S G-0072 (C7)
SCALE: 3/16"=1'-0



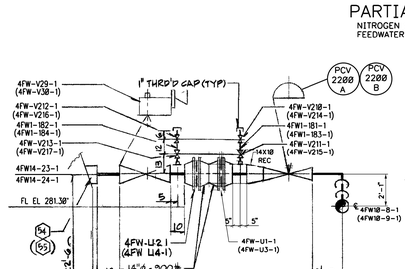
SECTION M-M G-0072 (C19,H11)
SCALE ⅛"=1'-0



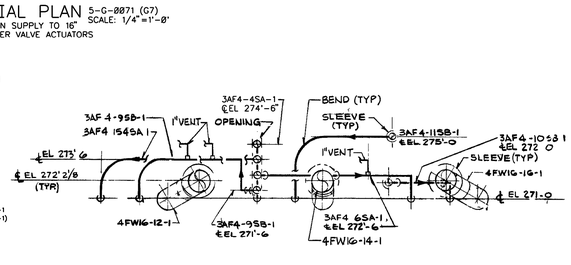
SECTION F-F G-0072 (G16)

SECTION F1-F1 SIMILAR G-0072 (D16,F16)
SCALE: ½=1'-0"

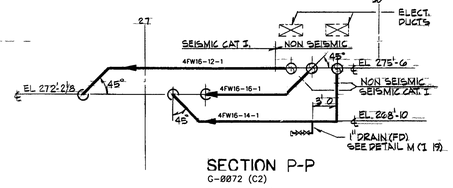
SECTION X-X
SCALE ½"=1'-0



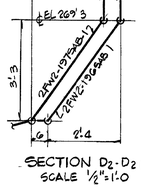
SECTION H-H G-0072 (G2)
SECTION H1-H1 G-0072 (G5)
SCALE 1/4"=1'-0
LINE & VALVE NOS. FOR SECTION H1-H1 APPEAR IN PARENTHESIS ( )



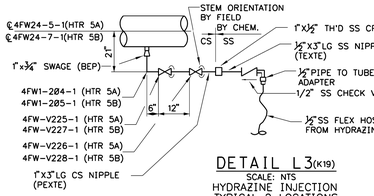
SECTION J-J G-0071 (K7), G0072 (M4)
SCALE: 1"=1'-0



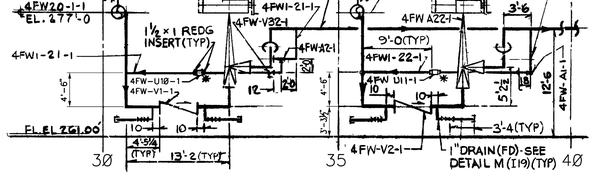
SECTION P-P
G-0072 (C2)
SCALE: ⅛"=1'-0



SECTION D2-D2 (J4)
SCALE ½"=1'-0



DETAIL L3 (K19)
SCALE: NTS
HYDRAZINE INJECTION
TYPICAL 2 LOCATIONS



SECTION G-G G-0072 (B5-8)
SCALE 1/8"=1'-0"

REV	DESCRIPTION	APPR'D
28	INCORPORATED: EC# 91696 (F2,F3,F15,G15)	ELECTRONICALLY SIGNED
27	INCORPORATED: EC# 73402 (E6)	ELECTRONICALLY SIGNED

PROFESSIONAL ENGINEER: N/A

QUALITY LEVEL: SAFETY RELATED IN PART ONLY

CAROLINA POWER & LIGHT COMPANY
NUCLEAR ENGINEERING DEPARTMENT
CP&L

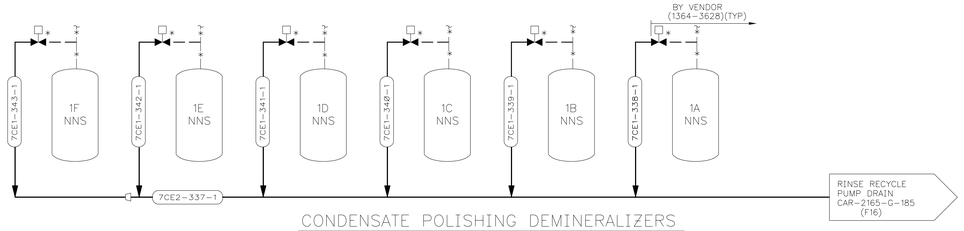
PLANT: HNP
SCALE: AS NOTED

TITLE:
FEEDWATER PIPING
SECTIONS
UNIT 1

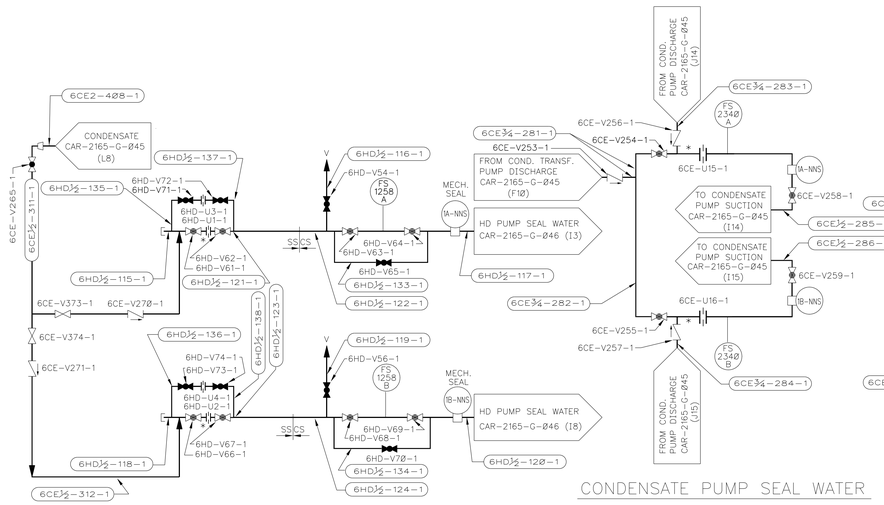
PLANT DWG NO.: CAR-2165-G-0073

CAR-2165
G-Ø88

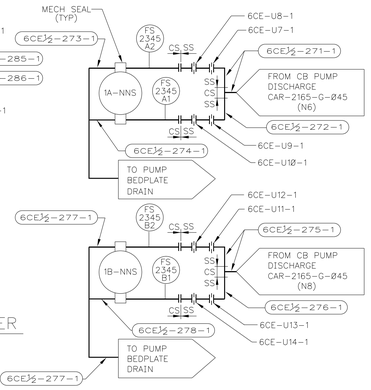
CONDENSATE POLISHING DEMINERALIZERS



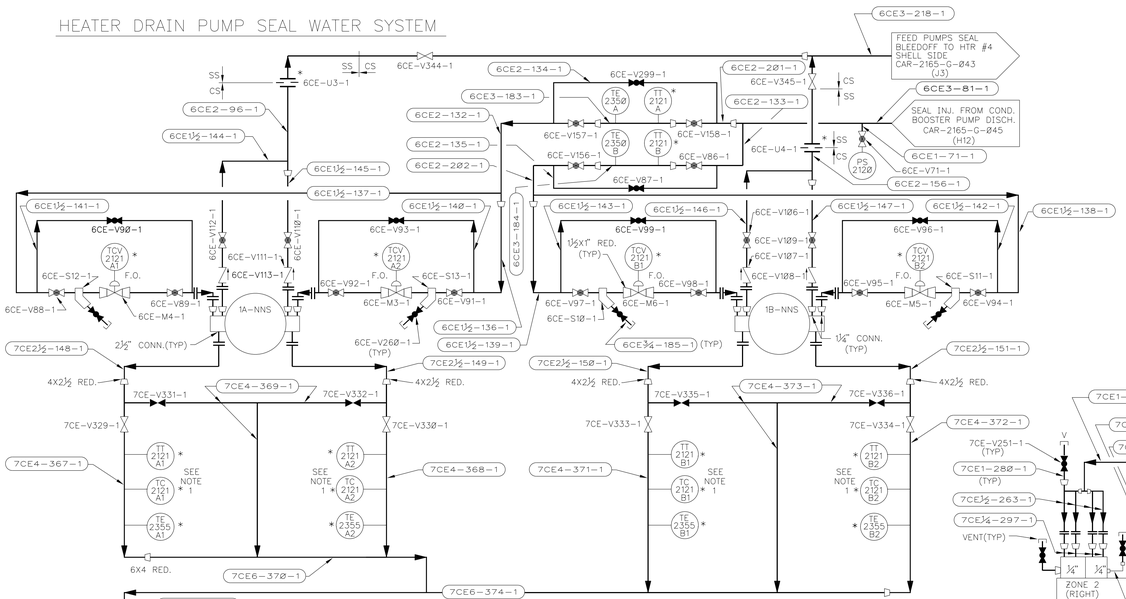
CONDENSATE PUMP SEAL WATER SYSTEM



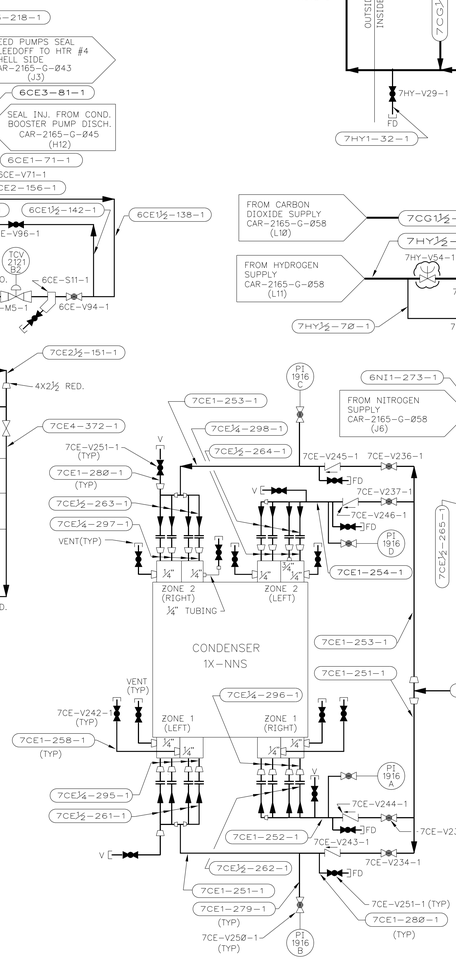
CONDENSATE BOOSTER PUMP SEAL WATER SYSTEM



HEATER DRAIN PUMP SEAL WATER SYSTEM

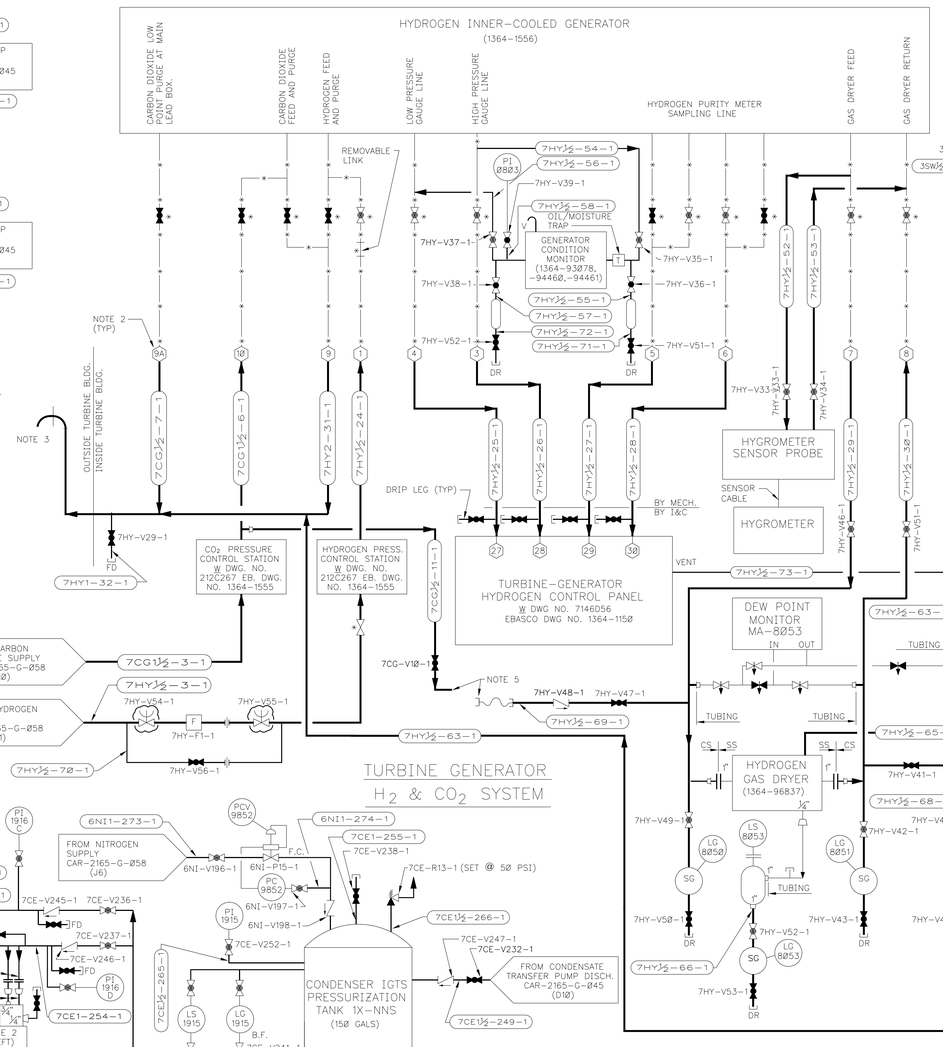


STEAM GENERATOR FEED PUMP SEAL WATER SYSTEM

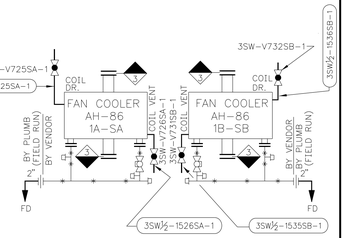


CONDENSER TUBESHEET PRESSURIZATION SYSTEM

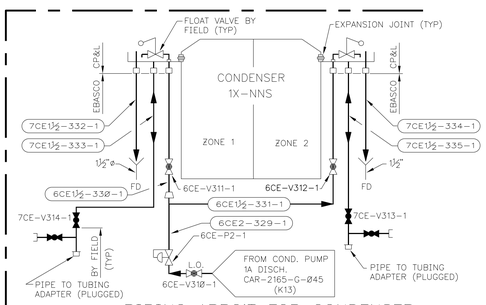
TURBINE GENERATOR H_2 & CO_2 SYSTEM



EMERGENCY SERVICE WATER INTAKE STRUCTURE FAN COOLERS



PIPING ARRG'T FOR CONDENSER EXPANSION JOINT WATER SEAL TROUGH



NOTES:

1. FOR TT-2121 & TC-2121, REFER TO DRAWING 1364-3611 (I-R DRAWING R-43648-A) FOR INSTALLATION DETAILS. FOR TE-2355 & TS-2355, REFER TO FCR-SM-344R1.
2. FOR DETAILS OF THESE CONNECTIONS SEE DRAWING 1364-1145.
3. LOCATE VENT FAR AWAY FROM PERSONNEL AND ANY SOURCE OF IGNITION. VENT TO THE ATMOSPHERE.
4. ——←—— INDICATES PIPING/EQUIPMENT TO BE SUPPLIED BY VENDOR.
5. FLEX HOSE FOR 1A OR CO_2 PURGE CONNECTIONS.

REFERENCE DRAWINGS:

FLOW DIAGRAM LEGEND	CAR-2165-G-Ø41
FLOW DIAGRAM EXTRACTION STEAM SYSTEM	CAR-2165-G-Ø43
FLOW DIAG. GNDS & AIR EVACUATION SYSTEM	CAR-2165-G-Ø45
FLOW DIAG. HTR. DR. & VENT SYS.	CAR-2165-G-Ø46
FLOW DIAG. CIRC. & SERV. WTR. SYS.	CAR-2165-G-Ø47
FLOW DIAG. CIRC. & SERV. WTR. SYS.	CAR-2165-G-Ø48
FLOW DIAG. MISC. GAS SYS.	CAR-2165-G-Ø58

REV	DATE	DESCRIPTION	DWN	CHK	APPR'D
35		INCORPORATED: EC# 402940 (H11,H12)	ELECTRONICALLY SIGNED		
34		INCORPORATED: EC# 75606 (D18, D19, E17, E19)	ELECTRONICALLY SIGNED AND DATED		
33		INCORPORATED: EC# 68194 (C8, C9, D8, D9, E8, E9)	ELECTRONICALLY SIGNED AND DATED		
32		INCORPORATED: EC# 60439 (A1-A4, B1-B4, C1-C4, D1-D4, E1-E4, F1, F2)	ELECTRONICALLY SIGNED AND DATED		
31	11/17/01	INCORPORATED: ESR Ø2-ØØ257 (D13-D15,E13,E14,F14-F16,G15-G17), ESR Ø8-ØØ289 (12,16)	ARM	RPP	DLS
3Ø	11/1/Ø8	INCORPORATED: ESR 95-Ø1ØØØ (A16-A19,B16-B19,C17-C19,D18,D19, E17-E19,F17-F19)	ARM	JWB	RPP FOR DLS
29	5/7/Ø8	INCORPORATED: ESR Ø8-ØØ192 (C8,C9,D8,D9,E8,E9)	ARM	EJE	DLS
28	4/26/Ø8	INCORPORATED: ESR 95-Ø1ØØØ (PARTIAL TURNOVER PER REV 6 (A18,A19,B18)	ARM	RPP	DLS

THIS DRAWING HAS BEEN PRODUCED AND IS CONTROLLED ON THE NED CAD/E SYSTEM. ANY REVISIONS TO THIS DOCUMENT SHOULD BE DONE USING THE CAD/E SYSTEM TO ASSURE PROPER CONTROL OF THE ELECTRONIC DRAWING DATABASE.

NUCLEAR SAFETY RELATED (Q-LIST)
YES ■ NO □ PARTIAL ■ F.P.-Q □ R.W.-Q □

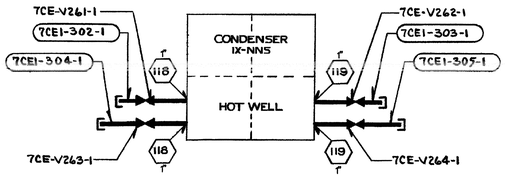
DUKE ENERGY
NUCLEAR ENGINEERING DEPARTMENT – RALEIGH, N.C.

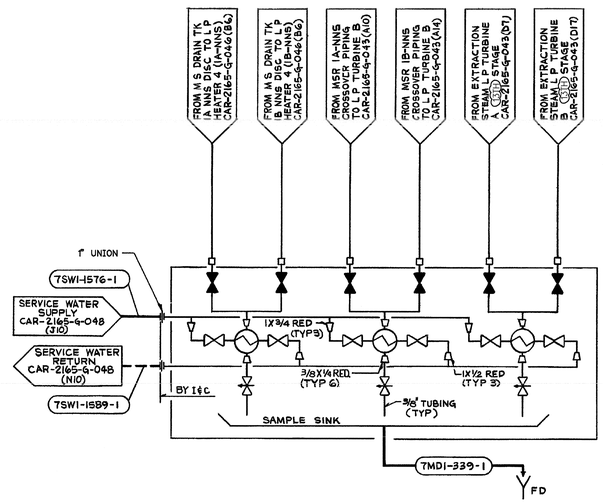
PLANT: HARRIS NUCLEAR PROJECT – UNIT 1 SCALE: NONE

TITLE: FLOW DIAGRAM MISCELLANEOUS SYSTEMS

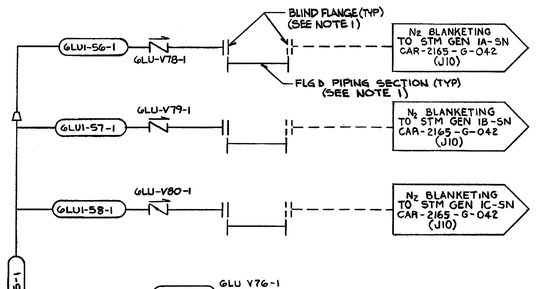
DWG NO. CAR-2165 G-Ø88

CAR-2165
G-089

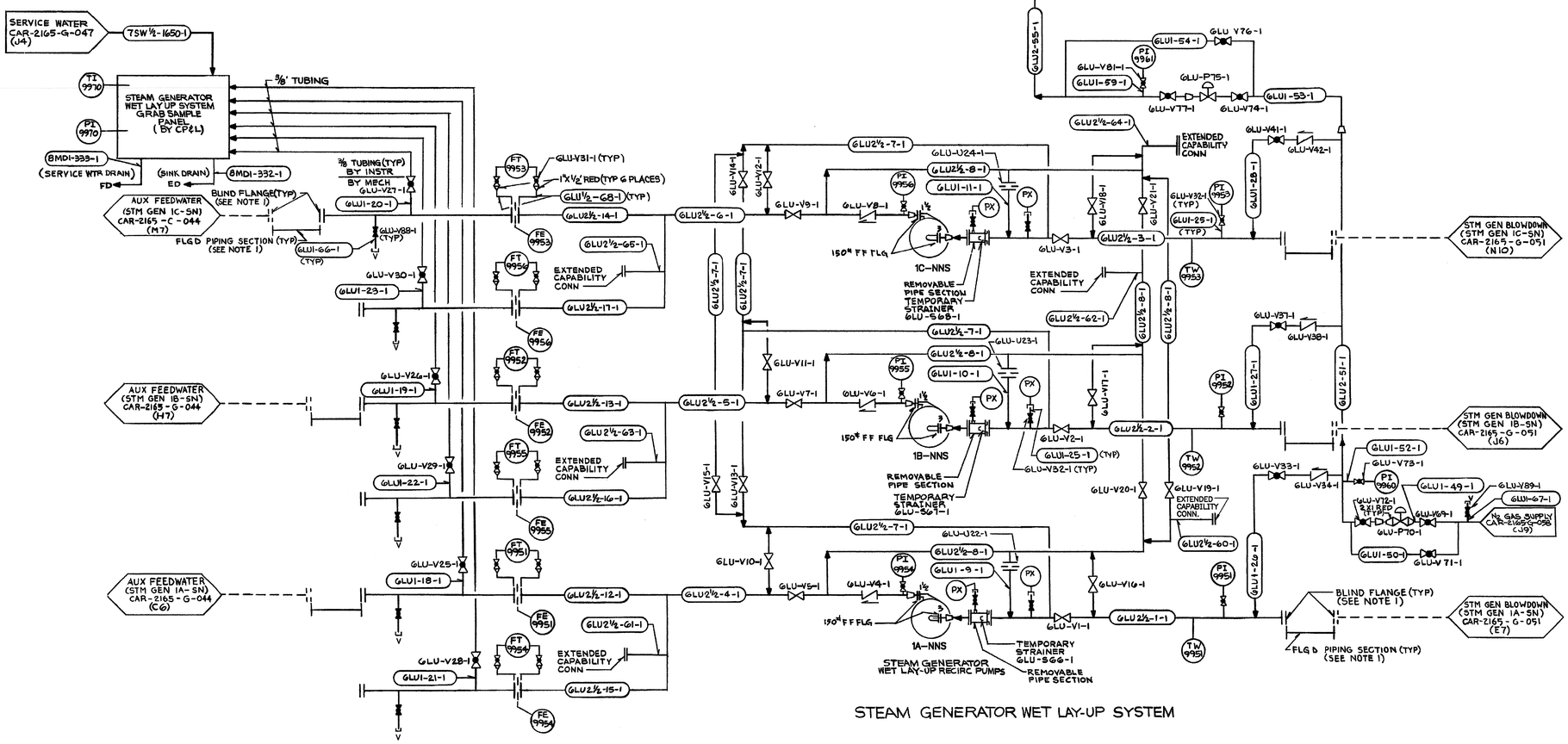




SECONDARY STEAM CYCLE SAMPLING SYSTEM



NOTE
1 REPLACE BLIND FLANGES WITH PIPING SECTION WHENEVER WET LAYUP SYSTEM IS TO BE IN USE DURING PLANT SHUTDOWN AND AFTER THE WATER TEMPERATURE HAS BEEN LOWERED TO 200 F OR LESS FLANGE RATINGS OF PIPING SECTION TO MATCH TIE-IN SYSTEMS.
2 SECONDARY STEAM CYCLE SAMPLING (B13) TUBING BY I&C TO BE HEAT TRACED BY FIELD



STEAM GENERATOR WET LAY-UP SYSTEM

REFERENCE DRAWINGS
FLOW DIAGRAM LEGEND CAR-2165-G-041

REV	DATE	DESCRIPTION	DWN	CHK	APPR'D
14		INCORPORATED: EC#74907 (A15)			ELECTRONICALLY SIGNED
13	4/23/21	THIS DRAWING HAS BEEN ELECTRONICALLY REPRODUCED WITH DESIGN CHANGE INCORPORATED: ESR 98-00537 (J1-J3,L1-L3,N1-N3)	ARM		

THIS DRAWING HAS BEEN PRODUCED AND IS CONTROLLED ON THE NED CAD/E SYSTEM. ANY REVISIONS TO THIS DOCUMENT SHOULD BE DONE USING THE CAD/E SYSTEM TO ASSURE PROPER CONTROL OF THE ELECTRONIC DRAWING DATABASE.

NUCLEAR SAFETY RELATED (Q-LIST)
YES ☐ NO ■ PARTIAL ☐ F.P.-Q ☐ R.W.-Q ☐

CAROLINA POWER & LIGHT COMPANY
NUCLEAR ENGINEERING DEPARTMENT – RALEIGH, N.C.

CP&L

PLANT: HARRIS NUCLEAR PROJECT – UNIT 1
SCALE: NONE

TITLE: FLOW DIAGRAM SECONDARY STM CYCLE SAMPLING SYSTEM & STEAM GENERATOR WET LAY-UP SYSTEM

DWG NO. CAR-2165-G-089

CPL-2165-
G-089SØ1

COOLING WATER ISOLATION SKID
1X-NNS
(1364-96774)

TEMPERATURE CONTROL UNIT
1X-NNS
(1364-96777)

SAMPLE RECLAMATION
DRAIN TANK
1X-NNS
(1364-96696)

1B-NNS

1A-NNS

SAMPLE RECLAMATION
TRANSFER PUMPS

HVAC
EXHAUST
DUCT

CONDENSER
1X-NNS

SAMPLE RECLAMATION SYSTEM

RECEIVED
8-31-95
HNP
DOCUMENT CONTROL

REV	DATE	DESCRIPTION	DRN	CHK	DPE	DPPE
3	8/24/95	INCORPORATED: ESR-948833 (I6,I7,M6,M7)	LLS	RP	GWW	DPL
2	7/18/95	INCORPORATED: ESR-948315 (K18,K11,L18,L11)	LLS	RPP	BFP	MP
1	2/3/84	INCORPORATED:PCR-5582, 5583, 5585, AND 5514 AS CIRCLED.	GRS	LLS	MMP	WAS

THIS DRAWING HAS BEEN PRODUCED AND IS CONTROLLED ON THE MED CAD/E SYSTEM. ANY REVISIONS TO THIS DOCUMENT SHOULD BE DONE USING THE CAD/E SYSTEM TO ASSURE PROPER CONTROL OF THE ELECTRONIC DRAWING DATABASE.

NUCLEAR SAFETY RELATED (Q-LIST)
YES ☐ NO ■ PARTIAL ☐ F.P.-Q ☐ R.W.-Q ☐

CAROLINA POWER & LIGHT COMPANY
NUCLEAR ENGINEERING DEPARTMENT - RALEIGH, N.C.

PLANT: HARRIS NUCLEAR PROJECT UNIT-1

SCALE: NONE

TITLE: FLOW DIAGRAM
SECONDARY SAMPLING SYSTEM
SAMPLE RECLAMATION SYSTEM
UNIT 1

DWG NO. CPL-2165-G-089SØ1

CAD FILE:D:\BFP\5514\2887

CPL–2165–
G–Ø89SØ2

COND. PUMP 1A–NNS DISCHARGE 2165–G–Ø45 (K13)
6CE–V355–1
6CE–V354–1
6CE1–391–1
⅜" TUBING
COND. PUMP 1B–NNS DISCHARGE 2165–G–Ø45 (K16)
6CE–V358–1
6CE–V357–1
6CE1–392–1
⅜" TUBING
⅜" x ¼" RED.

STEAM GENERATOR 1A–SN BLOWDOWN 2165–G–Ø51 (B7) — T1
STEAM GENERATOR 1B–SN BLOWDOWN 2165–G–Ø51 (H7) — T2
STEAM GENERATOR 1C–SN BLOWDOWN 2165–G–Ø51 (L7) — T3
MAIN STEAM STEAM GEN. 1A–SN (E5) — T4
MAIN STEAM STEAM GEN. 1B–SN 2165–G–Ø42 (H2) — T5
MAIN STEAM STEAM GEN. 1C–SN 2165–G–Ø42 (L2) — T6
CONDENSATE POLISHING DEMIN. 1A–NNS 1364–3628 — T7
CONDENSATE POLISHING DEMIN. 1B–NNS 1364–3628 — T8
CONDENSATE POLISHING DEMIN. 1C–NNS 1364–3628 — T9
CONDENSATE POLISHING DEMIN. 1D–NNS 1364–3628 — T10
CONDENSATE POLISHING DEMIN. 1E–NNS 1364–3628 — T11
CONDENSATE POLISHING DEMIN. 1F–NNS 1364–3628 — T12
CONDENSATE POLISHING OUTLET 2165–G–Ø45 (N12) — T13
COND. PUMPS COMMON DISCHARGE 2165–G–Ø45 (L14) — T14, T15
HEATER DRAIN PUMP 1A–NNS DISCHARGE 2165–G–Ø46 (J5) — T16, T17
HEATER DRAIN PUMP 1B–NNS DISCHARGE 2165–G–Ø46 (J9) — T18
FEEDWATER SYSTEM 2165–G–Ø44 (C13) — T19
SGBD FLASH TANK OUTLET 2165–G–Ø51S82 (F8) — T20
SGBD DEMIN. BED 1A–NNS OUTLET 2165–G–Ø51S82 (H9) — T21
SGBD DEMIN. BED 1B–NNS OUTLET 2165–G–Ø51S82 (H12) — T24
SGBD DEMIN. BED 1C–NNS OUTLET 2165–G–Ø51S82 (H16) — T25
SPARE CONNECTIONS — T26, T27

FEEDWATER DØ2/CP MONITOR PANEL 1C–NNS
(1364–Ø98346)
¼" COMPR. — 1
¾" FNPT — 2
¾" FNPT — 3
1" FNPT — 4
7SP¼–62Ø–1
7SP–H7–1
2" x ¾" RED.
7SP2–619–1
7SP2–617–1
7SP–H8–1
7SP¼–618–1
7SP1–621–1
SINK DRAIN TO WASTE SUMP C&D 2165–S–Ø185 (C12)

TEMPERATURE CONTROL UNIT TCU–2X–NNS
(1364–Ø98345, 1364–Ø98348)
31 — 2" FNPT
32 — 2" FNPT
33 — ½" FNPT MAKEUP

SAMPLE CONDITIONING RACK 1X–NNS
(1364–96769 THRU 96774)
(1364–96777)
(1364–97461)

7SP2–598–1
COOLING WATER RETURN CPL–2165–G–Ø89 SØ1 (B1) — P1
COOLING WATER SUPPLY CPL–2165–G–Ø89 SØ1 (C1) — P2
7SP2–596–1
7SP2–6Ø4–1
CHILLED COOLING WATER RETURN CPL–2165–G–Ø89 SØ1 (F1) — P3
CHILLED COOLING WATER SUPPLY CPL–2165–G–Ø89 SØ1 (G1) — P4
7SP2–6ØØ–1
2½" X2" RED TYP.(4 PLCS)

P5, P6
2½" X2" RED
2" X1½" RED
7SP2–594–1
DRAIN HEADER TO ACID & CAUSTIC WASTE SUMP CPL–2165–G–Ø89 SØ1 (M1)
DRAIN HDR. TO SAMPLE RECLAM. DRAIN TANK CPL–2165–G–Ø89 SØ1 (J1)
7SP2–595–1
SAMPLE RECLAM. SYS GRAB SAMPLE CPL–2165–G–Ø89 SØ1 (K14) — S22

T1A T2A T3A T4A T5A T6A T19A T2ØA T21A T24A
S1 S2 S3 S4 S5 S6 S19 S2Ø S21 S24

WET ANALYZER PANEL 1B–NNS
(1364–96799)
(1364–968ØØ)
(1364–968Ø1)

S25B S1A S2A S3A S4A S5A S6A S19A S21A S24A
S25C S1A S2A S3A S4A S5A S6A S19A S25A

P2 P3 P1
7DW¾–617–1
DEMIN. (FLUSH) WATER SUPPLY CAR–2165–G–1Ø5 (E4)
7SP2–612–1
7SP2–6Ø9–1

T25A T7A T8A T9A T1ØA T11A T12A T13A T15A T18A
S25 S7 S8 S9 S1Ø S11 S12 S13 S15 S18

WET ANALYZER PANEL 1A–NNS
(1364–968Ø2)
(1364–968Ø3)
(1364–9746Ø)

S7A S8A S9A S1ØA S11A S12A S13A S15A S18A S23A
S1B S2B S3B S4B S5B S6B S19B P3 P2 P1
DEMIN. (FLUSH) WATER SUPPLY CAR–2165–G–1Ø5 (E4)
7DW¾–618–1
7SP2–593–1
7SP1–611–1
7SP2–6Ø8–1
7SP2–6Ø9–1
7SP2–612–1
7SP2–6Ø1–1
DRAIN HEADER TO ACID & CAUSTIC WASTE SUMP CPL–2165–G–Ø89SØ1 (M8)
CHEMICAL SAMPLE RECLAM. DRAIN HEADER CPL–2165–G–Ø89SØ1 (J14)

T3B T15B T2B T13B T18B T1B T21B T2ØB T19B

CORROSION MONITOR 1A–NNS
CORROSION MONITOR 1B–NNS
C1 E C2 D1 D2 A B
PRV 7413
PRV 7414
PRV 7415
PRV 7429
CORROSION MONITOR TABLE TOP SINK
TUBING (TYP)
PIPING (TYP)
7SP¾–614–1
7SP¾–6Ø2–1
7SP¾–6Ø3–1
7SP¾–615–1
7SP–H4–1
7SP–H5–1
CHILLED COOLING WATER SUPPLY CPL–2165–G–Ø89SØ1 (H1)
CHILLED COOLING WATER RETURN CPL–2165–G–Ø89SØ1 (H1)
7SP1–611–1
7SP2–6Ø1–1
PIPING TUBING

REV	DATE	DESCRIPTION	DWN	CHK	DPE	DPPE
5		INCORPORATED: EC# 77775 (I12–I14,J12–J14,K12–K14,L9–L15)	ELECTRONICALLY SIGNED AND DATED			
4	2/8/Ø5	INCORPORATED: EC# 48Ø14 REV. 5 (B1Ø)	JAP	RPP	N/A	CRW
3	1Ø/14/Ø3	INCORPORATED: EC# 48Ø14 (A13–A16,B1Ø–B16,C1Ø,H14)	JAP	RPP	N/A	DMF
2	8/3Ø/95	INCORPORATED: ESR–94ØØ33 (B1Ø–B12,C1Ø–C13,F6,H6,H9,I1,I6–I9, J7,K7,K8,K9,K1Ø,L6,L7)	LLS	RPP	GOW	DPK
1	2/22/94	INCORPORATED:PCR–3922 PARTIAL TURNOVER PER FR87 (B11)	GRS	LLS	DKC FOR MMP	WAS
Ø	2/3/94	ISSUED PER PCR–55Ø3 AND 5514	GRS	LLS	MMP	WAS

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NUCLEAR SAFETY RELATED (Q–LIST)
YES ☐ NO ■ PARTIAL ☐ F.P.–Q ☐ R.W.–Q ☐

CAROLINA POWER & LIGHT COMPANY
NUCLEAR ENGINEERING DEPARTMENT – RALEIGH, N.C.

PLANT: HARRIS NUCLEAR PROJECT – UNIT 1
SCALE: NONE

TITLE: FLOW DIAGRAM SECONDARY SAMPLING SYSTEM UNIT 1

DWG NO. CPL–2165–G–Ø89SØ2

CAR-2165
G-Ø9Ø

NOTES:

1. 3-¾ MIXING EDUCTORS PER TANK
2. 7-¾ MIXING EDUCTORS.
3. SEE DWG. CAR-2165-G-429 WASTE PROCESSING SAMPLING SYSTEM
4. TEMPORARY STRAINER FOR INITIAL FLUSHING, REMOVE BEFORE STARTUP.
6. 4-¾ MIXING EDUCTORS.
7. IF NON-RADIOACTIVE, THE WASTES TO BE DIVERTED TO NEUTRALIZATION BASIN BEFORE CHEMICAL ADDITION.
8. ¾" TUBING-MAT. SST-1 A-269-316 BY INSTRUMENTATION.
9. MAT'L OF TEE CONN. & 4 FT. MIN. OF PIPE DOWNSTREAM-ALLOY 20, EBASCO MAT'L CODE HAS-1.
13. THESE SYSTEMS MEET THE REQUIREMENTS OF ETSB 11-1 REVISION 1, EXCEPT AS NOTED BY "I-" SEE NOTE 13".

* SUPPLIED BY VENDOR
** SUPERVISOR KEY CONTROL AT WASTE PROCESSING PANEL REQUIRED.

REFERENCE DRAWINGS

VALVE AND SPECIALTY LIST	CAR-1364-B-869
PIPING LINE LIST	CAR-1364-B-878
INSTRUMENT LIST	CAR-2156-B-432
FLOW DIAGRAM LEGEND	CAR-2165-G-841
SECONDARY WASTE TREATMENT SYSTEM UNITS 1&2	CAR-2165-G-480
FLOW DIAGRAM RAD. MONITOR	CAR-2165-G-185

REV	DESCRIPTION	APPROVED
31	INCORPORATED ECÆ 80252 (12)	ELECTRONICALLY SIGNED AND DATED
30	INCORPORATED ECÆ 64483 (D18)	ELECTRONICALLY SIGNED AND DATED

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NUCLEAR SAFETY RELATED (Q-LIST)
YES ☐ NO ☐ PARTIAL ■ F.P.-Q ☐ R.W.-Q ■

CAROLINA POWER & LIGHT COMPANY
NUCLEAR ENGINEERING DEPARTMENT – RALEIGH, N.C.

PLANT: HARRIS NUCLEAR PROJECT – UNIT 1
SCALE: NONE

TITLE: FLOW DIAGRAM SECONDARY WASTE TREATMENT SYSTEM
DWG NO. CAR-2165 G-Ø9Ø

CAR-2165
G-133

STARTING AIR SYSTEM

(SEE VENDOR'S PIPING SCHEMATIC-1364-7813)

JACKET WATER SYSTEM

(SEE VENDOR'S PIPING SCHEMATIC 1364-7812)

AIR INTAKE AND EXHAUST SYSTEM

(SEE VENDOR'S PIPING SCHEMATIC-1364-7814)

FUEL OIL SYSTEM

(SEE VENDOR'S PIPING SCHEMATIC-1364-7818)

LUBE OIL SYSTEM

(SEE VENDOR'S PIPING SCHEMATIC-1364-7817)

DRAINAGE SYSTEM

LEGEND

(ØØØ) – CONNECTION NUMBERS ON DIESEL GENERATOR.

* – FURNISHED BY VENDOR
(ØØØ) – EBASCO EMDRAC FILE NUMBER [1364-ØØØ] OF THAT EQUIPMENT OR VALVE

NOTES:

1. FLANGES ADDED IN ORDER TO MEET RFT SCHEDULE.
2. STARTING AIR MODULES ARE DESIGNED IN ACCORDANCE WITH ASME CLASS 3 REQUIREMENTS, BUT ARE NOT REQUIRED AS PART OF SYSTEM STAMP.

REFERENCE DRAWINGS

VALVE AND SPECIALTY LIST	CAR-1364-B-Ø69
PIPING LINE LIST	CAR-1364-B-Ø7Ø
INSTRUMENT LIST	CAR-2166-B-432
FLOW DIAGRAM LEGEND	CAR-2165-G-Ø41

REV.	DATE	DESCRIPTION	DWN	CHK	DPE	DPPE
22		INCORPORATED: EC# 91716 (H15)	ELECTRONICALLY SIGNED			
21		INCORPORATED: EC# 99246 (H15)	ELECTRONICALLY SIGNED			
2Ø		INCORPORATED: EC# 96081 (F1,F2,B4,B14,D4,D14)	ELECTRONICALLY SIGNED			
19		INCORPORATED: EC# 94413 (F18)	ELECTRONICALLY SIGNED AND DATED			
18		INCORPORATED: EC# 9223Ø (F7,F8,F9)	ELECTRONICALLY SIGNED AND DATED			
17		INCORPORATED: EC# 90808 (B5,B15,D5, D15,F1,F2,G2)	ELECTRONICALLY SIGNED AND DATED			
16		INCORPORATED: EC# 82727 AND EC# 82728 (A14,B14)	ELECTRONICALLY SIGNED AND DATED			
15		INCORPORATED: EC# 82726 (A4,B4)	ELECTRONICALLY SIGNED AND DATED			
14		INCORPORATED: EC #64035 (F9,F1Ø)	ELECTRONICALLY SIGNED AND DATED			
13	2/16/ØØ	INCORPORATED: ESR 95-ØØØ27 (A4,A14,C4,C14,H11,H15)	JWB	WFL	DLS	
12	3/30/93	THIS DRAWING HAS BEEN ELECTRONICALLY REPRODUCED WITH DESIGN CHANGES. INCORPORATED: PCR-3995(A1-E1, A11-A12,B1,B1Ø,D1,D1Ø) NON-DESIGN CHANGE: REVISED SYSTEM DESIGNATION.(A16)	TRW	LLS	MMP	MMP

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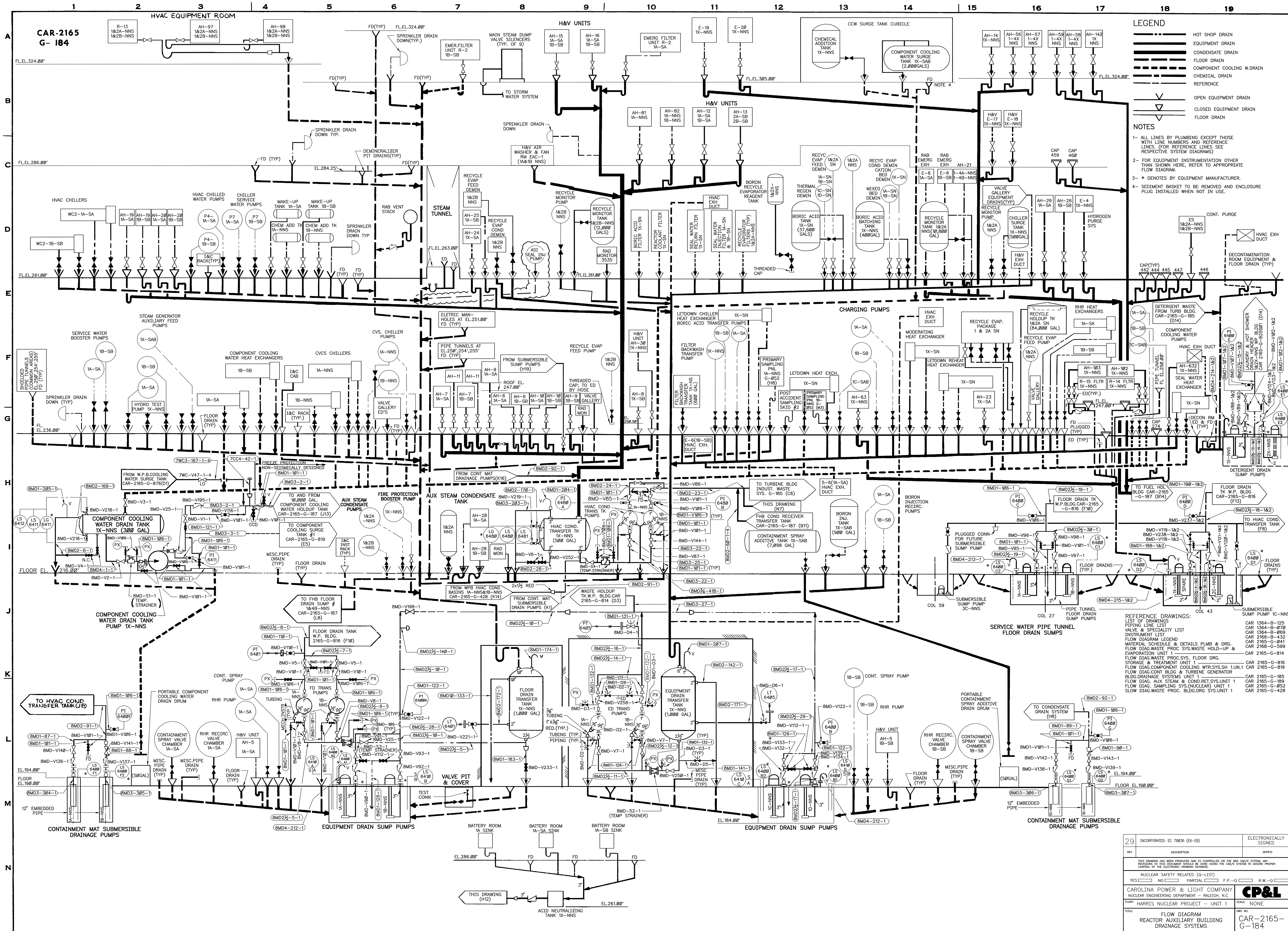
NUCLEAR SAFETY RELATED (Q-LIST)
YES ■ NO □ PARTIAL ■ F.P.-Q □ R.W.-Q □

DUKE ENERGY
NUCLEAR ENGINEERING DEPARTMENT – RALEIGH, N.C.

PLANT: HARRIS NUCLEAR PROJECT – UNIT 1 SCALE: NONE

TITLE: FLOW DIAGRAM DIESEL GENERATOR SYSTEMS UNIT 1

DWG NO. CAR-2165 G-133



CAR-2165
G- 184
HVAC EQUIPMENT ROOM
H&V UNITS
CCW SURGE TANK CUBICLE
HVAC CHILLERS
STEAM TUNNEL
CHARGING PUMPS
AUX STEAM CONDENSATE TANK
FIRE PROTECTION BOOSTER PUMP
AUX STEAM CONDENSATE PUMPS
COMPONENT COOLING WATER DRAIN TANK 1X-NNS (300 GAL)
COMPONENT COOLING WATER DRAIN TANK PUMP 1X-NNS
SERVICE WATER PIPE TUNNEL FLOOR DRAIN SUMPS
CONTAINMENT MAT SUBMERSIBLE DRAINAGE PUMPS
EQUIPMENT DRAIN SUMP PUMPS
VALVE PIT & COVER
ACID NEUTRALIZING TANK 1X-NNS
LEGEND
HOT SHOP DRAIN
EQUIPMENT DRAIN
CONDENSATE DRAIN
FLOOR DRAIN
COMPONENT COOLING W.DRAIN
CHEMICAL DRAIN
REFERENCE
OPEN EQUIPMENT DRAIN
CLOSED EQUIPMENT DRAIN
FLOOR DRAIN
NOTES
1- ALL LINES BY PLUMBING EXCEPT THOSE WITH LINE NUMBERS AND REFERENCE LINES. (FOR REFERENCE LINES SEE RESPECTIVE SYSTEM DIAGRAMS)
2- FOR EQUIPMENT INSTRUMENTATION OTHER THAN SHOWN HERE, REFER TO APPROPRIATE FLOW DIAGRAM.
3- * DENOTES BY EQUIPMENT MANUFACTURER.
4- SEDIMENT BASKET TO BE REMOVED AND ENCLOSURE PLUG INSTALLED WHEN NOT IN USE.
REFERENCE DRAWINGS:
LIST OF DRAWINGS CAR 1364-B-125
PIPING LINE LIST CAR 1364-B-070
VALVE & SPECIALITY LIST CAR 1364-B-069
INSTRUMENT LIST CAR 2166-B-432
FLOW DIAGRAM LEGEND CAR 2165-G-041
MATERIAL SCHEDULE & DETAILS PLMB & DRG. CAR 2168-G-599
FLOW DIAG.WASTE PROC SYS.WASTE HOLD-UP & EVAPORATION UNIT 1 CAR 2165-G-814
FLOW DIAG.WASTE PROC.SYS. FLOOR DRG. STORAGE & TREATMENT UNIT 1 CAR 2165-G-816
FLOW DIAG.COMPONENT COOLING WTR.SYS.SH 1.UN.1 CAR 2165-G-819
FLOW DIAG.CONT BLDG & TURBINE GENERATOR BLDG.DRAINAGE SYSTEMS UNIT 1 CAR 2165-G-185
FLOW DIAG. AUX STEAM & COND.RET.SYS.UNIT 1 CAR 2165-G-189
FLOW DIAG. SAMPLING SYS.(NUCLEAR) UNIT 1 CAR 2165-G-052
SLOW DIAG.WASTE PROC. BLDG.DRG SYS.UNIT 1 CAR 2165-G-428
29 INCORPORATED: EC 78036 (E6-E8) ELECTRONICALLY SIGNED
REV DESCRIPTION APPR'D
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NUCLEAR SAFETY RELATED (Q-LIST)
YES NO PARTIAL F.P.-Q R.W.-Q
CAROLINA POWER & LIGHT COMPANY
NUCLEAR ENGINEERING DEPARTMENT - RALEIGH, N.C.
CP&L
PLANT: HARRIS NUCLEAR PROJECT - UNIT 1
SCALE: NONE
TITLE: FLOW DIAGRAM REACTOR AUXILIARY BUILDING DRAINAGE SYSTEMS
DWG NO. CAR-2165-G-184

CAR-2165
G-185

LEGEND

- ACID WASTE
- ACID & CAUSTIC WASTE
- EQUIPMENT DRAIN
- FLOOR DRAIN
- INDUSTRIAL WASTE
- DETERGENT WASTE
- DETERGENT & ACID VENT
- REFERENCE LINE
- FLOOR DRAIN
- OPEN EQUIPMENT DRAIN
- CLOSED EQUIPMENT DRAIN
- ST STORM WATER WASTE

NOTES

1. COMPONENT COOLING WATER PIPE DRAINS, R.C.D.T. HEAT EXCHANGER SHELL DRAIN, AND EXCESS LETDOWN HEAT EXCHANGER SHELL DRAINS TO BE CAPPED. USE PORTABLE DRUM FOR DRAINING.
2. ALL LINES BY PLUMBING EXCEPT THOSE WITH LINE NUMBERS AND REFERENCED LINES. (FOR REFERENCED LINES SEE RESPECTIVE SYSTEM DIAGRAMS)
3. FOR EQUIPMENT INSTRUMENTATION OTHER THAN SHOWN HERE, REFER TO APPROPRIATE FLOW DIAGRAM.
4. * DENOTES BY EQUIPMENT MANUFACTURER.
5. FLANGED CONDENSER DRAIN DOWN CONN'S.

REFERENCE DRAWINGS

FLOW DIAGRAM LEGEND — CAR-2165-G-041
FLOW DIAG. STEAM GEN. BLOWDOWN SYSTEM — CAR-2165-G-051
FLOW DIAG. WASTE PROC. BLDG. DRAINAGE SYSTEMS — CAR-2165-G-428
FLOW DIAG. REACTOR AUX. BLDG DRAINAGE SYSTEMS — CAR-2165-G-184
FLOW DIAG. BORON RECYCLE SH. 1 — CAR-2165-G-811
FLOW DIAG. CONT. BLDG. WASTE PROC. SYSTEM — CAR-2165-G-813
FLOW DIAG. WASTE PROC. SYS. WASTE HOLD UP & VAP — CAR-2165-G-814
FLOW DIAG. WASTE PROC. SYS. FL. ORG. STORAGE & TREAT. — CAR-2165-G-816
HVAC AIR FLOW DIAG. ADMIN, SVCE & MISC. BLDGS — CAR-2168-G-518

CON'T BELOW @ L18

REFERENCE DRAWINGS CON'T FROM J18

FLOW DIAG. YARD DUCTBANK SUMPS DRAINAGE SYS — 5-G-0185 S81
FLOW DIAG. YARD DUCTBANK SUMPS DRAINAGE SYS — 5-G-0185 S82
FLOW DIAG. YARD DUCTBANK SUMPS DRAINAGE SYS — 5-G-0185 S83
FLOW DIAG. YARD DUCTBANK SUMPS DRAINAGE SYS — 5-G-0185 S84

REV	DATE	DESCRIPTION	APP'D
38		INCORPORATED: ECN 89462 (M15-M16,N17)	ELECTRONICALLY SIGNED
37		INCORPORATED: ECN 79281 (C6-C8,J18,L18)	ELECTRONICALLY SIGNED
36		INCORPORATED: ECN 74122 (C5,D5)	ELECTRONICALLY SIGNED & DATED
35		INCORPORATED: ECN 67999 R3 (D17)	ELECTRONICALLY SIGNED & DATED

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NUCLEAR SAFETY RELATED (Q-LIST)
YES ■ NO □ PARTIAL ■ F.P.-Q □ R.W.-Q □

CAROLINA POWER & LIGHT COMPANY
NUCLEAR ENGINEERING DEPARTMENT – RALEIGH, N.C.

PLANT: HARRIS NUCLEAR PROJECT – UNIT 1
SCALE: NONE

TITLE: FLOW DIAGRAM CONTAINMENT, TURBINE BLDG. TANK AREA & SECURITY BLDG. DRAINAGE SYSTEM
DWG NO: CAR-2165-G-185

CAR-2165
G-187

COL 24.7

COL 24.2 TO 13 — COL 24.2 TO 7.6Y

RAB UNIT #1 ONLY — FHB

H & V UNITS: AH-17 1-4A -5A; AH-17 1-4B -5B

SPRINKLER DRAIN DOWN

8MD2-60-1-4 EL 261.00'

FROM RAB CAR 2165 G-184 (H16)

CONT. ON G-184 (H12)

8MD-V104-1-4 F.D. 8MD1-104-1-4

8MD2-60-1-4

8MD1-161-1-4

SPRINKLER DRAIN DOWN EL. 256.00

8MD2-160-1-4

8MD-V214-1-4

8MD3-59-1-4

8MD-V29-1-4 CONDENSATE RECEIVER TRANSFER PUMP 1-4X-NNS

8MD-V72-1-4

8MD-V71-1-4

CONDENSATE RECEIVER & TRANS TANK 1-4X-NNS (1000 GAL)

8MD2-69-1-4

8MD2-71-1-4

8MD-V73-1-4

8MD-V212-1-4

8MD-V109-1-4

8MD1-109-1-4

F.D.F.

SCR'D CAP.

8MD-V215-1-4

8MD1-162-1-4

3/8" TUBING 8MD-V269-1-4

8MD-V104-1-4

8MD1-104-1-4

8MD3/4-226-1-4

8MD2-160-1-4

8MDV2-225-1-4

EL. 216.00'

TO FLOOR DRAIN SYSTEM (M9)

EXTEND THRU ROOF

EL. 286.00'

I & C SHOP

DECONTAMINATION FACILITY

RINSE TANK

ULTRASONIC TANK

AH-55 (1-4X-NNS)

SAMPLE LINES: ELEVATED SYS. CAR-2165-G-429

SAMPLE HOOD #18

RAD MON

1-4A NNS

1-4B NNS

TUBE SIDE

COOLING WATER HEAT EXCHANGER

EL 261.00' FD(TYP)

PIPE TUNNEL @ EL 254.00'

FD (TYP)

SW EVAP HTR VENT GAS COND (SHELL SIDE)

182X NNS

364X NNS

AH-74 1-4X NNS

SW DISTILLATE CONDENSER VENT GAS CONDENSER (SHELL SIDE)

SW ACID TANK

SW CAUSTIC TANK

SW EVAP CONCENTRATE TANKS VENT GAS COOLER

182X NNS (SHELL SIDE)

364X NNS (SHELL SIDE)

SW ACID PUMP

SW CAUSTIC PUMP

182X NNS

364X NNS

INST RACK (TYP)

FD (TYP)

SECONDARY WASTE DISTILLATE PUMPS

SECONDARY WASTE EVAPORATORS

SECONDARY WASTE ENTRAINMENT SEPARATORS

SECONDARY WASTE DEMINERALIZERS

SECONDARY WASTE FILTERS

182X NNS

364X NNS

MISC PIPE DRAINS (TYP)

LOW CONDUCTIVITY HOLDING TANKS

182C NNS

182D NNS

NITROGEN ACCUMULATOR 1 & 2X NNS

HVAC UNIT AH-77 1-4X-NNS

SEC. WASTE EVAP CONC PUMPS

SECONDARY WASTE BAG FILTERS

SEC. WASTE STEAM CONDENSATE PUMPS

SEC. WASTE CONC TANK

SECONDARY WASTE EVAP CONC TANK

SECONDARY WASTE TANK TRANSFER PUMPS

SECONDARY WASTE CONCENTRATE TANK

SECONDARY WASTE EVAPORATOR HTR

SECONDARY WASTE FILTER BACKWASH TRANS TANK PUMP

AUX STM. CONDENSATE TANKS

AUX STM. COND TANK PUMPS

HIGH CONDUCT HOLDING TANK PUMPS

HIGH CONDUCTIVITY HOLDING TANK MIXING PUMP

HIGH CONDUCT HOLDING TANK

LOW CONDUCTIVITY HOLDING TANK PUMPS

LOW CONDUCT HOLDING TANK

SECONDARY WASTE SUMP PUMPS 1-4M & 1-4N NNS

AH-78-1 4X-NNS

EL 216.00'

8MD-V115-1-4

8MD-V82-1-4

8MD-V81-1-4

8MD1-139-1-4

8MD2"-64-1-4

8MD2"-54-1-4

8MD1-125-1-4

8MD-V125-1-4

TO FD TANKS SEE CAR (2165-G-81G (E1B)

FD SUMP PUMPS - 1-4K NNS & 1-4L NNS

NEUTRALIZING SUMP

SPRINKLER DRAIN DOWN

MISC PIPE DRAINS (TYP)

F.D. (TYP.)

FD (TYP)

HVAC EXH DUCT

EMERG EXH SYSTEM UNIT E-12 (1-4X-SB)

HVAC SUPPLY UNIT AH-22 1-4A-NNS 1-4B-NNS

PERSONNEL DECONTAMINATION AREA

LAVATORIES

SHOWERS

PT 6464

8MD-V125-1-4

8MD1-125-1-4

8MD2-136-1-4

TO LAUNDRY & HOT SHOWER DRAIN HDR CAR-2165-G-825501 (C-10)

8MD1-230-1-4

8MD-V259-1-4

8MD2-145-1-4

8MD-V208-1-4

8MD-V202-1-4

LD 6464 A

LD 6464 B

FUEL POOLS DEMINERALIZER 1 4X-NNS

FUEL POOLS DEMINERALIZER 2 & 3 X-NNS

EMERG EXH SYSTEM UNIT E-13 (1-4X-SB)

FD (TYP)

PIPE TUNNEL @ EL 252.00'

DETERGENT DR SUMP PUMPS 1-4A-NNS & 1-4B-NNS

HVAC EXH. DUCT

FUEL POOLS SKIMMER FILTER

FUEL POOLS REFUEL WTR PURIF FILTER

FUEL POOLS DEMIN FILTER

FUEL POOLS COOLING PUMPS

FUEL POOL STRAINERS

MISC PIPE DRAINS

FUEL POOL HEAT EXCHS

144X NNS

144A SA

144B SB

FUEL POOLS SKIMMER PUMP

144X NNS

FD (TYP)

PT 6475

8MD-V125-1-4

8MD1-125-1-4

8MD2-68-1-4

8MD-V67-1-4(TYP)

8MD-V115-1-4(TYP)

TO LAUNDRY & HOT SHWR DR. HDRS CAR-2165-G-825501 (C-10)

8MD2-67-1-4

8MD-V66-1-4(TYP)

DECONTAMINATION TRANSFER PUMPS SEE DETAIL "B" (D18)

8MD-V28-1-4(TYP) "2" VT OVERFLOW

1-4A NNS

1-4B NNS

DECON. RCVG. & TRANSF. TK. 1-4X-NNS (1000 GAL.)

8MD2-70-1-4

8MD1-129-1-4

8MD3-65-1-4

FD (TYP)

8MD-V104-1-4

8MD1-104-1-4

8MD-V21-1-4

FUEL POOLS COOLING PUMPS

FUEL POOLS STRAINERS

FUEL POOLS HEAT EXCH'S

243A SA

243B SB

FUEL POOLS DEMIN FILTER

FUEL POOLS REFUEL WTR PURIF FILTER

INST RACK (TYP)

282X NNS

283X NNS

FUEL POOLS SKIMMER FILTER

FUEL POOLS SKIMMER PUMP

283X NNS

MISC PIPE DRAINS (TYP)

HVAC EXH DUCT

NITROGEN ACCUMULATOR 2&3X-NNS

FUEL POOLS REFUEL WTR PURIF FILTER

COMPONENT COOLING WATER TRANSFER PUMP 1-4X-NNS

DECONTAMINATION TRANSFER PUMPS

1/2" 3/4"

8MD-V261-1-4

8MD1/2-231-1-4

8MD3/4-232-1-4

DETAIL "A" (L12)

1-4A-NNS 1-4B-NNS

8MD-V265-1-4

8MD1/2-227-1-4

8MD3/4-230-1-4

8MD3/4-228-1-4

I.C. (TYP.) PIPING (TYP.)

8MD-V266-1-4

8MD1/2-229-1-4

FD. SYS.

DETAIL "B" (H13)

DECONTAMINATION FACILITY

RINSE TANK

ULTRASONIC TANK

SERVICE SINK

HVAC EXH DUCT

MISC. PIPE DRAIN (TYP)

1"Φ

DECON RINSE PUMP 1-4X-NNS

DECON WASH PUMP 1-4X-NNS

DECON CHEM ADD. TANK

CASK DECONTAMINATION ENCLOSURE

STORAGE AREA

FD (TYP)

FREEZE PROTECTED NON-SEISMICALLY DESIGNED 8MD3-21-1

TO & FROM CCW DR. TANK UNIT 1 CAR-2165-G-814 (E-5)

8MD3-21-1

8MD2-167-1-4

8MD2-166-1-4

8MD-V217-1-4 (TYP)

8MD2-166-1-4

8MD2-415-1-4

8MD-V412-1-4

8MD-V413-1-4

8MD2-416-1-4

8MD-V74-1-4

8MD2-72-1-4

1-4X-NNS COMP. CLG. WATER HOLD-UP TANK

8MD-V17-1-4

8MD-V104-1-4

8MD1-109-1-4

8MD-V109-1-4

8MD1-102-1-4

8MD-V24-1-4

8MD-V23-1-4

8MD1-104-1-4

8MD-V104-1-4

FD

FD (TYP)

SEE DETAIL "A" LOC (D16)

COMPONENT COOLING WATER TRANSFER PUMP 1-4X-NNS

8MD3-62-1-4

8MD2½-58-243

FUEL POOLS AND REFUELING WATER PURIFICATION PUMPS

8MD-V108-243

8MD-V103-243

8MD-V63-243

8MD-V62-243

8MD-V68-243

8MD 2½-53-243

FD SUMP PUMPS 243B-NNS - 243A-NNS

FILTER BACKWASH TRANSFER TANK

FILTER BACKWASH TRANSFER PUMP

8MD1-108-243

8MD 2½-52-243

8MD-V64-243

8MD-V65-243

8MD2½-55-243

8D SUMP PUMPS 243B-NNS - 243A-NNS

2B3X-NNS

MISC PIPE DRAINS (TYP)

8MD-V104-1-4

8MD-V24-1-4

8MD-V63-243

8MD-V68-243

FD. WASTE WATER TANKS CAR-2165-G-084 (E4)

8MD-V108-243

FILTER BACKWASH TRANSFER TANK

FILTER BACKWASH TRANSFER PUMP

8MD1-108-243

8MD 2½-52-243

8MD-V64-243

8MD-V65-243

8MD2½-55-243

8D SUMP PUMPS 243B-NNS - 243A-NNS

2B3X-NNS

FILTER BACKWASH TRANSFER TANK

FILTER BACKWASH TRANSFER PUMP

8MD1-108-144

8MD2¼-53-144

FUEL POOLS AND REFUELING WATER PURIFICATION PUMPS

8MD-V108-144

8MD-V63-144

8MD-V64-144

8MD-V65-144

8MD1-103-144

8MD2¼-55-144

8MD2¼-58-144

FD SUMP PUMPS 144A-NNS - 144B-NNS

ED SUMP PUMPS 144A-NNS - 144B-NNS

WASTE PROCESSING BLDG (SECONDARY WASTE AREA)

FUEL HANDLING BLDG

LEGEND

- ACID & CAUSTIC VENT
- ACID & CAUSTIC WASTE
- DETERGENT WASTE
- EQUIPMENT DRAIN
- FLOOR DRAIN
- COMPONENT COOLING WATER DR.
- SECONDARY WASTE
- CLOSED EQUIPMENT DRAIN
- OPEN EQUIPMENT DRAIN
- FLOOR DRAIN
- REFERENCE
- CONDENSATE DRAIN
- E.D. CAPPED DUE TO CANCELLATION OF UNITS 3 & 4
- INDICATES E.D. NUMBER AS SHOWN ON PLMB. PLAN DWGS.

NOTES

1. FOR EQUIPMENT INSTRUMENTATION OTHER THAN SHOWN HERE, REFER TO APPROPRIATE FLOW DIAGRAM.
2. ALL LINES BY PLUMBING EXCEPT THOSE WITH LINE NUMBERS AND REFERENCE LINES (FOR REFERENCE LINES SEE RESPECTIVE SYSTEM DIAGRAMS.
3. * BY EQUIPMENT MANUFACTURER.

REFERENCE DRAWINGS

LIST OF DRAWINGS	CAR-1364-B-125
FLOW DIAG REAC AUX BLDG DRG SYS, UNIT 1	CAR-2165-G-154
FLOW DIAG WASTE PROD SYSTEM FLOOR DRAIN DRG. STG & TREATMENT UNIT 1 & 2	CAR-2165-G-816
FLOW DIAG LAUNDRY & HOT SHOWERS STG & TREATMENT UNIT 1 & 2	2165-G-825
FUEL HDLG BLDG PLEL 216'-6" & 236' PLMB & DRG UNIT 1 & 2	2168-G-577
FUEL HDLG BLDG PLEL 261.00' PLMB & DRG UNIT 1 & 2	2168-G-578
FUEL HDLG BLDG PLEL 286.00' PLMB & DRG UNIT 1 & 2	2168-G-579
FUEL HDLG BLDG RISER DIAGRAM PLMB & DRG UNIT 1 & 2	2168-G-580
MATERIAL SCHEDULES & DETAILS PLMB & DRG	CAR-2168-G-598
PIPING LINE LIST	CAR-1364-B-070
VALVE & SPECIALTY LIST	CAR-2166-B-432
FLOW DIAGRAM LEGEND	CAR-2165-G-041

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APPROVED FOR CONSTRUCTION

NORTH CAROLINA REGISTERED No. 4234 PROFESSIONAL ENGINEER JOHN ROSS

THIS DOCUMENT IS DELIVERED IN ACCORDANCE WITH AND IS SUBJECT TO THE PROVISIONS OF SECTION X OF THE CONTRACT BETWEEN CAROLINA POWER & LIGHT COMPANY AND EBASCO SERVICES INCORPORATED DATED SEPTEMBER 1, 1970, AS AMENDED.

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT

FLOW DIAGRAM
FUEL HANDLING BUILDING
DRAINAGE SYSTEMS
UNIT 1

EBASCO SERVICES INCORPORATED

APPROVED — DATE 7-1-74

SCALE NONE — DIV. MECH — DR. L LANA — CHECKED

CAR-2165 G-187

NO	DATE	REVISION	BY	CK	SUP	APP
10	10-9-89	INCORPORATED IN THIS REVISION: PCR-4462 (L9)	CDH	RPB	MW	GW
9	9/1/16	INCORPORATED IN THIS REVISION: PCR-3983 (E1B, E19)	CDH	TRW	WSW	MJ
8	10/31/19	INCORPORATED IN THIS REV: PCR-1841 (A17, A18) 2353 (N2, N3)	DH	TRW	LB	MA
7	10-30-95	INCORPORATED: DCA-M-250 (J18, K5, K19, L9, L10, L11, L14, L15, L16, L17, M15, M16, N19) 2601 (H2) PCR-P-2342 R1 (J18, K13) K18) 2359 R1 (L13, M14) 2467 (T15, J13) 3171 (B1C) 3822 R1 (D18, D19) 4589. (J18, J19) PCR-SP-179 R1 (P11, L5, L10, L11, L15, L17, N2) 242 R1 (K12, L12, L13)	Q.B. R	TRW	RPB	DLP	APP

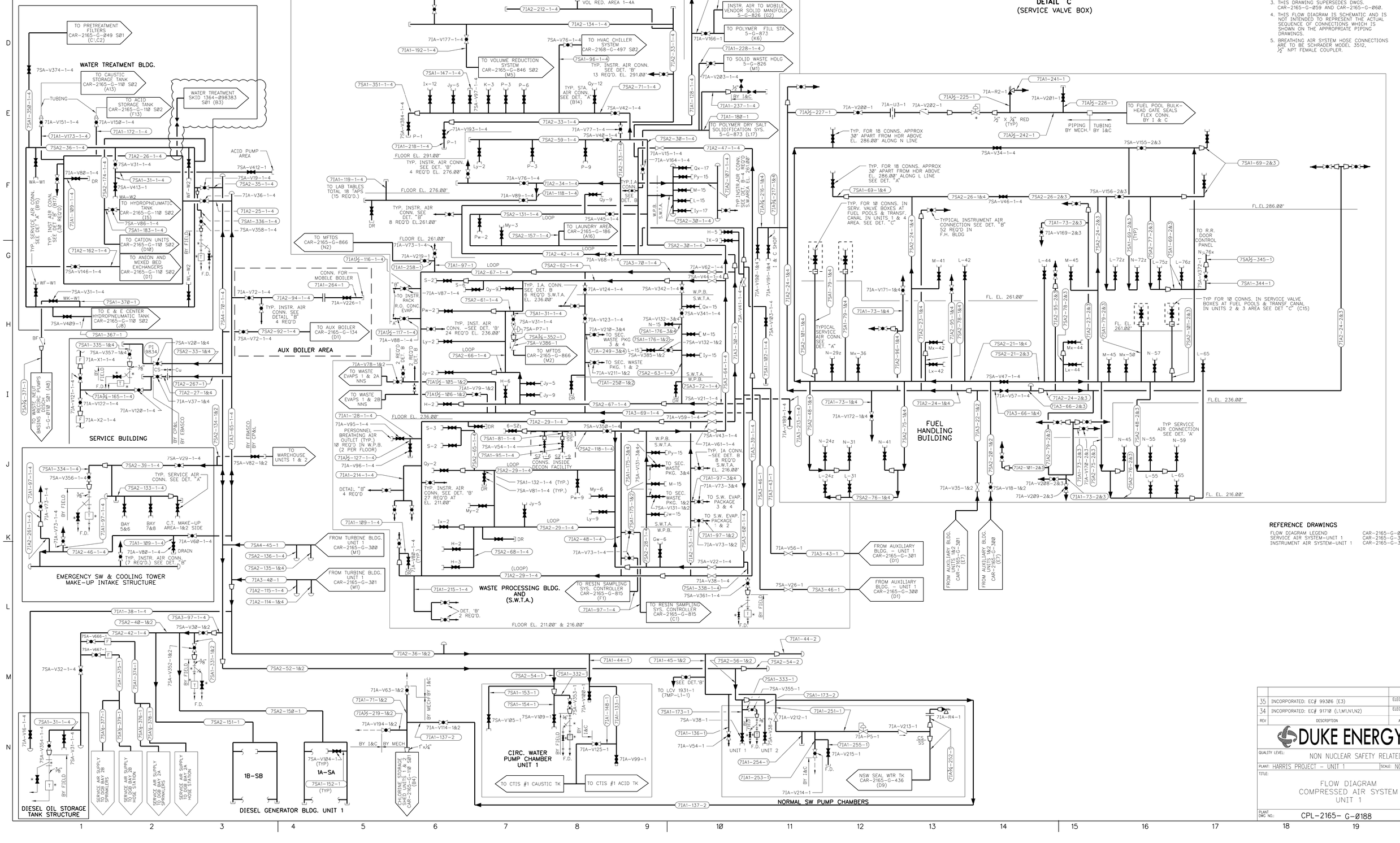
CP&L-HPES FIELD DRAWING REVISION

NO.	DATE	REVISION	BY	CH.	APPROVED
6	4-27-89	INCORPORATED IN THIS REVISION: ECR-P-2348, 2359.	JEG	RSM	LL MB
5	6-16-85	REVISED: (16, M7) PIPING; ADDED: (M9) DRAINAGE (N19) NOTE 2, (L1) CAPS (L11) INSTR. DELETED: (K12) INSTR., (J13 THRU L13) PIPING, (K13, L13) VALVES. K.C. ROSSI-NRC REF 11594	MB	JEG RSM	LL MB
		GENERAL REVISION AS CIRCLED FOR A(1) UNIT PLANT, INCORPS DCN-P2-0821			
		ALSO INCORPORATED IN THIS REVISION: DCN-FD-0444, 0708			
		ISSUED FOR CONSTRUCTION AS NOTED AND ADDED: (L8, L9, M8, L3, E6, L8) INSTRS. ADDED: (D3, J17) INSTR. PIPING, (K5) PUMP (G17) DELETED (K14, M5) PIPING, (E5) VALVE			

NO.	DATE	REVISION	BY	CH.	APPROVED
4	7-14-83	REVISED: (B11) NOTE (4) INSTR. NO. ADDED: (C18, H15, I12) INSTRUMENT DELETED: (B11, B12) PIPING.	JEG	RSM	LL MB
3	7-26-79	REVISED: (J16, L2) NOTE, (H3) VAS. (C15, F16, I3, J3, J4, H2, I12, L12) PIPING, (M1, L16) LINE NOS., PID LINES VALVE NO. ADDED: (B18, H8) INSTR. (A17, B17, C15, C17, E5, H11, I9, I12, K11, L11) LINE NOS. (M1) VAS. (B9, C16, F9, I12, K5, K7, L8, M2, M5) PIPING, (L4, L9, L11, L14, L16, M3) NOTE 5, (B15, C15, C16, D15, G11, I12, K11, L11) VALVES, (G15, H8, L12, L13, M5, M6) NOTE (F), (K6) EQUIPE PIPING (I19, J19) CAPS, (D16, D18) DETAILS, DELETED: (G8) GAL PIPING, (K5) VALVE NO. (J12) LINE & VALVE.	LA	LL	MB
2	6-30-78	ISSUED FOR CONSTRUCTION			
1	12-15-77	ISSUED FOR PRELIMINARY CONSTRUCTION			

NO.	DATE	REVISION	BY	CH.	APPROVED
16	5/1/89	INCORPORATED MASTER EC 21068; EC 7323A (KT); EC 7323A (KIT).		DH	KPR
15	2/16/87	INCORPORATED: ESR-9400400 (L1 - L7)	LLS	RPB	DLP
14	5/15/19	INCORPORATED IN THIS REV. PCR-6786 (K5)	ESP	RPB	DLP
13	3-17-93	INCORPORATED IN THIS REV.: PCR-5960 (F19)	LLS	RPB	GDW
12	6/10/91	INCORPORATED IN THIS REV: PCR-5771 (F19)	ESP	RPB	JWL
11	4/1/91	INCORPORATED IN THIS REV: PCR-5572 (I6-L6, L1)	ESP	GI	PK

CAR-2165
G-188



NOTES:

1. "S-5" - INDICATES THE APPROXIMATE LOCATION OF HOSE STATION IN VICINITY OF COLUMN S-5.
2. ALL HOSE STATION VALVES ARE NORMALLY CLOSED.
3. THIS DRAWING SUPERSEDES DWGS. CAR-2165-G-Ø59 AND CAR-2165-G-Ø6Ø.
4. THIS FLOW DIAGRAM IS SCHEMATIC AND IS NOT INTENDED TO REPRESENT THE ACTUAL SEQUENCE OF CONNECTIONS WHICH IS SHOWN ON THE APPROPRIATE PIPING DRAWINGS.
5. BREATHING AIR SYSTEM HOSE CONNECTIONS ARE TO BE SCHRADER MODEL 3512, ¼" NPT FEMALE COUPLER.

REFERENCE DRAWINGS

FLOW DIAGRAM LEGEND	CAR-2165-G-Ø241
SERVICE AIR SYSTEM-UNIT 1	CAR-2165-G-3Ø2
INSTRUMENT AIR SYSTEM-UNIT 1	CAR-2165-G-3Ø1

REV	DESCRIPTION	APPROVED
35	INCORPORATED: EC# 99306 (E3)	ELECTRONICALLY SIGNED
34	INCORPORATED: EC# 91710 (L1,M1,N1,N2)	ELECTRONICALLY SIGNED

DUKE ENERGY

QUALITY LEVEL: NON NUCLEAR SAFETY RELATED

PLANT: HARRIS PROJECT - UNIT 1 SCALE: NONE

TITLE: FLOW DIAGRAM COMPRESSED AIR SYSTEM UNIT 1

PLANT DWG NO.: CPL-2165- G-Ø188