Figure 1.3-1 – Production Building Subfloor Plans Preliminary Arrangement

Security-Related Information – Withhold Under 10 CFR 2.390

Figure 1.3-2 – Production Building Floor Plans Preliminary Arrangement

Security-Related Information – Withhold Under 10 CFR 2.390

Figure 1.3-3 – Production Building Sections Preliminary Arrangement

Security-Related Information – Withhold Under 10 CFR 2.390

Figure 1.3-4 – SHINE Facility Site Layout

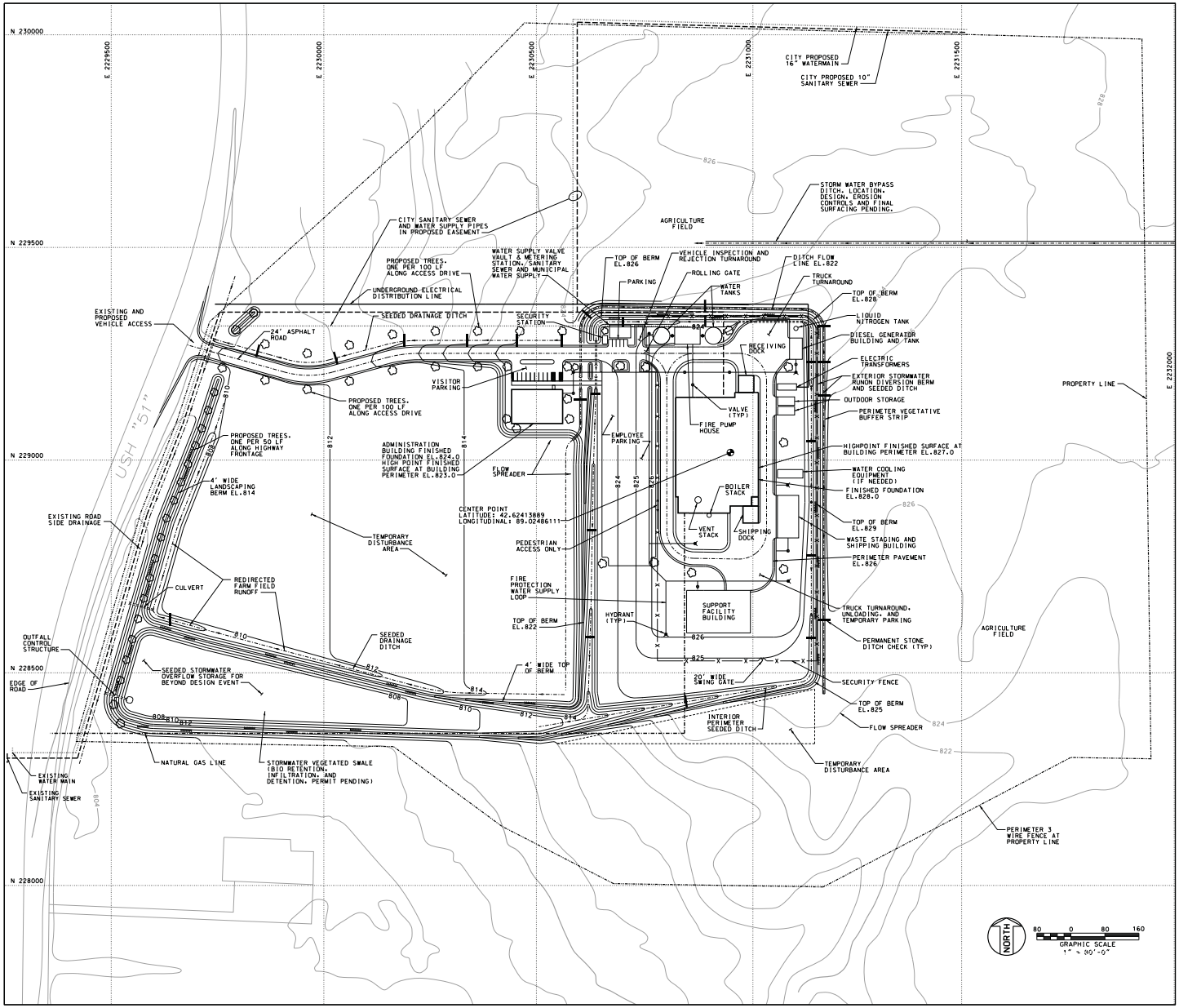

Figure 1.3-5 – RCA Boundaries

Security-Related Information – Withhold Under 10 CFR 2.390

Figure 1.3-6 – Legend for Process Flow Diagrams
(Sheet 1 of 2)

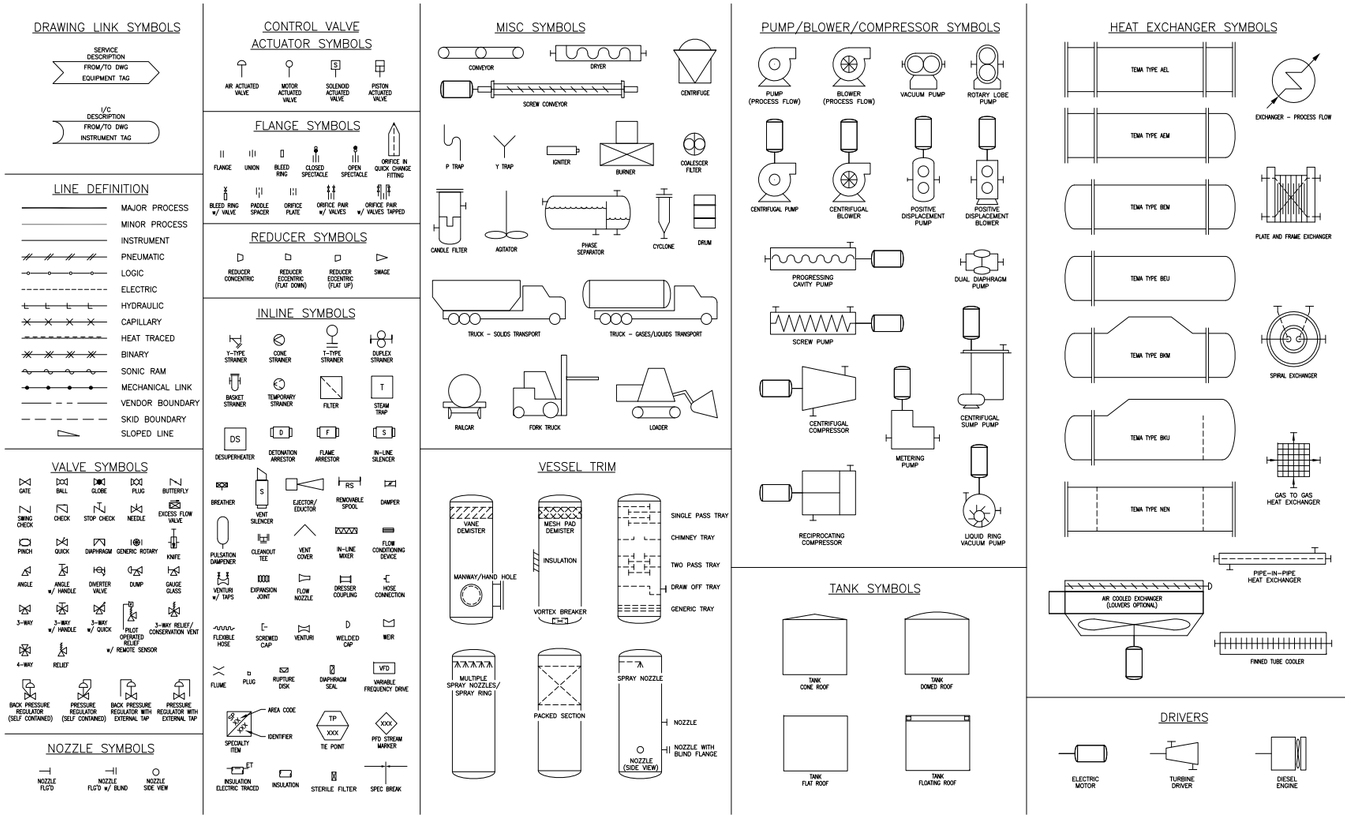

Figure 1.3-6 – Legend for Process Flow Diagrams (Sheet 2 of 2)

PIPING NUMBERING SYSTEM

2"–PW–XXXX–123–YYYY–1"H2–ET

- ET – HEAT TRACING
- H2 – INSULATION SIZE/TYPE
- YYYY – PIPING DESIGN TABLE NUMBER
- 123 – UNIQUE LINE NUMBER
- XXXX – SYSTEM CODE
- PW – PROCESS SERVICE
- 2" – LINE SIZE

PROCESS SERVICE IDENTIFICATION

A	– AIR	MS	– MEDIUM PRESSURE STEAM
AH	– AMMONIUM HYDROXIDE	NG	– NATURAL GAS
AV	– ATMOSPHERIC VENT	N	– NITROGEN
BA	– BREATHING AIR	NA	– CAUSTIC
BD	– BLOWDOWN	NH	– AMMONIA
BFW	– BOILER FEED WATER	NT	– NITRIC ACID
C	– CHEMICAL FEED (MISC.)	OX	– OXYGEN
CD	– CONDENSATE	OWS	– OILY WATER SEWER
CG	– COVER GAS	PA	– PLANT AIR
CHS	– CHEMICAL SEWER	PC	– PROCESS CONDENSATE
CHW	– CHILLED WATER	PG	– PROCESS GAS
CO2	– CARBON DIOXIDE	PP	– POTASSIUM PERMANGANATE
CWR	– COOLING WATER RETURN	PTW	– POTABLE WATER
CWS	– COOLING WATER SUPPLY	PW	– PROCESS WATER
DMW	– DEMINERALIZED WATER	RV	– RELIEF VENT
DR	– DRAIN	RW	– RADIOACTIVE LIQUID WASTE
F	– FLARE	SA	– SULFURIC ACID
FF	– FLUSHING FLUID	SC	– STEAM CONDENSATE
FO	– FUEL OIL	SL	– UREX SOLVENT
FW	– FIRE WATER	SO	– SEAL OIL
GLR	– GLYCOL RETURN	SS	– SANITARY SEWER
GLS	– GLYCOL SUPPLY	STS	– STORM SEWER
H	– HYDROGEN	TS	– TARGET SOLUTION
HA	– HOT FLUE GAS	UN	– URANYL NITRATE
HS	– HIGH PRESSURE STEAM	V	– VACUUM
IA	– INSTRUMENT AIR	WW	– WASTE WATER
LO	– LUBE OIL		
LN	– LIQUID NITROGEN		
LS	– LOW PRESSURE STEAM		

ABBREVIATIONS

AG	– ABOVE GROUND
ATM	– ATMOSPHERE
BYP	– BYPASS
CC	– CHEMICAL CLEANOUT
CL	– CENTERLINE
CO	– CLEANOUT
CONN	– CONNECTION
DES	– DESIGN
D/P	– DIFFERENTIAL PRESSURE
EL	– ELEVATION
ESD	– EMERGENCY SHUTDOWN
FOF	– FACE OF FLANGE
FLG	– FLANGE
FP	– FULL PORT
FV	– FULL VACUUM
GO	– GEAR OPERATED
GR	– GRADE
HC	– HOSE CONNECTION
HH	– HAND HOLE
HP	– HIGH PRESSURE
IAS	– INSTRUMENT AIR SUPPLY
ISBL	– INSIDE BATTERY LIMITS
LP	– LOW PRESSURE
MOC	– MATERIALS OF CONSTRUCTION
NNF	– NORMALLY NO FLOW
OSBL	– OUTSIDE BATTERY LIMITS
OVHD	– OVERHEAD
R	– RELOCATED
REQD	– REQUIRED
SC	– SAMPLE CONNECTION
SCH	– SCHEDULE
SD	– SHUTDOWN
SG	– SPECIFIC GRAVITY
SP	– SET POINT
SS	– STAINLESS STEEL
STD	– STANDARD
T/C	– THERMOCOUPLE
TEMP	– TEMPERATURE
THRD	– THREADED
TL	– TANGENT LINE
T/T	– TANGENT TO TANGENT
TYP	– TYPICAL
UG	– UNDERGROUND
VF	– VENDOR FURNISHED

VALVE LIST KEY

1st LETTER	2nd NO TYPE	3rd NO CLASS	4th NO END CONNECTION	5th NO MATERIAL
V – VALVE	1 – BALL 2 – CHECK 3 – GATE 4 – GLOBE 5 – BUTTERFLY 6 – PLUG 7 – TRIPLE OFFSET	0 – 125 1 – 150 3 – 300 6 – 600 8 – 800 9 – 900 5 – 1500	1 – SW 2 – SW/BW 3 – BW 4 – BW/FLG 5 – FLG 6 – THREADED 7 – LUGGED 8 – NON–LUGGED 9 – WAFER 0 – SWxFLG	1 – CAST IRON/DUCTILE IRON 2 – LOW CARBON STEEL 3 – STAINLESS 4 – KILLED CARBON STEEL (NACE MR0175 COMPLIANT) 5 – LOW & INTERMEDIATE ALLOY STEEL

ABBREVIATIONS FOR VALVES

FO – FAIL OPEN	FTV – FAIL TO VENT	HPT – HIGH POINT	LPT – LOW POINT
FC – FAIL CLOSED	CSO – CAR SEAL OPEN	LO – LOCK OPEN	NO – NORMALLY OPEN
FL – FAIL IN LAST POSITION	CSC – CAR SEAL CLOSED	LC – LOCK CLOSED	NC – NORMALLY CLOSED

ABBREVIATIONS FOR HAND SWITCHES

HOA – HAND OFF AUTOMATIC; F/R – FORWARD REVERSE; OCA – OPEN CLOSED AUTOMATIC; S/S – START/STOP

ABBREVIATIONS FOR EQUIPMENT TAGS

A – EXCHANGERS, CONDENSERS
B – (LATER)
C – COMPRESSORS, BLOWERS, VACUUM PUMPS, FANS, EXHAUSTERS, REFRIGERATION UNITS AND THEIR DRIVES, GEARS, AND FLUID DRIVES
D – DEMINERALIZERS, ABSORBERS, CLARIFIERS, AIR DRYERS, EVAPORATORS, AERATORS, DECARBONATORS, AND DEGASIFIERS
E – ELECTRICAL EQUIPMENT (INCLUDING SWITCHGEAR, MOTOR CONTROL CENTERS, TRANSFORMERS, SWITCH BOARDS, ETC.)
F – FILTERS, STRAINERS, PURIFIERS, CENTRIFUGES, AND SILENCERS
G – HANDLING EQUIPMENT, CRANES, HOISTS, AND DRIVERS
H – HUMIDIFICATION/DEHUMIDIFICATION EQUIPMENT
J – INSTRUMENT AND CONTROL BOARDS, PANELS, AND CABINETS
K – DIESEL GENERATORS, DIESEL ENGINES
M – PIPING SPECIALTIES (TRAPS, HOSES, EXPANSION JOINTS, RESTRICTION ORIFICES, ETC.)
P – PUMPS AND THEIR DRIVES, GEARS, AND FLUID DRIVES
R – RACKS
S – SPECIAL PACKAGED ITEMS OR SYSTEMS
T – TANKS AND RESERVOIRS
V – VESSELS
X – MISCELLANEOUS AIR HANDLING DEVICES (INCLUDING AIR MIXING BOXES, DUCT SILENCERS, DAMPERS, ETC.)
Y – (LATER)
Z – MISCELLANEOUS EQUIPMENT

INSULATION/HEAT TRACING

AC – ACOUSTIC CONTROL INSULATION
CC – COLD SERVICE INSULATION
CJ – CHILLED FLUID JACKETED
CP – CONDENSATION CONTROL
CT – CHILLED FLUID TRACED
ET – ELECTRIC TRACED
FP – FIRE PROTECTION INSULATION
HC – HEAT CONSERVATION INSULATION
HJ – HOT FLUID JACKETED
HT – HOT FLUID TRACED
PF – PREVENTION FROM FREEZING INSULATION
PP – PERSONNEL PROTECTION INSULATION
PS – PROCESS STABILITY INSULATION
SJ – STEAM JACKETED
ST – STEAM TRACED

INSTRUMENT IDENTIFICATION TABLE

	FIRST LETTER	MEASURING DEVICES							CONTROLLING DEVICES						ALARMS*					SWITCHES*					MISC.
		E	W	R	I	T	RT	IT	G	RC	IC	C	CV	>	Z	A	L	LL	H	HH	IS	S	Y	XSL	XSH	
SYMBOL	MEASURED OR INITIAL VARIABLE	PRIMARY ELEMENT	WELL	READOUT (RECORDING)	READOUT (INDICATING)	TRANSMITTER (BLIND)	TRANSMITTER (RECORDING)	TRANSMITTER (INDICATING)	GAUGE (LOCAL)	CONTROLLERS (RECORDING)	CONTROLLERS (INDICATING)	CONTROLLERS (BLIND)	S. CONTAINED CONTROL VALVE	CONTROL VALVE	FINAL CONTROL ELEMENT	BLIND	LOW	LOW LOW	HIGH	HIGH HIGH	INDICATING	BLIND	RELAY	SHUTDOWN LOW (XSL)	SHUTDOWN HIGH (XSH)	SAFETY DEVICE
A	ANALYZER	AE	AW	AR	AI	AT	ART	AIT		ARC	AIC	AC		AV		AA	AAL/AALL		AAH/AAHH		AIS	AS	AY	AXSL	AXSH	
B	BURNER, COMBUSTION	BE	BW	BR	BI	BT	BRT	BIT	BG	BRC	BIC	BC			BZ	BA	BAL/BALL		BAH/BAHH		BIS	BS	BY	BXSL	BXSH	
C	CONDUCTIVITY (ELECTRICAL)	CE		CR	CI	CT	CRT	CIT		CRC	CIC	CC			CZ	CA	CAL/CALL		CAH/CAHH		CIS	CS	CY	CXSL	CXSH	
D	DENSITY OR SPEC. GRAV.	DE		DR	DI	DT	DRT	DIT		DRC	DIC	DC				DA	DAL/DALL		DAH/DAHH		DIS	DS	DY	DXSL	DXSH	
E	VOLTAGE	EE		ER	EI	ET	ERT	EIT		ERC	EIC	EC			EZ	EA	EAL/EALL		EAH/EAHH		EIS	ES	EY	EXSL	EXSH	
F	FLOW	FE		FR	FI	FT	FRT	FIT	FG	FRC	FIC	FC	FCV	FV		FA	FAL/FALL		FAH/FAHH		FIS	FS	FY	FXSL	FXSH	
G	USER'S CHOICE																									
H	HAND INITIATED										HIC	HC	HCV	HV								HS	HY			
I	CURRENT (ELECTRICAL)	IE		IR	II	IT	IRT	IIT		IRC	IIC				IZ	IA	IAL/IALL		IAH/IAHH		IIS	IS	IY	IXSL	IXSH	
J	POWER	JE		JR	JI	JT	JRT	JIT		JRC	JIC				JZ	JA	JAL/JALL		JAH/JAHH		JIS	JS	JY	JXSL	JXSH	
K	TIME OR TIME SCHEDULE	KE		KR	KI	KT	KRT	KIT		KRC	KIC	KC	KCV		KZ	KA	KAL/KALL		KAH/KAHH		KIS	KS	KY	KXSL	KXSH	
L	LEVEL	LE	LW	LR	LI	LT	LRT	LIT	LG	LRC	LIC	LC	LCV	LV		LA	LAL/LALL		LAH/LAHH		LIS	LS	LY	LXSL	LXSH	
M	MOISTURE OR HUMIDITY	ME		MR	MI	MT	MRT	MIT		MRC	MIC	MC		MV		MA	MAL/MALL		MAH/MAHH		MIS	MS	MY	MXSL	MXSH	
N	USER'S CHOICE																									
O	USER'S CHOICE																									
P	PRESSURE OR VACUUM	PE		PR	PI	PT	PRT	PIT		PRC	PIC	PC	PCV	PV		PA	PAL/PALL		PAH/PAHH		PIS	PS	PY	PXSL	PXSH	PSV PSE
Q	QUANTITY OR EVENT	QE		QR	QI	QT	QRT	QIT		QRC	QIC				QZ	QA	QAL/QALL		QAH/QAHH		QIS	QS	QY	QXSL	QXSH	
R	RADIOACTIVITY	RE	RW	RR	RI	RT	RRT	RIT		RRC	RIC	RC			RZ	RA	RAL/RALL		RAH/RAHH		RIS	RS	RY	RXSL	RXSH	
S	SPEED OR FREQUENCY	SE		SR	SI	ST	SRT	SIT		SRC	SIC	SC	SCV	SV	SZ	SA	SAL/SALL		SAH/SAHH		SIS	SS	SY	SXSL	SXSH	
T	TEMPERATURE	TE	TW	TR	TI	TT	TRT	TIT		TRC	TIC	TC	TCV	TV		TA	TAL/TALL		TAH/TAHH		TIS	TS	TY	TXSL	TXSH	TSE
U	MULTI–VARIABLE													UV		UA							UY		UU	
V	VIBRATION	VE		VR	VI	VT	VRT	VIT								VA			VAH/VAHH		VIS	VS	VY		VXSH	
W	WEIGHT OR FORCE	WE		WR	WI	WT	WRT	WIT		WRC	WIC	WC	WCV		WZ	WA	WAL/WALL		WAH/WAHH		WIS	WS	WY	WXSL	WXSH	
X	SHUTDOWN													XV		XA	XAL/XALL		XAH/XAHH			XS	XY			
Y	EVENT, STATE OR PRESENCE																									
Z	POSITION	ZE		ZR	ZI	ZT	ZRT	ZIT		ZRC	ZIC	ZC	ZCV	ZV		ZA	ZAL/CLOSE		ZAH/OPEN		ZIS	ZS	ZY			

*S, SWITCH, THE ACTUATING DEVICE MAY BE USED IN THE SAME FASHION AS A, ALARM, THE ANNUNCIATING DEVICE.

ADDITIONAL INSTRUMENT ABBREVIATIONS, IF REQUIRED
THE FOLLOWING IS A GUIDE FOR ADDING ABBREVIATIONS (USUAL OR PREFERRED USAGE)

FIRST POSITION	SECOND POSITION	THIRD POSITION	FOURTH POSITION
A ANALYSIS	ALARM	ALARM	
B BURNER		BOARD	
C CONDUCTIVITY (ELECTRICAL)	CONTROL, CONTROLLER	CONTROL, CONTROLLER	CONTROLLER
D DENSITY OR SPECIFIC GRAVITY	DIFFERENTIAL	DEVICE	
E VOLTAGE (EMF)	ELEMENT	ELEMENT	
F FLOW	FRACTION (RATIO)		
G	GLASS		
H HAND INITIATED		HIGH	HIGH
I CURRENT (ELECTRICAL)	INDICATOR, INDICATING	INDICATOR	INDICATOR
J POWER	SCAN		
K TIME	TIME RATE OF CHANGE	CONTROL STATION	
L LEVEL	LIGHT (PILOT)	LOW	LOW
M MOISTURE OR HUMIDITY	MOMENTARY	MIDDLE	MIDDLE
N			

FIRST POSITION	SECOND POSITION	THIRD POSITION	FOURTH POSITION
O	ORIFICE (RESTRICTION)		
P PRESSURE OR VACUUM	POINT (TEXT CONN.)		
Q QUANTITY OR EVENT	INTEGRATE (TOTALIZE)		
R RADIOACTIVITY	RECORDER	RECORDER	RECORDER
S SPEED OR FREQUENCY	SWITCH, SAFETY		
T TEMPERATURE	TRANSMITTER	SAFETY, SWITCH TRANSMITTER	
U MULTIVARIABLE	MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V VIBRATION, MECH. ANALYSIS	VALVE, DAMPER, LOUVER	VALVE, DAMPER, LOUVER	VALVE, DAMPER, LOUVER
W WEIGHT OR FORCE	WELL		
X	X		
X SHUTDOWN	SHUTDOWN, X AXIS		
Y EVENT, STATE OR PRESENCE	RELAY, Y AXIS	RELAY	
Z POSITION	DRIVE, FINAL CONTROL ELEMENT, Z AXIS	DRIVE, FINAL CONTROL ELEMENT	

DRAWING SCALE
NTS