FIRST LETTER		SECOND AND SUCCEEDING LETTERS																			
		DISPLAY DEVICES							CONTROLLING DEVICES							SENSING DEVICES					
MEASURED VARIABLE	SYMBOLS FOR MEASURED VARIABLES	INDICATING	RECORDING	INTEGRATING INDICATOR (SEE NOTE 5)	SCAN (SEE NOTE 7)	ALARM (SEE NOTES 12 & 14) LOW	HIGH	LOW HIGH	INDICATING	RECORDING	BLIND	CONTROL VALVE	SELF ACTUATED VALVE	FINAL CONTROL ELEMENT (SEE NOTE 11)	SWITCH (SEE NOTE 6)	PRIMARY ELEMENT	BLIND TRANSMITTERS	INDICATING TRANSMITTER	LOCAL OBSERVATION GLASS	TEST CONNECTION	RELAY OR CONVERTER (BLIND) (SEE NOTE 3)
TYPICAL SYMBOL	( )	( ) I	( ) R	( ) O I	( ) J ( )	( ) AL	( ) AH	( ) AHL	( ) IC	( ) RC	( ) C	( ) V	( ) CV	( ) Z	( ) S ( )	( ) E	( ) T	( ) IT	( ) G	( ) P	( ) Y
ANALYSIS (SEE NOTE 1)	A	AI	AR		AJ ( )	AAL	AAH	AAHL	AIC	ARC	AC	AV		AZ	AS ( )	AE	AT	AIT		AP	AY
BURNER FLAME	B	BI	BR		BJ ( )	BAL					BC	BV			BS ( )	BE	BT		BG	BP	BY
CONDUCTIVITY	C	CI	CR		CJ ( )	CAL	CAH	CAHL	CIC	CRC		CV		CZ	CS ( )	CE	CT	CIT		CP	CY
DENSITY	D	DI	DR		DJ ( )	DAL	DAH	DAHL	DIC	DRC		DV		DZ	DS ( )	DE	DT	DIT		DP	DY
VOLTAGE (EMF)	E	EI	ER		EJ ( )	EAL	EAH	EAHL	EIC	ERC	EC			EZ	ES ( )	EE	ET	EIT			EY
FLOW (SEE NOTE 10)	F	FI	FR	FOI	FJ ( )	FAL	FAH	FAHL	FIC	FRC	FC	FV	FCV	FZ	FS ( )	FE	FT	FIT	FG	FP	FY
FLOW RATIO	FF	FFI	FFR		FFJ ( )				FFIC	FFRC	FFC	FFV		FFZ							
GAGING (DIMENSIONAL)	G	GI	GR		GJ ( )	GAL	GAH	GAHL	GIC	GRC	GC	GV		GZ	GS ( )	GE	GT	GIT			
HAND	H								HIC		HC	HV	HCV	HZ	HS ( )						
CURRENT	I	II	IR	IOI	IJ ( )	IAL	IAH	IAHL	IIC	IRC	IC			IZ	IS ( )	IE	IT	IIT			IY
POWER	J	JI	JR	JOI	JJ ( )	JAL	JAH	JAHL	JIC	JRC	JC			JZ	JS ( )	JE	JT	JIT			JY
TIME	K	KI	KR	KOI	KJ ( )	KAL	KAH	KAHL	KIC	KRC	KC	KV		KZ	KS ( )		KT	KIT			KY
LEVEL	L	LI	LR		LJ ( )	LAL	LAH	LAHL	LIC	LRC	LC	LV	LCV	LZ	LS ( )	LE	LT	LIT	LG	LP	LY
MOISTURE	M	MI	MR		MJ ( )	MAL	MAH	MAHL	MIC	MRC	MC	MV		MZ	MS ( )	ME	MT	MIT		MP	MY
NEUTRON	N																				
TORQUE	O	OI	OR		OJ ( )	OAL	OAH	OAHL	OIC	ORC	OC	OV		OZ	OS ( )	OE	OT				OY
PRESSURE	P	PI	PR		PJ ( )	PAL	PAH	PAHL	PIC	PRC	PC	PV	PCV	PZ	PS ( )	PE	PT	PIT		PP	PY
PRESSURE DIFFERENTIAL	PD	PDI	PDR			PDAL	PDAH	PDAHL	PDIC	PDRC	PDC	PDV	PDCV	PDZ	PDS ( )		PDT	PDIT			
QUALITY OR EVENT	Q	QI	QR	QOI	QJ ( )	QAL	QAH	QAHL	QIC	QRC	QC	QV		QZ	QS ( )		QT	QIT			QY
RADIATION	R	RI	RR	ROI	RJ ( )	RAL	RAH	RAHL	RIC	RRC	RC			RZ	RS ( )	RE	RT	RIT		RP	RY
SPEED OR FREQUENCY	S	SI	SR	SOI	SJ ( )	SAL	SAH	SAHL	SIC	SRC	SC	(SEE NOTE 10)		SZ	SS ( )		ST	SIT			SY
TEMPERATURE	T	TI	TR		TJ ( )	TAL	TAH	TAHL	TIC	TRC	TC	TV	TCV	TZ	TS ( )	TE	TT	TIT		TW	TY
TEMPERATURE DIFFERENTIAL	TD	TDI	TDR			TDAL	TDAH	TDAHL	TDIC	TDRC	TDC	TDV	TDCV	TDZ	TDS ( )	(SEE NOTE 8)				(SEE NOTE 8)	
MULTI-VARIABLE	U	UI	UR		UJ ( )	UAL	UAH	UAHL	UIC	URC	UC	UV		UZ	US ( )						UY
VISCOSITY	V	VI	VR		VJ ( )	VAL	VAH	VAHL	VIC	VRC	VC	VV		VZ	VS ( )	VE	VT	VIT			VY
WEIGHT	W	WI	WR	WOI	WJ ( )	WAL	WAH	WAHL	WIC	WRC	WC	WV		WZ	WS ( )	WE	WT	WIT			WY
UNCLASSIFIED (SEE NOTE 4)	X	XI	XR		XJ ( )	XAL	XAH	XAHL	XIC	XRC	XC	XV		XZ	XS ( )	XE	XT	XIT			XY
USERS CHOICE (SEE NOTE 2)	Y																				YY
POSITION	Z	ZI	ZR		ZJ ( )	ZAL	ZAH	ZAHL	ZIC	ZRC	ZC			ZZ	ZS ( )	ZE	ZT	ZIT			ZY

CONTROL VALVE BODIES

GLOBE, GATE OR OTHER IN-LINE TYPE AS IDENTIFIED (FO)

UNCLASSIFIED (TYPE OF BODY WRITTEN IN, OR ADJACENT TO SYMBOL) (X)

THREE WAY (FO)

FOUR WAY (FO)

FO - INDICATES FAIL OPEN
FC - INDICATES FAIL CLOSE
FL - INDICATES FAIL AS IS
FI - INDICATES FAIL INDETERMINATE

ACTUATORS

(IF REQUIRED) FO
PNEUMATIC ACTUATOR
FO - INDICATES FAIL OPEN
FC - INDICATES FAIL CLOSE

DIAPHRAGM, PRESSURE BALANCED

(ELECTRIC) M
ROTARY MOTOR (SHOWN TYPICALLY WITH ELECTRICAL SIGNAL)

CYLINDER, SINGLE ACTING; ALSO DOUBLE ACTING CYLINDER THAT IS ASSEMBLED WITH PILOT SO THAT ACTUATOR ASSY. IS ACTUATED BY ONE CONTROLLED INPUT.

S
CYLINDER, DOUBLE ACTING WITH ACTUATING PILOT VALVE

CYLINDER, DOUBLE ACTING ASSEMBLED WITHOUT PILOT VALVE

HAND ACTUATOR (MOUNTED AT TOP SIDE, OR BOTTOM OF ACTUATED DEVICE, AS APPLICABLE)

E/H
ELECTRO-HYDRAULIC

UNCLASSIFIED (X TYPE OF ACTUATOR TO BE WRITTEN ADJACENT TO SYMBOL)

S R
SOLENOID RESET (OPTIONAL)

SFRCS INPUT / OUTPUT SIGNAL

RSI-
SFRCS INPUT SIGNAL (SEE M-001 FOR DESCRIPTION)

RS-
SFRCS OUTPUT TRIP SIGNAL (SEE M-001 FOR DESCRIPTION)

SELF - ACTUATING DEVICES

PRESSURE

PCV
PRESSURE REDUCING REGULATOR, SELF-CONTAINED

PCV
PRESSURE REDUCING REGULATOR WITH EXTERNAL PRESSURE TAP

PDCV
DIFFERENTIAL PRESSURE REDUCING REGULATOR WITH INTERNAL AND EXTERNAL PRESURE TAPS

PCV
PRESSURE REDUCING REGULATOR WITH EXTERNAL PRESSURE TAP PROVIDING PNEUMATIC SIGNAL TO ACTUATOR (16)

PCV
BACK-PRESSURE REGULATOR WITH EXTERNAL PRESSURE TAP

PCV
BACK-PRESSURE REGULATOR SELF-CONTAINED

PSV
PRESSURE RELIEF OR SAFETY VALVE STRAIGHT THRU PATTERN SPRING OR WT. LOADED OR WITH INTEGRAL PILOT

PSV
PRESSURE RELIEF OR SAFETY VALVE, ANGLE PATTERN SPRING OR WEIGHT LOADED, OR INTEGRAL PILOT

PS S PSV
PRESSURE RELIEF OR SAFETY VALVE, ANGLE PATTERN, TRIPPED BY INTEGRAL SOLENOID

PSV
VACUUM RELIEF, ANGLE PATTERN, SPRING OR WEIGHT LOADED OR WITH INTEGRAL PILOT

PSE
RUPTURE DISK OR SAFETY HEAD FOR VACUUM RELIEF

PSE
RUPTURE DISK OR SAFETY HEAD FOR PRESSURE RELIEF

TEMPERATURE

TEMPERATURE REGULATOR, FILLED SYSTEM TYPE

LEVEL

LCV
LEVEL CONTROL WITH MECHANICAL LINKAGE

HAND

HCV
HAND CONTROL VALVE IN PROCESS LINE. (HCV IS FOR HAND ACTUATED VALVES USED FOR THROTTLING OR REQUISITIONED BY INSTR. GROUP)

HS
HAND ACTUATED SWITCHING VALVE IN PNEUMATIC SIGNAL LINE. TWO-WAY SHOWN-FOR THREE- OR FOUR-WAY ADD LINES AS REQUIRED

FLOW

FS
MAGNETROL TYPE FLOW SWITCH

FICV
FLOW REGULATOR WITH INTEGRAL FLOW INDICATOR. TAG "FCV" IF WITHOUT FLOW INDICATOR

MISCELLANEOUS

RELAY

1:1 ( )Y
1:1 RELAY (VOLUME BOOSTER)

> ( )Y
HIGH MEASURED VARIABLE SELECTOR IF HIGH SIGNAL SELECTOR ADD (SIGNAL)

√ ( )Y
SQUARE ROOT EXTRACTOR

E/P ( )Y
ELECTRO-PNEUMATIC CONVERTER

UR XXX (X)
MULTIPOINT RECORDER SUFFIX (X) INDICATES POINT NUMBER

( )Y
SPECIAL CONVERTER SEE INSTRUMENT INDEX FOR DETAILS

(1/4") I
INTERLOCK

(1/4") C 12
PANEL MOUNTED PATCHBOARD OR MATRIX CONNECTION

R
INDICATOR LIGHT (SEE NOTE 15)
(R) RED (G) GREEN
(W) WHITE (A) AMBER
(B) BLUE (O) ORANGE

TE C
CLAMP TYPE TEMPERATURE ELEMENT

INSTRUMENTS

(1/2")
LOCAL INSTRUMENT INCLUDING TRANSMITTER FOR SINGLE MEASURED VARIABLE

LOCAL INSTRUMENT FOR TWO MEASURED VARIABLES OR MORE THAN ONE FUNCTION

INSTRUMENT FOR SINGLE MEASURED VARIABLE

INSTRUMENT FOR TWO MEASURED VARIABLES OR MORE THAN ONE FUNCTION

CONTROL ROOM PANEL MOUNTED

MOUNTED ON A PANEL NOT LOCATED INSIDE CONTROL ROOM

MOUNTED BEHIND A CONTROL ROOM PANEL

MOUNTED BEHIND A PANEL NOT LOCATED INSIDE CONTROL ROOM

INSTRUMENT WITHIN A HEATED ENCLOSURE

SUTP XXX
START UP TEST PANEL. SEQUENCE NUMBER

DIGITAL DATA SYSTEM - COMPUTER

VARIABLE INTO DATA SYSTEM. INDICATES ALARM OR FUNCTION AS REQUIRED

POINT TERMINATES AT PLANT COMPUTER, (855), AND TECH SUPPORT CENTER, (TSC), COMPUTER, SIGNAL SOURCE FOR POINT IS AS SHOWN.

POINT TERMINATES AT PLANT COMPUTER, (855), AND TECH SUPPORT CENTER, (TSC), COMPUTER, SIGNAL SOURCE FOR TSC POINT IS THROUGH 855.

POINT TERMINATES AT TECH SUPPORT CENTER, (TSC) COMPUTER. SIGNAL SOURCE FOR POINT IS AS SHOWN.

TSC ONLY

NOTES:

(1) "A" IS USED FOR ALL ANALYTICAL VARIABLES: FOR EXAMPLE: O_2, H_2O, CO_2, pH, THE RECOGNIZED CHEMICAL OR PHYSICAL SYMBOL (SUCH AS pH) OR A DESCRIPTION DENOTING THE FUNCTION OF THE ANALYZER SHOULD BE NOTED ON THE P & ID OUTSIDE THE INSTRUMENT SYMBOL.

(2) A USER'S CHOICE LETTER IS INTENDED TO COVER A MEANING THAT WOULD BE USED REPETITIVELY IN A PARTICULAR PROJECT. WHEN USED, THE LETTER MAY HAVE ONE MEANING AS A FIRST LETTER AND ANOTHER MEANING AS A SUCCEEDING LETTER. THE MEANINGS NEED BE DEFINED ONLY ONCE IN A LEGEND, OR OTHERWISE FOR THAT PROJECT. FOR EXAMPLE, THE LETTER "N" MAY BE DEFINED AS TURBIDITY AS A FIRST LETTER AND TELEVISION MONITOR AS A SECOND LETTER. "BN" WOULD BE A BURNER FLAME TELEVISION MONITOR.

(3) THE EQUATION OF DESCRIPTION DENOTING THE FUNCTION OF THE RELAY "Y" SHOULD BE SHOWN ON THE P & ID. FOR EXAMPLE: A+B+C=K, LP SELECTOR, VOLUME BOOSTER.

(4) "X" IS USED TO REPRESENT ANY "SPECIAL" VARIABLES AND MAY BE DEFINED AS REQUIRED. FOR EXAMPLE: MASS FLOW (SIGNAL) FROM A MULTIPLYING RELAY WHICH COMPUTES THE PRODUCT OF DENSITY AND FLOW. THIS ITEM IS NOT TO BE CONFUSED WITH "U" MULTI-VARIABLE SYMBOL.

(5) WHEN "O" IS USED AS A SECOND OR SUCCEEDING LETTER IT DENOTES AN INTEGRATING MODIFIER. FOR EXAMPLE: "FOI" IS AN INDICATING FLOW INTEGRATOR (OR TOTALIZER).

(6) STARTUP AND SHUTDOWN DEVICES ARE USUALLY BLIND, BUT MAY BE INDICATING OR RECORDING. IF SO, ADD "I" OR "R" AFTER MEASURED VARIABLE. FOR EXAMPLE: FIS, TRS. SWITCH FUNCTIONS MAY BE FURTHER MODIFIED BY "L" FOR LOW AND "H" FOR HIGH.

(7) THE DESIGNATION "AJ ( )" MAY DENOTE A SCANNING ANALYZER INDICATOR, RECORDER, TRANSMITTER, ETC., BY USING THE DESIGNATION AJI, AJR, AJT, ETC., RESPECTIVELY.

(8) "TW" DENOTES A THERMOWELL. "TE" DENOTES A THERMOWELL WITH THERMOCOUPLE OR RESISTANCE BULB AND HEAD SUITABLE FOR USE WITH A SECONDARY INSTRUMENT. "TX" DENOTES PLUGGED TEST POINT (NO THERMOWELL).

(9) PRESSURE RELIEF VALVES AND RUPTURE DISKS SHALL BE IDENTIFIED AS "PSV" AND "PSE" RESPECTIVELY.

(10) THE FOLLOWING SPECIAL SYMBOLS ARE USED:
RO - RESTRICTION ORIFICE
NRV - NON RETURN (STOP CHECK) VALVE
SV - SOLENOID VALVE
PX, FX - CAPPED PRESSURE FLOW TEST POINT (NO VALVE)

(11) FOR DEVICES OTHER THAN CONTROL VALVES, SUCH AS HYDRAULIC COUPLINGS, VARIABLE SPEED DRIVES, ETC.

(12) HIGH-HIGH ALARMS SHALL BE DESIGNATED "( ) AHH" AND LOW-LOW ALARMS "( ) ALL".

(13) ALL INSTRUMENT IDENTIFICATIONS ARE BASED UPON ISA STANDARD "S5.1-1967". FOR FURTHER DETAILS REFER TO ISA STANDARD.

(14) ALL ANNUNCIATOR SIGNALS WHICH GO TO THE CONTROL ROOM WILL ALSO HAVE A PARALLEL SIGNAL TO THE COMPUTER.

(15) IN GENERAL, THE SYMBOL IL IS USED TO DESIGNATE AN INDICATING LIGHT. WHERE SPECIAL DESIGNATION IS REQUIRED, PILOT LIGHTS SHALL BE IDENTIFIED WITH THE PARTICULAR VARIABLE LETTER, FOLLOWED BY SECOND LETTER "L".

(16) a. EVERY CONTROL SWITCH IN THE CONTROL ROOM FOR SAFETY FEATURES ACTUATION SYSTEM (SFAS) EQUIPMENT HAS A BLOCK SWITCH WHICH ALLOWS THE OPERATOR TO BLOCK THE SAFETY ACTUATION SIGNAL AFTER THE SAFETY ACTUATION INITIATION. THE BLOCK SWITCH HAS AN INSTRUMENT NUMBER BUT DOES NOT APPEAR ON THE P & ID.
b. SELECTED CONTROL SWITCHES IN THE CONTROL ROOM FOR THE STEAM & FEEDWATER RUPTURE CONTROL SYSTEM (SFRCS) EQUIPMENT HAVE A BLOCK SWITCH WHICH ALLOWS THE OPERATOR TO BLOCK THE SAFETY SIGNAL AFTER THE SAFETY INITIATION. THE BLOCK SWITCH HAS AN INSTRUMENT NUMBER AND DOES APPEAR ON THE P & ID.

(17) DELETED

(18) NON PROCESS ELECTRICAL INSTRUMENTATION NOT SHOWN ON THE P & ID - REFER TO APPLICABLE ELECTRICAL DRAWINGS.

LICENSE RENEWAL BOUNDARY DRAWING
LR-M002 REV 0

THIS DRAWING WAS REDRAWN ON CADD AND SUPERSEDS REV. 12

DB 02-11-05

DAVIS-BESSE NUCLEAR POWER STATION
UNIT NO. 1
THE TOLEDO EDISON COMPANY

PIPING & INSTRUMENT DIAGRAM
INSTRUMENTATION SYMBOLS

DRAWING NO.	REV.
M-002	16

DFN= /PIDS/M002.DGN

01D03