GENERAL EQUIPMENT

COOLING TOWER

PRESSURE VESSEL

FLAT BOTTOM TANK w/CLOSED TOP

CONE BOTTOM TANK

SLANT PLATE CLARIFIER OR SEPARATOR

AIR COMPRESSOR

HEAT EXCHANGER FOR VAPOR SERVICE (FIN TUBE)

ELECTRIC HEAT EXCHANGER

HEAT EXCHANGER FOR LIQUID SERVICE (PLATE OR SHELL & TUBE)

CENTRIFUGAL FAN

CENTRIFUGAL PUMP

ROTARY PUMP

DIAPHRAGM PUMP

VACUUM BLOWER

FAN

CENTRIFUGAL PUMP (IN TANK)

ELECTRICAL COIL HEATER

GENERAL EQUIPMENT (cont'd)

ROTARY, CENTRIFUGAL & WATER SEALED COMPRESSORS & VACUUM PUMPS

SUMP PUMP

BLOWER SILENCER

GENERAL PIPING

PRIMARY PROCESS FLOW

SECONDARY PROCESS OR UTILITY FLOW

CAM LOCK CONNECTION

SOLIDS FLOW OR INTERMITTENT FLOW

CONCENTRIC REDUCER OR INCREASER

ECCENTRIC REDUCER OR INCREASER

FLEXIBLE CONNECTION

HOSE CONNECTION

FLANGED JOINT

BLANK FLANGED

DRAIN w/RECOVERY

SAMPLE CONNECTION

ATMOSPHERIC VENT

SPRAY NOZZLE

BASKET STRAINER OR BAG FILTER

INSULATED

INSULATED & HEAT TRACED

MAGNETIC FLOW METER

FLOAT CONTROL VALVE

BOILER

MISCELLANEOUS

DWG.# — LINE BREAK OR RESUMPTION POINT

VALVE NOTATION

CONTROL VALVE BODIES

OPEN		CLOSED
	GATE (GA)	
	BALL (BA)	
	BUTTERFLY (BF)	
	PLUG (PL)	
	NEEDLE (NE)	
	CHECK (CK)	

DIAPHRAGM ACTUATED VALVES (TYPICAL)

HV — NO — FC

NORMAL MODE *(SEE NOTE BELOW)*

FAILURE MODE – FO,FC,FL,FI

NOTE:

FAIL POSITIONS ALL BODY STYLES
- FO – FAIL OPEN
- FC – FAIL CLOSED
- FL – FAIL LOCKED/LAST POSITION
- FI – FAIL INDETERMINATE
- CSO – CAR SEAL/LOCK OPEN
- CSC – CAR SEAL/LOCK CLOSED

NORMAL MODE IDENTIFICATION (I.E. NO. NC.) SHOULD ONLY BE USED FOR ON–OFF TYPE VALVES WHOSE POSITION CANNOT BE SHOWN BY SHADING THE VALVE BODY.

VALVE ACTUATORS

HAND OR HAND WHEEL

PNEUMATIC DIAPHRAGM

SOLENOID

GENERAL INSTRUMENTS

INSTRUMENT FOR SINGLE MEASURED VARIABLE AND ANY NUMBER OF FUNCTIONS. INSTRUMENT IS FIELD MOUNTED

INSTRUMENT IS MOUNTED IN FRONT OF LOCAL PANEL.

SHARED DISPLAY OR VIRTUAL (SOFTWARE BASED) SYMBOLS AND SWITCH

REMOTE OR BLIND INDICATOR/CONTROLLER

CENTRAL PLC OR CONTROL ROOM INDICATOR/ CONTROLLER/RECORDER OR ANNUNCIATION POINT

INTERLOCK

(NOTE A) ON / OFF — E *(NOTE B)* — E *(NOTE B)*

GENERAL INSTRUMENTS (cont'd)

ALARM & CONTROL DESIGNATIONS

S/S, HH, H, L, LL — 0–100%

- HH – HI–HI ALARM (CONTROL ROOM)
- H – HI ALARM (CONTROL ROOM)
- L – LO ALARM (CONTROL ROOM)
- LL – LO–LO ALARM (CONTROL ROOM)
- S/S – START/STOP FROM CONTROL ROOM
- 0–100% – ADJUSTABLE RANGE OF OUTPUT
- HOA – HAND/OFF/AUTO
- OCA – OPEN/CLOSED/AUTO

NOTE A: SHOWN ON THE UPPER AND LOWER LEFT HAND SIDE WILL BE THE DISPLAY SUCH AS ON/OFF, OPEN/CLOSED, SET/RESET, LAH, LAL, LDA (STEEPING DEVIATION). LDA APPLIES TO VIRTUAL (SOFTWARE) ALARMS ONLY. IT IS UNDERSTOOD THAT A VIRTUAL SWITCH EXISTS WITH A UNIQUE TAG NUMBER FOR THE LOOP.

NOTE B: ELECTRICAL AND HAND SWITCH DESIGNATION WILL BE SHOWN ON THE UPPER RIGHT HAND SIDE

CONNECTION TO PROCESS OR INSTRUMENT INPUT

ELECTRICAL SIGNAL OR INTERNAL SYSTEM LINK

TYPICAL CONNECTION ANY VARIABLE

DIRECT CONNECTION PROCESS BLOCK VALVE SYMBOL OPTIONAL

PRESSURE SENSORS

DIRECT CONNECTED

WITH DIAPHRAGM SEAL PIPE MOUNTED

WITH DIAPHRAGM SEAL LINE MOUNTED (FLANGED)

EQUIPMENT NUMBER IDENTIFICATION

C–102A
- DUPLICATE OR SPARE
- SEQUENCE NUMBER
- EQUIPMENT LETTER (SEE BELOW)
  - A – AIR STRIPPER
  - B – BLOWER
  - C – COLUMN, ADSORBER/ABSORBER
  - E – HEAT EXCHANGER
  - F – FILTER
  - P – PUMP
  - T – TANK
  - Y – MISCELLANEOUS EQUIPMENT
  - Z – MISCELLANEOUS EQUIPMENT

SELF–ACTIVATED PRESSURE DEVICES

PCV — PRESSURE REDUCING REGULATOR

PSE — RUPTURE DISK OR SAFETY HEAD FOR PRESSURE RELIEF

PRV — PRESSURE RELIEF VALVE

LINE NUMBER IDENTIFICATION

PA–4016–3"–E

- MATERIAL SPECIFICATION
  - A – SCHEDULE 10 CARBON STEEL
  - B – SCHEDULE 40 CARBON STEEL
  - C – SCHEDULE 40 PVC
  - D – SCHEDULE 80 PVC
  - E – SCHEDULE 80 GALVANIZED STEEL
  - F – STAINLESS STEEL TUBING
  - G – 12 GAUGE CARBON STEEL
  - H – FLEX HOSE
- LINE SIZE
- SEQUENTIAL NUMBER
- FLOW TYPE
  - CFR – COOLING FLUID RETURN
  - CFS – COOLING FLUID SUPPLY
  - CWR – COOLING WATER RETURN
  - CWS – COOLING WATER SUPPLY
  - DW – POTABLE WATER
  - IA – INSTRUMENT AIR
  - PA – PLANT AIR
  - PC – PROCESS CONDENSATE
  - PL – RECOVERED DNAPL
  - PV – PROCESS VAPOR
  - UW – PROCESS WATER

INSTRUMENT IDENTIFICATION

AE	ANALYZING ELEMENT
AI	ANALYSIS INDICATOR
ASH	ANALYSIS SWITCH HIGH
FAL	FLOW ALARM LOW
FE	FLOW ELEMENT
FI	FLOW INDICATOR
FIC	FLOW INDICATOR CONTROL
FSL	FLOW INDICATOR CONTROL
FV	FLOW VALVE
HS	HAND SWITCH
KI	TIMER INDICATOR
LAH	LEVEL ALARM HIGH
LAHH	LEVEL ALARM HIGH–HIGH
LAL	LEVEL ALARM LOW
LALL	LEVEL ALARM LOW–LOW
LG	LEVEL GLASS (VIEWING)
LIC	LEVEL INDICATOR CONTROL
LSH	LEVEL SWITCH HIGH
LSHH	LEVEL SWITCH HIGH–HIGH
LSL	LEVEL SWITCH LOW
LSLL	LEVEL SWITCH LOW–LOW
PAL	PRESSURE ALARM LOW
PCV	PRESSURE CONTROL VALVE
PI	PRESSURE INDICATOR
PIC	PRESSURE INDICATOR CONTROL
PSH	PRESSURE SWITCH HIGH
PSHH	PRESSURE SWITCH HIGH–HIGH
PSL	PRESSURE SWITCH LOW
PSLL	PRESSURE SWITCH LOW–LOW
PV	PRESSURE VALVE
SC	SPEED CONTROL
SI	SPEED INDICATOR
TAH	TEMPERATURE ALARM HIGH
TAHH	TEMPERATURE ALARM HIGH–HIGH
LAL	TEMPERATURE ALARM LOW
TALL	TEMPERATURE ALARM LOW–LOW
TE	TEMPERATURE ELEMENT
TI	TEMPERATURE INDICATOR
YS	PROXIMITY SWITCH
ZS	POSITION SWITCH

REV.	DATE	DESCRIPTION	DRAWN BY	DRAFT CHK	PROJ ENGR	LEAD ENGR	CONF CTRL/ NUCL SFTY	FAC MGR	E&TS MGR
7	5-22-14	ISSUED FOR AS–BUILT, PHASE 2A	KTW	BJK	DJH	JTP	JBS	JRW	PAC
6	6-26-13	PHASE IIA DESIGN–ISSUED FOR AS–BUILT	KTW	NJB	DJH	JTP	SJD	JRW	PAC
5	10/26/12	PHASE IIA DESIGN–CERTIFIED FOR CONSTRUCTION	NJB	TJH	TJM	BCK	SJD	JRW	RES

DRAWING REVISIONS

U.S. DEPARTMENT OF ENERGY
PADUCAH, PORTSMOUTH PROJECT OPERATIONS, PADUCAH GASEOUS DIFFUSION PLANT

LPE

LATA Environmental Services of Kentucky, LLC managed for the DEPARTMENT OF ENERGY under U.S. GOVERNMENT contract DE–AC30–10CC40020 Paducah, Kentucky

DOE CONTRACT NO. DE–AC30–10CC40020

PROJECT NAME: C–400 REMEDIATION DESIGN

TITLE: EQUIPMENT, PIPING, INSTRUMENT INDETIFICATION AND CONTROL SYSTEM STANDARDS

EDCS CAD FILENAME	BUILDING	PLANT	CLASS
J7DC40000A001 REV7.DWG	C–400	PDGP	U

DATE:	SCALE:	DRAWING NUMBER	REV
PROFESSIONAL SEAL	N/A	J7DC40000A001	7

3C2