

**BILL OF MATERIAL (BOM)**

GROUPING	DESCRIPTION	QTY	UNIT
STEEL PIPE	PIPE, BLACK STEEL, ASTM A53 OR A106, GRADE A OR B, 6", SCHEDULE 40	500	FT
	PIPE, BLACK STEEL, ASTM A53 OR A106, GRADE A OR B, 3", SCHEDULE 40	5	FT
	PIPE, BLACK STEEL, ASTM A53 OR A106, GRADE A OR B, 2", SCHEDULE 40	225	FT
	PIPE, BLACK STEEL, ASTM A53 OR A106, GRADE A OR B, 1", SCHEDULE 80	50	FT
6" FITTINGS & PARTS	FLANGE, 6", CARBON STEEL, WELD NECK, RF, ASME CLASS 150, MEETING ASTM A105, ASME B16.5	5	EA
	BOLT SET, FOR 6" 150# FLANGE, ASTM A-307 GRADE B CARBON STEEL WITH HEAVY HEX NUT (ASTM A563 GRADE B)	5	SET
	GASKET, 6", FLEXITALIC STYLE LS, SPIRAL WOUND, CLASS 150, ASME B16.20, WINDING 304/GRAPHITE FILLER, OUTER RING CARBON STEEL, 1/8" THICK	5	EA
	TEE, 6", CARBON STEEL, BUTT WELD, STD. WEIGHT, MEETING ASTM A234 WPB AND ASME B16.9	1	EA
	TEE, REDUCING, 6" RUN X 3" BRANCH, CARBON STEEL, BUTT WELD, STD. WEIGHT, MEETING ASTM A234 WPB AND ASME B16.9	1	EA
	REDUCER, 6" X 4", CONCENTRIC, CARBON STEEL, BUTT WELD, STD. WEIGHT, MEETING ASTM A234 WPB AND ASME B16.9	1	EA
	REDUCER, 6" X 2", CONCENTRIC, CARBON STEEL, BUTT WELD, STD. WEIGHT, MEETING ASTM A234 WPB AND ASME B16.9	1	EA
	ELBOW, 6", 90 DEGREE, LONG RADIUS, CARBON STEEL, BUTT WELD, STD. WEIGHT, MEETING ASME B16.9 AND ASTM A234 WPB	17	EA
	ELBOW, 6", 45 DEGREE, LONG RADIUS, CARBON STEEL, BUTT WELD, STD. WEIGHT, MEETING ASME B16.9 AND ASTM A234 WPB	4	EA
	SOCKET, 6" BUTT WELD RUN X 2" SOCKET WELD OUTLET, CLASS 3000, MEETING ASTM A105	3	EA
	THREDOLET, 6" BUTT WELD RUN X 2" THREADED NPT OUTLET, CLASS 3000, MEETING ASTM A105	1	EA
	THREDOLET, 6" BUTT WELD RUN X 1" THREADED NPT OUTLET, CLASS 3000, MEETING ASTM A105	3	EA
	THREDOLET, 6" BUTT WELD RUN X 1/2" THREADED NPT OUTLET, CLASS 3000, STD. WEIGHT, MEETING ASTM A105	4	EA
	2" FITTINGS & PARTS	FLANGE, 2", CARBON STEEL, SOCKET WELD, RF, ASME CLASS 150, MEETING ASTM A105, ASME B16.5	3
	FLANGE, 2", CARBON STEEL, SCREWED, THREADS PER ASME B1.20.1 (NPT), RF, ASME CLASS 150, MEETING ASTM A105, ASME B16.5	7	EA

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	GASKET, 2", FLEXITALIC STYLE LS, SPIRAL WOUND, CLASS 150, ASME B16.20, WINDING 304/GRAPHITE FILLER, OUTER RING CARBON STEEL, 1/8" THICK	9	EA
	ELBOW, 2", 45 DEGREE, CARBON STEEL, SCREWED, CLASS 3000, STD. WEIGHT, MEETING ASME B16.11, ASME B1.20.1 (NPT) AND ASTM A234 WPB OR A105	1	EA
	ELBOW, 2", 90 DEGREE, LONG RADIUS, CARBON STEEL, SCREWED, CLASS 3000, STD. WEIGHT, MEETING ASME B16.11, ASME B1.20.1 (NPT) AND ASTM A234 WPB OR A105	7	EA
	ELBOW, 2" 45 DEGREE, LONG RADIUS, CARBON STEEL, SOCKET WELD, CLASS 3000, STD. WEIGHT, MEETING ASME B16.11 AND ASTM A234 WPB OR A105	3	EA
	ELBOW, 2", 90 DEGREE, LONG RADIUS, CARBON STEEL, SOCKET WELD, CLASS 3000, STD. WEIGHT, MEETING ASME B16.11 AND ASTM A234 WPB OR A105	1	EA
	TEE, REDUCING, 2" THREADED RUN X 1" THREADED BRANCH OUTLET, MALLEABLE IRON, THREADS MEETING ANSI/ASME B1.20.1 (NPT), CLASS 150, MEETING ASTM A197 AND ANSI/ASME B16.3	4	EA
	TEE, REDUCING, 2"x1" THREADED RUN X 2" THREADED BRANCH OUTLET, MALLEABLE IRON, THREADS MEETING ANSI/ASME B1.20.1 (NPT), CLASS 150, MEETING ASTM A197 AND ANSI/ASME B16.3	1	EA
	TEE, REDUCING, 2" THREADED RUN X 1/2" THREADED BRANCH OUTLET, MALLEABLE IRON, THREADS MEETING ANSI/ASME B1.20.1 (NPT), CLASS 150, MEETING ASTM A197 AND ANSI/ASME B16.3	8	EA
	CAP, PIPE, 2", BUTT WELD, CARBON STEEL, STD. WEIGHT, MEETING ASTM A234 WPB AND ASME B16.9	2	EA
	CAP, PIPE, 2", SCREWED, CLASS 3000, MEETING ASME B16.11, ASME B1.20.1 (NPT), ASTM A105	2	EA
1" FITTINGS & PARTS	PLUG, PIPE, 1", SQUARE HEAD, SCREWED, CLASS 3000, MEETING ASME B16.11 AND ASME B1.20.1 (NPT)	2	EA
	CAP, PIPE, 1", SCREWED, CLASS 3000 MEETING ASME B16.11, ASME B1.20.1 (NPT), ASTM A105	5	EA
	UNION, 1", CARBON STEEL, THREADED, CLASS 3000, MEETING ASME B16.11, ASME B1.20.1 (NPT) AND ASTM A234 WPB OR A105	3	EA
	ELBOW, 1", 90 DEGREE, LONG RADIUS, CARBON STEEL, SCREWED, CLASS 3000, STD. WEIGHT, MEETING ASME B16.11, ASME B1.20.1 (NPT) AND ASTM A234 WPB OR A105	6	EA
	TEE, 1" THREADED, MALLEABLE IRON, THREADS MEETING ANSI/ASME B1.20.1 (NPT), CLASS 150, MEETING ASTM A197 AND ANSI/ASME B16.3	1	EA
	NIPPLE, PIPE, 1", BLACK STEEL, SEAMLESS, SCH. 80, MEETING ASTM A733, ASME B1.20.1 (NPT), AND ASTM A53 OR A106, LENGTH VARIES, QUANTITY DETERMINED BY INSTALLER	NA	

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1/2" FITTINGS	CAP, PIPE, 1/2", SCREWED, CLASS 3000 MEETING ASME B16.11, ASME B1.20.1 (NPT), ASTM A105	10	EA
	NIPPLE, PIPE, 1/2", BLACK STEEL, SEAMLESS, SCH. 80, MEETING ASTM A733, ASME B1.20.1 (NPT), AND ASTM A53 OR A106, LENGTH VARIES, QUANTITY DETERMINED BY INSTALLER	NA	EA
POLYETHYLENE PIPE AND FITTINGS	PIPE, POLYETHYLENE, 2", ASTM D2513, PE2708, SDR-11, BI-MODAL COMPOSITION	500	FT
	RISER, PE TO STEEL, 2" MPT TO 2" IPS PE, SDR-11, HUBBELL CONFLX RISER P/N 1753-96-1017-36 OR EQUAL	2	EA
VALVES	VALVE, BALL, 6", FLANGED, RF, CARBON STEEL BODY, ASME CLASS 150, STD. PORT, MEETING ASME B16.34 AND ASME B16.38, APOLLO 88A-10C-01 OR EQUAL, W/ TRIM OPTIONS: BALL/STEM A108, SEAT/PKG RPTFE/PTFE	2	EA
	VALVE, BALL, 2", FLANGED, RF, CARBON STEEL BODY, ASME CLASS 150, FULL PORT, MEETING ASME B16.34 AND ASME B16.33, APOLLO 88A-208-01 OR EQUAL, W/ TRIM OPTIONS: BALL/STEM A108, SEAT/PKG RPTFE/PTFE	3	EA
	VALVE, BALL, 2" NPT ENDS, CARBON STEEL BODY, ASME CLASS 600, FULL PORT, 3-PIECE DESIGN, MEETING ASME B16.34 AND CGA 3.16-M88, APOLLO 83B-148-01 OR EQUAL, W/ TRIM OPTIONS: BALL/STEM A276, MULTI-SEAL SEAT, PACKING PTFE	6	EA
	VALVE, BALL, 1" NPT ENDS, 600 CWP, BRONZE BODY, FULL PORT, MEETING ASME B16.34 AND ASME B16.33, LOCKING HANDLE, APOLLO 80-105-27 OR EQUAL, W/ TRIM OPTIONS: BALL/STEM B16, SEAT/PKG RPTFE	9	EA
	VALVE, BALL, 1/2" NPT ENDS, 600 CWP, BRONZE BODY, FULL PORT, MEETING ASME B16.34 AND ASME B16.33, LOCKING HANDLE, APOLLO 80-105-27 OR EQUAL, W/ TRIM OPTIONS: BALL/STEM B16, SEAT/PKG RPTFE	10	EA
	PLUG, PIPE, 6", CHERNE INDUSTRIES MODEL #271578 OR EQUAL	4	EA
SPECIALTY ITEMS	PLUG, PIPE, 2", CHERNE INDUSTRIES MODEL #271527 OR EQUAL	2	EA
	TRACER WIRE, 14 AWG INSULATED COPPER	500	FT
	GAUGE, PRESSURE, 0-160 PSIG, 4-1/2" DIAL, SILICON FILLED, 1/2" NPT (MALE), ASHCROFT 45-1009-SL04LXG160# OR EQUAL	2	EA

**GENERAL NOTES:**

- FOR PIPING, ALL WELDERS AND WELD PROCEDURES SHALL BE QUALIFIED PER ASME B&PV CODE SECTION IX. QUALIFICATIONS SHALL BE SUBMITTED TO FRNP FOR APPROVAL PRIOR TO WORK.
- SHOP AND FIELD WELDING SHALL BE WITNESSED BY A QUALIFIED WELD INSPECTOR USING FULL IN-PROCESS VISUAL WELD EXAMINATION FOR 10% OF WELDS PERFORMED BY EACH WELDER, WITH RANDOM SELECTION.
- PIPE SMALLER THAN 2" SHALL BE SCHEDULE 80 UNLESS NOTED OTHERWISE.
- PIPE AND FITTINGS 2" AND SMALLER SHALL BE THREADED UNLESS OTHERWISE NOTED.
- DRILL OR BORE OPENING INTO PIPE PER MANUFACTURER'S INSTRUCTIONS PRIOR TO WELDING THREDOLETS OR SOCKETLETS IN PLACE.
- PAINT PIPE WITH A COATING SYSTEM CAPABLE OF DIRECT APPLICATION ON RUSTED SURFACES WITH MINIMAL SURFACE PREPARATION. ONE OR TWO COAT SYSTEMS ARE ACCEPTABLE IF DRYING TIMES BETWEEN COATS IS MINIMAL TO AVOID ADDITIONAL SET UP. PAINT SHALL BE WATER BASED AND LOW VOC THAT CAN BE COLOR MATCHED TO EXISTING NATURAL GAS PIPING, SIMILAR TO RUSTOX MADE BY ENCORE COATINGS. SPECIFIC COATING SYSTEM SHALL BE SUBMITTED TO FRNP ENGINEERING FOR INTERNAL SAFETY AND COMPLIANCE REVIEWS.
- ADHESIVE LABELS SHALL BE APPLIED TO THE PIPING SYSTEM AFTER PAINTING IS COMPLETE. LABELS SHALL STATE "NATURAL GAS" WITH BLACK LETTERING AND A YELLOW BACKGROUND WITH A FLOW DIRECTION ARROW. LABELING SHALL BE APPLIED PER REQUIREMENTS OF ANSI/ASME A13.1, SCHEME FOR THE IDENTIFICATION OF PIPING SYSTEMS. LABELS SHALL BE APPLIED ADJACENT TO ALL VALVES AND FLANGES, ADJACENT TO CHANGE IN DIRECTION, AND EVERY 50 FEET ON HORIZONTAL RUNS. LETTERING AND LABEL SIZE SHALL MEET ANSI/ASME A13.1.
- ALL VENTS SHALL BE POSITIONED TO DISCHARGE TO THE NORTH TO NORTH-EAST DIRECTION.
- FIELD DETERMINE LENGTH OF PIPE TO ACCOMMODATE PIPING ARRANGEMENT AT EACH LOCATION.
- REFER TO PROJECT MECHANICAL BOM FOR SPECIFIC PART ORDERING DETAILS. SUBSTITUTIONS MAY BE ALLOWED FOR SOME ITEMS WITH PRIOR APPROVAL BY FRNP ENGINEERING. PROJECT BOM IS NOT ALL INCLUSIVE, MISCELLANEOUS MATERIAL AND COMMODITIES SHALL BE PURCHASED BY INSTALLER.
- PIPING MAY BE ADJUSTED FOR FIELD CONDITIONS WITH ENGINEERING'S APPROVAL.
- ENSURE ALL ABANDONED PIPE IS SECURELY SUPPORTED HAVING NO MORE THAN 2 FEET OF PIPE BEYOND NEAREST SUPPORT.
- FOR STRUCTURAL SUPPORTS AND GROUNDING INFORMATION SEE STRUCTURAL DWG. SERIES C5D-FA5270-B01
- INSTALLER SHALL PROVIDE AND HANG ALL VALVE NUMBER TAGS
- TORQUE PIPING FLANGE BOLTS TO THE FOLLOWING VALUES FOR FLEXITALIC STYLE LS GASKETS AS RECOMMENDED BY MANUFACTURER:  
2" - MINIMUM 50 FT-LBS, MAXIMUM 90 FT-LBS  
6" - MINIMUM 90 FT-LBS, MAXIMUM 200 FT-LBS
- ALL NEW WELDED FITTINGS SHALL BE FULL PENETRATION UNLESS OTHERWISE NOTED.
- FOR PLUG DETAIL SEE DWG. M5D-FA5270-B02
- PROVIDE 1/2"-#18 CARBON STEEL EXPANDED METAL SCREEN (OR APPROVED ALTERNATE) TO VENT DISCHARGE OPENING, TACK WELD IN PLACE.
- COORDINATE WITH FRNP FOR PLACEMENT OF BARRIERS TO PROTECT PIPING.
- FINAL VALVE LOCATION SHALL BE APPROVED BY FRNP ENGINEERING PRIOR TO INSTALLATION.

SECTION NUMBER OR DETAIL LETTER

DRAWING ON WHICH SECTION OR DETAIL IS TAKEN

DRAWING ON WHICH SECTION OR DETAIL IS SHOWN

**SECTION AND DETAIL KEY**

TOLERANCES UNLESS OTHERWISE SPECIFIED

FRACTIONS XX DECIMALS XXX DECIMALS ANGLES BREAK SHARP EDGES MAX. FINISH

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REV. NO.	ISSUE / REVISION DESCRIPTION	DATE	DRW	CHKR	RE	TR	APPD
0	CERTIFIED FOR CONSTRUCTION FOR ESO FA5270		X	X	X	X	X

PE

DRW Egdie Holland 5/4 3/22/19

CHKR Hubbitt 3/22/19

RE Steve Larson 3/22/19

TR N/A

APPD [Signature] 3/23/19

TERRY L. FLETCHER 14860 PROFESSIONAL ENGINEER LICENSED

3/22/19

DRAWING APPROVALS

**FOUR RIVERS NUCLEAR PARTNERSHIP, LLC**

DOE PRIME CONTRACT # DE-EM0004885

**NATURAL GAS LINE USING EXISTING NITROGEN LINES NOTES AND MECHANICAL BOM**

NON-ESSENTIAL

SCALE NONE	PLANT PGDP	BLDG AREA	FL X	CLASS U
ID FA5270	M5D-FA5270-B06			REV 0