Spurlock Station Units 1-4 Co-fire Project Scoping Report

East Kentucky Power Cooperative

Spurlock Units 1-4 Co-fire PSR
Project No. 164714

Revision 4
October 2024

Spurlock Station Units 1-4 Co-fire
Project Scoping Report

prepared for

East Kentucky Power Cooperative
Spurlock Units 1-4 Co-fire PSR
Maysville, Kentucky

Project No. 164714

Revision 4
October 2024

prepared by

Burns & McDonnell Engineering Company, Inc.
Kansas City, Missouri

INDEX AND CERTIFICATION

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Certification

I hereby certify, as a Professional Engineer in the state of Kentucky, that the information in this document was assembled under my direct personal charge. This report is not intended or represented to be suitable for reuse by East Kentucky Power Cooperative or others without specific verification or adaptation by the Engineer.

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LIST OF ABBREVIATIONS

Abbreviation	Term/Phrase/Name
AHJ	Authority Having Jurisdiction
AQCS	Air Quality Control System
ASME	American Society of Mechanical Engineers
BMcD	Burns & McDonnell Engineering Company, Inc.
BMS	Burner Management System
BOP	Balance of Plant
B&W	Babcock & Wilcox
CCOFA	Close Coupled Overfire Air
CE	Combustion Engineering
CFB	Circulating Fluidized Bed
CFD	Computational Fluid Dynamics
COD	Commercial Operation Date
DCS	Distributed Control System
DOR	Division Of Responsibility
DRB	Dual Register Burner
EA	Environmental Assessment
EKPC	East Kentucky Power Cooperative
ESP	Electrostatic Precipitator
ESV	Emergency Shutoff Valve
FD	Forced Draft
FG	Fuel Gas

Abbreviation	Term/Phrase/Name
FGC	Fuel Gas Conditioning
FGD	Flue Gas Desulfurization
FO	Fuel Oil
HAC	Hazardous Area Classification
HVAC	Heating, Ventilation and Air Conditioning
ID	Induced Draft
IG	Igniter Gas
I/O	Input/Output
LP	Low Pressure
MCC	Motor Control Center
MCR	Maximum Continuous Rating
MFT	Master Fuel Trip
M&R	Metering and Regulation
NEPA	National Environmental Policy Act
NFPA	National Fire Protection Association
NIDS	Novel Integrated Desulphurization System
NOx	Nitrogen Oxide
OE	Owner's Engineer
OEM	Original Equipment Manufacturer
O&M	Operation and Maintenance
PA	Primary Air
PLC	Programmable Logic Controller

Abbreviation	Term/Phrase/Name
PM	Particulate Matter
PSR	Project Scoping Report
P&IDs	Piping and Instrumentation Diagrams
RUS	Rural Utilities Service
SCR	Selective Catalytic Reduction
SOFA	Separated Overfire Air
SSO	Safety Shut Off
SNCR	Selective Non-Catalytic Reduction
UPS	Uninterrupted Power Supply

1.0 EXECUTIVE SUMMARY

East Kentucky Power Cooperative (EKPC; Owner) is considering modifying all four units at their existing Hugh L. Spurlock Generating Station (Spurlock) for up to 50% dual fuel operation. The proposed project will allow Spurlock Units 1, 2, 3 and 4 to operate on 100% coal and co-fire up to a maximum of 50% natural gas and 50% coal by heat input at full load. Spurlock Units 1, 2, 3 and 4 will retain their existing fuel oil (FO) capabilities for startup.

EKPC has retained Burns & McDonnell Engineering Company, Inc. (BMcD; Engineer) to assist with defining the scope, schedule, and cost estimate for installing the equipment and infrastructure associated with the dual fuel conversion of Spurlock Units 1, 2, 3 and 4. The report summarizes the project definition and associated cost estimate.

1.1 Purpose

The purpose of this report is to define the overall scope, schedule, performance, capital costs and operating and maintenance costs of the Spurlock Units 1, 2, 3 and 4 for a 50% gas addition project and provide general information to support the following activities:

- Permitting.
- Internal budget appropriations.
- Approval from the RUS for project financing.

1.2 Project Configuration Summary

1.2.1 Existing Facility Description

Spurlock Unit 1 is a 300 net MW generating unit, originally placed into operation in 1977. The steam generator is a Babcock & Wilcox (B&W) RB-495 pulverized coal, natural circulation radiant boiler. Coal is pulverized in eight (8) B&W EL-76 coal mills and fired via twenty-four (24) burners in a front wall-rear wall opposed-fired configuration. The current Unit 1 configuration includes low nitrogen oxide (NOx) burners, a Selective Catalytic Reduction (SCR) system, an electrostatic precipitator (ESP), and Induced Draft (ID) fan, a wet Flue Gas Desulfurization (FGD) system, and a wet ESP.

Spurlock Unit 2 is a 510 net MW generating unit (plus 30 MW equivalent for steam supply to an off-site paper mill), originally placed into operation in 1981. The steam generator is an Alstom Combustion Engineering (CE) single furnace tangentially-fired pulverized coal boiler. Coal is pulverized in five (5) CE coal mills and fired on five (5) elevations in a 4-corner configuration. The ignition system is fired

with FO and there are two (2) elevations of start-up oil guns at the bottom and the top. The current Unit 2 configuration includes low NOX burners with close coupled over fire air (CCOFA) and a separated overfire air (SOFA), an SCR, an ESP, an ID fan, a wet FGD system, and a wet ESP.

Spurlock Unit 3 is a 268 net MW generating unit, originally placed into operation in 2005. The steam generator is an Alstom circulating fluidized bed (CFB) boiler. The current Unit 3 configuration includes limestone boiler injection, a selective non-catalytic reduction (SNCR) system, a Novel Integrated Desulphurization System (NIDS), baghouse, and an ID fan. Spurlock Unit 4 is a 268 net MW generating unit, similar in design to Spurlock Unit 3. Unit 4 was originally placed into operation in 2009.

1.2.2 Future Configuration & Modifications

Fuel gas (FG) will be supplied from a new metering and regulation (M&R) yard (by Others) that will be located in an unoccupied area near the Main Entrance. This M&R yard will supply 200 psig (average) FG at an assumed temperature of 40 degrees Fahrenheit to 80 degrees Fahrenheit to the Fuel Gas Conditioning (FGC) yard. The FGC yard will consist of a filter-coalescer and drains tank. The filter-coalescer will remove small particulates and water from the FG before it is sent to the low pressure (LP) skids associated with the individual units. Byproducts from both are sent to the drains tank for removal by a disposal contractor.

For the 50% gas co-fire conversion on Unit 1, twelve (12) existing coal burners will be replaced with dual fuel burners, six (6) on the front wall and six (6) on the rear wall of the boiler. The burners are grouped such that three (3) burners are fed from a single coal pulverizing mill. All coal burners in mill groups B, C, E and G will be replaced with dual fuel burners. FG at Unit 1 will then be regulated via the LP skids to the pressure and flow rate required for boiler demand. Two LP control skids will be provided for the dual fuel burners and igniters. The LP control system for the front burners and the LP control system for the front igniters will be located on a single combined skid. The second LP skid will have the LP control system for the rear burners and igniters. Each of the 12 burners will have an individual safety shut off skid (SSOs). There will be 4 total igniter SSOs, one for each set of igniters grouped by coal pulverizer mill group.

On Unit 2, eight (8) new gas burners and igniters will be installed. Two (2) new gas burners will be installed in each corner, one between elevations B and C and the other between elevations C and D. FG at Unit 2 will then be regulated with one LP control skid to regulate flow to all 8 burners. Each of the 8 gas burners and igniters will have a combined SSO skid.

Unit 3 and Unit 4 will each have sixteen (16) new gas lances installed. Nine (9) gas lances will be installed in existing secondary air ports on the rear wall of the boiler and seven (7) gas lances will be installed in

new penetrations on the front side of the boiler. FG at Unit 3 and Unit 4 will have 2 LP control skids. One LP skid will control the flow of gas to the front seven lances and the other will control flow to the nine rear lances. On the front, six lances will share 3 SSOs, with two lances on each SSO. The remaining lance will have its own SSO skid. On the rear, there will be a similar configuration. Eight of the nine lances on the rear will be controlled with four SSOs, and the remaining lance will have its own SSO.

The compressed air system and the FO system will not be modified as part of the project.

The existing air pollution control devices downstream of the Unit 1, 2, 3 and 4 boilers will remain in the gas path while firing on any blend of coal or natural gas. The Unit 1 and 2 control systems include an SCR, an ESP, a wet FGD system, and a wet ESP. The Unit 3 and 4 control systems include limestone boiler injection, an SNCR, a NIDS, and a baghouse. The SCRs and SNCRs will be utilized to reduce NOx emissions while firing on all fuels. The wet scrubbers and NIDS will be utilized to reduce sulfur dioxide (SO_2) while firing on all fuel blends. The ESP's and baghouses will be utilized to reduce particulate matter (PM) with all fuel blends. The wet ESP's will be utilized to reduce PM and sulfuric acid (H_2SO_4) on all fuel blends. The only modifications anticipated to the pollution control systems as part of the natural gas co-firing project is a modification to the ammonia feed system to accommodate potentially lower ammonia feed rates required for high natural gas blends.

Modifications to the plant distributed control system (DCS) will be required to incorporate the additional input/output (I/O) and control schemes associated with the new burners and FG equipment. The burner management system (BMS), in particular, will have enough additional I/O to warrant a new remote I/O cabinet per unit. M&R yard and gas conditioning equipment will include programable logic controllers (PLCs) for primary control, with foreign device interfaces to allow operators to monitor the systems via the control room DCS screens. The plant simulators will also be updated to allow for adequate training of plant staff.

1.3 Contracting Approach

The selected contracting strategy for this report and basis for the estimate is an Owner's Engineer (OE) contracting approach. Under this approach, Owner will hire an Owner's Engineer to perform detailed design, develop procurement packages and administer them after award, and assist in management of on-site construction activities, including management of startup and commissioning activities. All procurements will be by Owner on Owner's paper.

In the OE approach, the Owner and OE work together to procure the project equipment, construction, and site services contracts. The procurement of long lead equipment such as the gas firing system (burners)

and DCS equipment is needed early in the project to support plant detailed design and permitting efforts. The estimate is based on procuring this major equipment under separate procurement contracts.

The OE contracting approach includes an estimated 14 equipment and material supply contracts, 4 construction contracts, and 10 service contracts (for example, subsurface investigation, performance and emissions testing, etc.). A listing of the anticipated equipment, construction, and service contracts is included in Appendix C to this report.

1.4 Schedule

For an estimated commercial operation date (COD) in December 2029, the critical path of the project is based on obtaining the Rural Utility Service (RUS) National Environmental Policy Act (NEPA) Environmental Assessment (EA) approval by October 2027. This path of activities commences with issuing the NEPA EA application by August 2025. Table 1-1 reflects the major milestones for the project. The complete schedule is shown in Appendix Q.

Table 1-1: Spurlock Units 1-4 Co-fire Project Milestones

Permitting Activities	**Date**
Submit Air Permit	July 2025
CPCN Advance Notice	November 2024
Submit RUS NEPA EA Application	August 2025
Engineering/Procurement	
NTP Engineering	January 2025
Gas Firing System Contract Award	June 2026
DCS Contract Award	December 2026
Construction/Startup Period – 29 Months	
Start Construction	August 2027
Start Major Equipment Erection	February 2028
Start BOP Mechanical and Electrical Construction	September 2027
Unit 1: Startup, Testing & Tuning	October 2029
Unit 1: Commercial Operation	December 2029
Unit 2: Startup, Testing & Tuning	March 2029
Unit 2: Commercial Operation	May 2029

Unit 3: Startup, Testing & Tuning	February 2029
Unit 3: Commercial Operation	May 2029
Unit 4: Startup, Testing & Tuning	September 2029
Unit 4: Commercial Operation	December 2029

1.5 Cost Estimate

The estimated capital cost for the project is approximately $187 million, excluding escalation. This equates to approximately $139/kW, with a total output of 1346 MW (net) for all four units. Escalation is estimated to be $19.6 million assuming the project started in August 2024 and has a COD of final unit (Unit 4) in mid-2029. Escalation is estimated to be $41.0 million assuming full project schedule with COD of final unit (Unit 4) in December 2029.

To reduce the risk of project cost overruns, a contingency of nearly $22.0 million is included in this estimate, equating to 15% of the estimated capital cost. This contingency is expected to account for variations in pricing accuracy or minor scope changes. However, it does not account for major project scope changes, nor does it account for the impact of major shifts in market conditions which may be experienced prior to the COD.

1.6 Performance and Emissions Estimates

Spurlock Units 1, 2, 3 and 4 will have the ability of operating on either coal or gas or a combination of both (up to 50% co-firing) and is not anticipated to have a change in rated capacity with the addition of FG firing. Table 1-2 through Table 1-4 indicate the current and estimated future gross unit heat rates for each Unit with coal and FG.

Table 1-2: Spurlock Unit 1 Preliminary Plant Performance Summary

	100% Coal	50 / 50 Coal / Gas	Coal @ 50% Load	Fuel Gas @ 50% Load
Fired Performance				
Gross Output, kW	330,000	330,000	165,000	165,000
Gross Heat Rate (HHV), Btu/kWh	9,850	9,993	10,638	10,949
Net Output, kW	300,000	300,000	149,000	149,000
Net Heat Rate (HHV), Btu/kWh	10,835	10,992	11,820	12,165

Table 1-3: Spurlock Unit 2 Preliminary Plant Performance Summary

	100% Coal	50 / 50 Coal / Gas	Coal @ 50% Load	Fuel Gas @ 50% Load
Fired Performance				
Gross Output, kW	555,000	555,000	278,000	278,000
Gross Heat Rate (HHV), Btu/kWh	9,850	9,993	10,638	10,949
Net Output, kW	510,000	510,000	250,000	250,000
Net Heat Rate (HHV), Btu/kWh	10,719	10,875	11,820	12,165

Table 1-4: Spurlock Units 3 & 4 Preliminary Plant Performance Summary

	100% Coal	50 / 50 Coal / Gas	Coal @ Min. Load (60%)	Fuel Gas @ Min. Load
Fired Performance				
Gross Output, kW	302,000	302,000	181,000	181,000
Gross Heat Rate (HHV), Btu/kWh	9,400	9,536	10,175	10,412
Net Output, kW	268,000	268,000	163,000	163,000
Net Heat Rate (HHV), Btu/kWh	10,593	10,746	11,305	11,569

Units 1 and 2 will meet emissions criteria through use of SCR systems, ESPs, wet FGDs, and wet ESPs. In general, firing on 50% natural gas or co-firing is expected to maintain or reduce emissions currently being measured. The SCRs will utilize ammonia injection grid and the current catalyst configuration to decrease NOx emission to a preliminary expected emission rate of 0.100 lb/MMBtu or lower. A future study of boiler outlet conditions and SCR operating conditions will be required to identify future minimum load operating limitations to support maintaining the current emission limits. The ESPs will reduce PM emissions to a preliminary expected emission rate of 0.015 lb/MMBtu or lower. The wet FGDs will reduce SO_2 emissions to a preliminary expected emission rate of 0.100 lb/MMBtu or lower.

Units 3 and 4 will meet emissions criteria through use an SNCR system and NIDS with a baghouse. In general, firing on 50% natural gas or co-firing is expected to maintain or reduce emissions currently being measured. The SNCR will utilize ammonia injection lances to decrease NOx emission to a preliminary expected emission rate of 0.07 lb/MMBtu or lower. A future study of boiler conditions and SNCR operating conditions will be required to identify future minimum load operating limitations to support maintaining the current emission limits. The fluidized bed absorbers will reduce SO_2 emissions to a preliminary expected emission rate 0.20 lb/MMBtu on a 24-hour average for Unit 3 and 0.15 on a 24-hour

block average for Unit 4. The baghouses will reduce PM emissions to a preliminary expected emission rate of 0.015 lb/MMBtu on a 3-hour average for Unit 3 and 0.009 lb/MMBtu on a 30 day rolling average for Unit 4.

1.7 Project Risks

Project risks which can affect scope, schedule, budget, safety, or quality can be subdivided into three categories which include design/engineering risks, procurement risks, and construction/startup risks. Each category risk is listed below for consideration with some key risks identified. The complete risk matrix is included in Appendix P.

1.7.1 Design/Engineering Risks

Some key design and engineering risks identified include the following:

- The conversion of the Unit 3 and Unit 4 CFB's for co-firing natural gas requires novel design solutions that are unproven. This could lead to design activities taking longer than anticipated and design rework as information is discovered throughout the design process.
- Design basis changes after design begins including, but not limited to site plan and layout, design standard, and deliverables.
- Changes to project schedule (accelerated or delayed).
- Existing plant documents are found to be inaccurate or are unavailable.
- Permitting taking longer than expected. Although EKPC and BMcD have general "rule of thumb" durations for the major permit applications and processes, ultimately these timelines are controlled by the permitted authorities and can vary dramatically by State or Individual.
- Lack of detailed subsurface data. Although the project utilized subsurface information from the Spurlock CCR/ELG project, a more thorough investigation will need to be completed to confirm soil variability, depth of bedrock, and locations of karst. Existing underground utilities in areas of new foundations and underground utility corridors will need to be investigated during detailed design. For the purposes of this Project Scoping Report (PSR), estimated costs for pilot trenching have been included.
- Owner support not available when required for reviews and / or walkdowns.

- A computational fluid dynamics (CFD) model was not performed for Unit 1 or Unit 2 as part of this PSR. Therefore, predicted behavior of these particular boilers for the expected future operating conditions (including, but not limited to, existing fan performance) has not been investigated or confirmed. It has also not been confirmed that the Units can reach full design load while co-firing on natural gas. Costs have been included in the estimate for CFD modeling during detailed design to confirm and refine conceptual design.

- Project standards are not clear, change, or conflict with Owner standards.

- Scope/design changes or scope gaps not identified during PSR. Any design or scope changes could impact project costs and may affect multiple systems throughout the project. Additionally, should any scope gaps become apparent during detailed design, these could impact project cost and schedule to properly incorporate.

- A number of studies and evaluations will be performed as part of detailed design that are excluded from this PSR effort. These studies could result in additional and / or modified scope to what forms the basis of this report and cost estimate. These studies include, but are not limited to: Lighting study, noise study, main fuel trip (MFT) study, ventilation study, uninterrupted power supply (UPS) study, DCS capacity study, instrument study, transportation study, dispersion modeling, NFPA 85 study, implosion / draft study, air heater study, condition assessment, baseline testing and CFD modeling (Units 1 & 2), pilot trenching, grounding study, hazardous area classification (HAC) study, and existing steel evaluation.

1.7.2 Procurement Risks

Some key procurement risks include:

- Late major equipment award or design changes. Key design deliverables are based on receiving certain submittals and input data from the major equipment and will be delayed if these contracts are awarded late. In addition, late design changes by these manufacturers will have ripple effects on the balance of plant (BOP) design that could affect the project schedule and cost. Finally, late award or design changes could affect scheduled delivery dates and will impact the construction schedule.

- Price escalation for equipment. As the commercial operational date (COD) is not until late 2029 for the fourth and final Unit, the long project development and permitting schedule will make it more difficult to lock in equipment costs early and increase the risk of price escalation.

- Poor quality and / or manufacturing design flaws.
- Unplanned buyouts to meet schedule demands.
- High turnover and / or supplier representative changes mid-project.
- Misunderstood and / or overlooked specification requirements.
- Late submittals.
- Late fabrication at shop and / or late sub supplier parts and materials.

1.7.3 Construction/Startup Risks

Some key construction and startup related risks to consider are:

- Interference in the existing boiler house structure and with existing underground utilities.
- Wage rate increases and/or labor issues with contractors. Similar to equipment price escalation, due to the long project duration local wage rate increases are very possible. Additionally, the local labor pool may be affected by other capital projects in the area which are out of EKPC's control.
- Unexpected soil conditions and / or water table.
- Change in construction sequence due to engineering changes or late equipment deliveries. Design changes or late equipment deliveries may force the construction team to revise sequences to less favorable activities which may impact costs or schedule.
- Equipment does not fit in planned location or through corridors.
- Lack of commodity materials or price escalation. Commodity prices and lead time can be affected by other projects in the region outside of EKPC's control which can impact project schedule or costs.
- Late pipe fabrication.
- Equipment/systems do not operate as designed or need to be repaired/replaced. Equipment malfunctioning or systems not behaving as expected can delay startup as these issues are

resolved. Lack of timely vendor corrections to improperly performing equipment can negatively impact the project schedule.

- Flex hose tie-points misalign.

- Flushing and cleaning taking longer than expected. A host of variables such as pipe manufacturing, proper storage and handling, and quality of installation can affect the speed and efficiency of cleaning out the various systems to prepare for operation. In addition, some equipment vendors have very strict cleanliness requirements and procedures which must be followed and approved by the vendor's field representatives prior to proceeding to the subsequent steps.

- Hot commissioning activities taking longer than expected. This is particularly pertinent for the CFB boilers on Units 3 and 4 where the proposed co-firing modifications have not been executed to BMcD's knowledge.

- Unrelated furnace problems: Air leaks, water / steam leaks, etc.

- Failure of existing equipment/systems not performing as expected. Examples of systems include, but are not limited to, coal gravimetric feeders and pulverizers, ID and FD fans, SCR catalyst effectiveness, FO pump performance, air heater performance.

- Delays in the gas pipeline getting to site could impact the startup and commissioning schedule for the gas co-fire project.

- Installing the Unit 1 and Unit 4 gas firing equipment in a Fall 2028 outage prior to being able to fully check out and commission (prior to gas arriving on site) could create warranty issues if equipment fails to perform during fall 2029 commissioning.

1.8 Conclusions & Recommendations

Burns & McDonnell recommends Owner evaluate the project economics based on cost and performances presented in this report. If Plant economics are favorable, Burns & McDonnell recommends Owner proceed/continue with necessary project execution activities in order to meet a Substantial Completion date as determined by Owner.

Burns & McDonnel recommends Owner negotiate firm gas contract with gas supplier for ignition capacity, at a minimum, and for enough gas to achieve full baseload capacity.

2.0 INTRODUCTION

2.1 Background

This Project Scoping Report is to summarize the scope of the proposed Spurlock Units 1-4 Co-fire Project, present the capital cost estimate, operation and maintenance (O&M) cost estimate, and performance estimate.

2.2 Scope of Study

The scope of work included preparing the following major items:

1. Project Site Design Criteria.
2. Division of Responsibility (DOR).
3. Key Conceptual Design Documents.
4. Permit Matrix.
5. Risk Matrix.
6. Project Execution Schedule.
7. Capital Cost Estimate.
8. Owner's Cost Estimate.
9. Project Annual Cash Flow.
10. Operations and Maintenance (O&M) Cost Estimate.

2.3 Objectives

The objectives of this study were to establish the preliminary design parameters of major components of the Project to provide adequate information to support the following activities:

1. Evaluation of the economics of the Project.
2. Preparation of a Project schedule.
3. Certificate of Public Convenience (CPCN) Application and Public Service Commission (PSC) Approval process.
4. Required federal and state permitting process.

2.4 Limitations and Qualifications

The costs presented within this report are subject to:

- Final negotiation of the terms and conditions with the major equipment suppliers and construction contractors.

- Final geotechnical report findings and final foundation design.
- Final site survey and topographic information.
- Final results of studies to be performed during detailed design. Refer to Section 1.7.1 for partial list.
- Final determination/negotiation of the project schedule.
- Final selection of the engineered equipment and construction contractors.
- Final permitting requirements.
- Events prior to Full Notice-to-Proceed (FNTP) that may cause price escalation in equipment, materials, or labor beyond that included in the costs.

Estimates and projections prepared by BMcD relating to schedules, performance, construction costs, and operating and maintenance costs are based on professional experience, qualifications and judgment as a professional consultant. Since BMcD has no control over weather, cost and availability of labor, material and equipment, labor productivity, energy or commodity pricing, demand or usage, population demographics, changes in technology, construction contractor's procedures and methods, unavoidable delays, construction contractor's method of determining prices, economic conditions, government regulations and laws (including interpretation thereof), competitive bidding and market conditions or other factors affecting such estimates or projections, BMcD does not guarantee or warranty (actual, expressed, or implied) that actual results, rates, costs, performance, schedules, etc., will not vary from the estimates, analysis, projections, and recommendations prepared by BMcD and contained herein.

3.0 PROJECT DEFINITION

3.1 Plant Location and Layout

Hugh L. Spurlock Generating Station (Spurlock) is located west of Maysville, KY. Access to site is from Mary Ingles Highway (Hwy 8) that runs along the south side of the facility. The existing facility consists of four (4) coal-fired steam generating units. They are numbered one (1) through four (4) from east to west. The M&R yard will be located in the southeast area of the plant property and will be furnished and installed by the gas utility. The new FGC equipment will be located west of the exiting Unit 3 and 4 cooling towers. The new main gas line feeding the units will run along the north side of the units before branching off to each unit.

Refer to Appendix E Site Arrangement drawings for additional information.

3.2 Project Overview

The Spurlock Co-fire Project includes converting Units 1, 2, 3 and 4 at EKPC's Hugh L. Spurlock Generating Station from 100% pulverized coal operation to co-fire operation. Unit1 is an existing 300 net MW B&W pulverized coal steam generator. Unit 2 is an existing 510 net MW (plus 30 MW equivalent for steam to off-site paper mill) Alstom CE single cell tangentially-fired pulverized coal boiler. Units 3 and 4 are 268 net MW Alstom CFB steam generating units. This project scope is to convert Units 1, 2, 3 and 4 to provide coal and gas firing capabilities. This includes the capability to operate on 100% coal and co-fire up to 50% natural gas.

The project's major components will include a below grade gas line from an M&R yard (by Others), a FGC yard, an above grade gas main line from the FGC yard to an LP control system at each existing Unit, safety shut-off (SSO) skids with double isolation and vents, and new and / or modified burners and lances at each burner front as described below in more detail by Unit. The project will also include replacement of the existing FO igniters on Unit 1 with new igniters capable of housing either gas or FO igniter internals. This modification only applies at the twelve (12) locations where the existing burners are being modified. The existing FO capacity will also be retained to allow for startup on FO. This capability provides protection in the event natural gas is curtailed.

The new M&R station will be located at the southern end of the property near Highway 8. The FGC and M&R area will receive two redundant power feeds from the existing Unit 3 and Unit 4 cooling tower switchgear. These will feed an automatic transfer switch that will send a single 480VAC feed to a power panelboard. This panelboard will supply all 480V loads including a stepdown transformer which will feed

a 120/208VAC panelboard. A small packaged 120VAC UPS system will provide uninterruptable power supply to critical control systems in both the FGC and M&R areas.

A carbon steel gas line will connect to a flanged custody point at the M&R yard and run below grade along the existing plant road to the main gate. Outside of the limits of the M&R yard there will be an isolation valve for manual shutoff of FG supply by EKPC as well as connections for a pipeline pigging station (temporary). Piping will be routed underground from the M&R yard to the FGC yard. The below grade piping and ductbank along this corridor will be routed in a common utility trench. Gas will be provided at a pressure of 200 psig from the M&R station. The gas supply temperature is expected to be between 40 degrees Fahrenheit and 80 degrees Fahrenheit.

The gas pipe will transition above grade to avoid the existing Unit 4 cooling tower circulating water pipes and the above grade steam pipe to the paper mill adjacent to EKPC Spurlock. Once above ground at the FGC yard, the piping will terminate into another pigging station. Equipment for pigging the piping is designed for receiving only and will be supplied by EKPC on an as-needed basis. Isolation valves will be provided as well as purge and vent connections. The gas then passes through the filter-coalescer prior to going back underground and supplying the units.

The gas line will run below grade from the FGC yard to the southeastern corner of the existing Unit 1 boiler building. Upon stubbing above grade, the gas pipe will be supported on a new rack structure along the eastern wall of the Unit 1 turbine and boiler buildings. The pipe will turn along the back end of the units where it will branch off and penetrate the existing turbine building walls and connect to a new LP control skid at the ground floor elevation of each unit.

For Unit 1, two LP skids will be provided, one for the front wall burners and igniters and one for the rear wall burners and igniters. A header from the LP skids will convey the gas to the top two existing burner elevations. Unit 1 is a front wall-rear wall opposed-fired boiler with a total of twenty-four burners. Eight (8) burners are located at elevation 593’-6”, eight (8) burners are located at elevation 601’-6”, and eight (8) burners are located at elevation 609’-6”. Three (3) existing burners on the front and rear walls at elevations 601’-6” and 609’-6” will be modified with the addition of a retractable B&W Low NOx Super Spud assembly inserted through the existing burner guide tube. This will allow gas to be injected into the furnace at these existing burner locations. It should be noted that the B&W Super Spud design allows the modified burner to fire on coal and gas, but not on coal and gas at each individual burner at the same time. New flame detectors will also be added to the existing burners to detect flame when operating on coal or gas. Each coal elbow, at the twelve locations indicated above, will be replaced with a new coal

elbow designed for incorporating the B&W Super Spud gas lance. A new FG SSO assembly, or skid, will be provided for each burner. A new igniter gas (IG) SSO skid will be provided for each mill group. The modified burners were selected based on maintaining current mill grouping. All burners on mill groups B, C, E, and G will be modified as described. Refer to Figures 3-1 and 3-2 for the locations of the modified burners on the front and rear wall, respectively.

Figure 3-1: Spurlock Unit 1 Front Wall Burner Modifications (Elevation View)

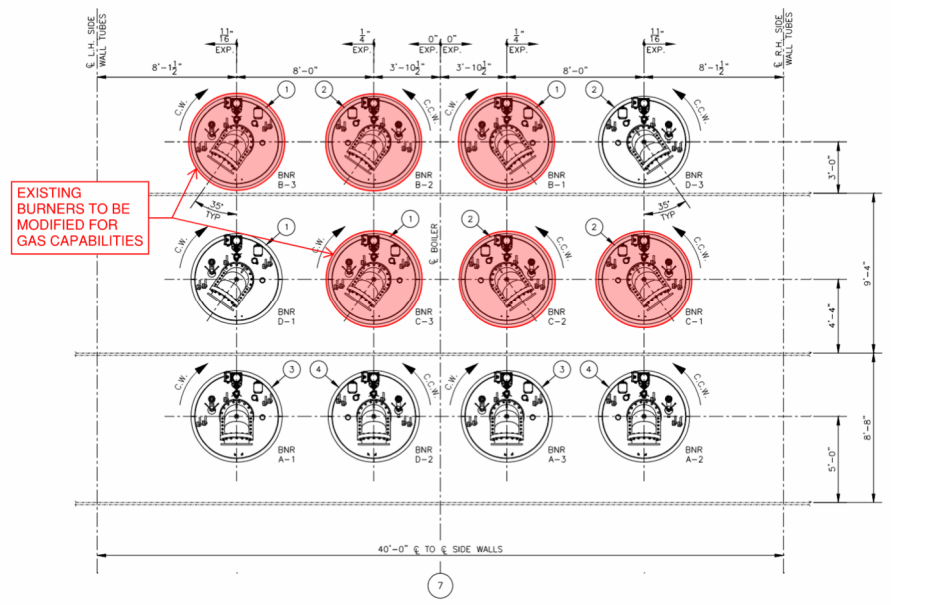
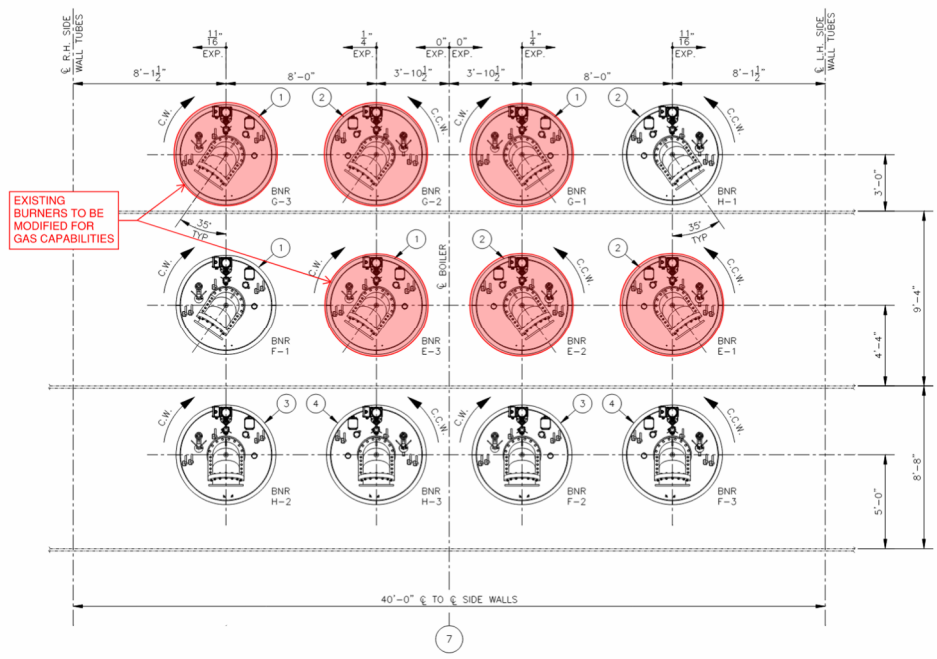


Figure 3-2: Spurlock Unit 1 Rear Wall Burner Modifications (Elevation View)



For Unit 2, a single LP skid will be provided. A gas header from the LP skid will convey the gas to the elevations of the new gas burners. Unit 2 is a single cell tangentially-fired pulverized coal boiler with a total of twenty burners. Eight (8) new gas burners will be installed, with two (2) new burners located on each corner of the boiler. One new burner will be located between the existing burners at elevations B and C and the other between existing elevations C and D. B&W's Low NOx Super Spud assembly is also the design basis for the new gas burners on Unit 2. This will require modifications to the existing air registers between the existing burners. Gas igniters will also be provided at the locations of the new gas burners. New flame detectors will be provided for each of the new burners and igniters. A new FG SSO assembly, or skid, will be provided for each burner. A new combined FG / IG SSO skid will be provided for each burner and igniter pair. The existing FO system will not require any modifications on Unit 2.

For Units 3 and 4, two LP control skids will be provided for the new gas lances. One LP control skid will be for the gas lances on the front wall and one for the lances on the rear wall. A gas header from the LP skids will convey the gas to the elevations of the new gas lances. Units 3 and 4 are CFB boilers with four existing FO warm up guns located in the side walls (two at each end). These existing warmup guns will remain unchanged to allow the units to start up as they currently do today. A total of sixteen new gas lances will be installed at each unit to allow gas to be injected into the furnace for co-firing operations. Nine lances will be installed in existing secondary air ports in the rear wall and seven lances will be installed in new penetrations in the front wall adjacent to the existing coal chutes. Modifications to the existing refractory and boiler tubing will be required for the new lances on the front wall. New safety shut-off skids will be provided for the lances. In general, two lances will be serviced by a single SSO skid. However, one lance on the front and rear wall will both be on its own SSO. Refer to Figures 3-3 and 3-4 below for graphical representations of where the new lances will be installed in plan and elevation, respectively. The existing FO system will not require any modifications on Units 3 and 4.

Figure 3-3: Spurlock Units 3 & Unit 4 Lance Locations (Plan View)

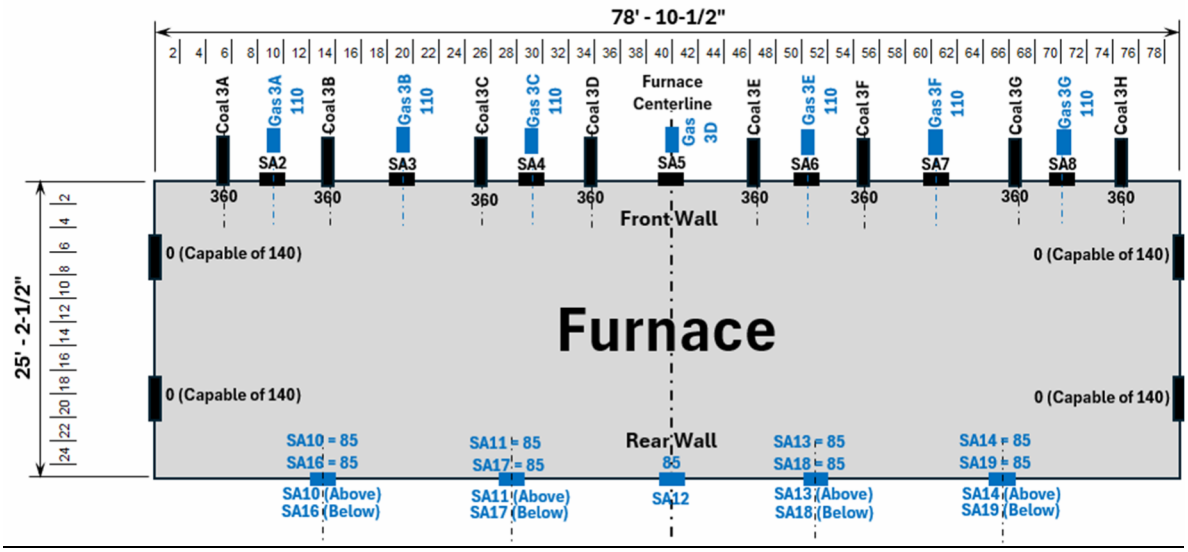
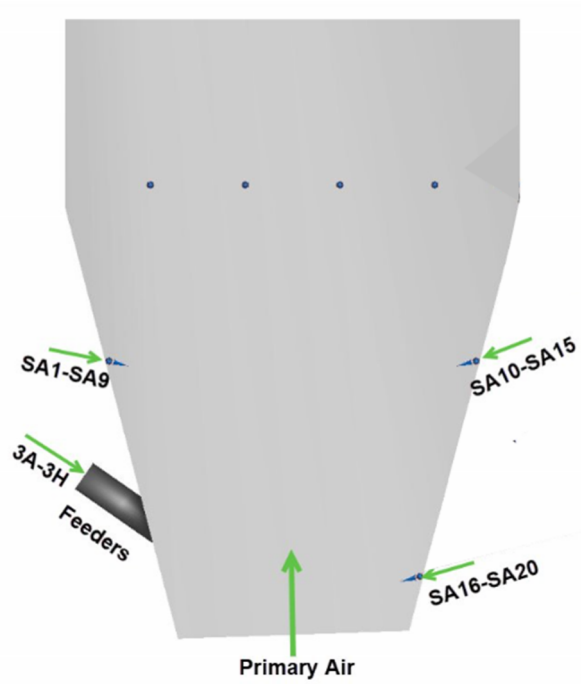


Figure 3-4: Spurlock Units 3 & Unit 4 Lance Locations (Elevation View)



A study of the existing combustion air system has not been performed on Units 1 and 2 at this time and will be part of detailed design. However, co-firing up to 50% natural gas is not expected to require modifications or replacement of existing fans. For both Units 1 and 2, a new duplex blower skid has been included in the cost estimate for providing combustion/cooling air to the igniters and scanners. Vent piping for LP FG and SSO FG and IG skids will be provided in accordance with NFPA 85. Where allowed by NFPA 85, vents have been manifolded together for cost efficiency. A HAC study has not

been performed as part of the PSR effort and will be conducted during detailed design. An allowance, per unit, has been included in the cost estimate to account for potential ventilation modifications to the existing boiler buildings based on past project experience.

A permanent nitrogen purge system (new nitrogen tank, hard piping, etc.) has not been included in the cost estimate. However, a conceptual nitrogen purge scheme was developed to account for piping and valving required to isolate and purge sections of piping and equipment for startup and maintenance. Purging of the FG system will be accomplished utilizing two different methods. The piping from the M&R yard to the emergency shutoff valve (ESV) stations will be performed primarily using a sweep purge approach. A connection is provided at the M&R yard tie-point near the anticipated pigging connections that will purge the piping above and below ground to the terminal connection above ground at the FGC yard. A sweep purge uses an inert gas, such as nitrogen, at a high velocity and large volume to force the natural gas out of the piping at the opposite end. It is similar to pigging. This same approach is used for the segment of piping downstream of the FGC yard and discharging near the ESV station at each unit. The FGC yard itself that is above ground will utilize a pressure purge fed from either inert gas bottles or a tanker truck. Purging within the units themselves will be developed during Detailed Design but is intended to utilize a pressure purge system fed from temporary inert gas bottles or tanker truck. Purging of individual burners and igniters will be accomplished using portable inert gas bottles.

A preliminary high-level review of the existing PA, FD, and ID fans was performed for Units 3 and 4 to determine whether modifications or replacement was expected to support the co-fire project. Based on the existing Owner-provided fan curves and discussion with the fan manufacturer, modifications or replacement of the existing PA, FD, or ID fans are not anticipated at this time and have not been included in the cost estimate.

A lighting study was not conducted as part of the PSR, but will be performed during detailed design. However, upgrades to lighting around the boiler front have been included in the cost estimate based on past similar project experience to account for the addition of new lighting fixtures, receptacles, conduit, and contactors around the boiler deck area.

It is assumed that no upgrades or modifications to the existing compressed air system will be required for this project and are not currently included in the cost estimate. It is anticipated that the air consumption for the existing coal burners will be similar to the air consumption required for the modified FG burners. The igniters will utilize less air when operating on FG as atomization of the FO is not being performed.

Ancillary users of instrument and service air will be evaluated during detailed design once data is provided by the gas firing system equipment supplier.

No modifications to the auxiliary systems of the boilers, such as soot blowing, are planned for modification as they are needed for coal firing operations. This includes the air heaters and any associated cleaning mechanisms, bag house cleaning systems, or fly ash removal systems.

New auxiliary electrical equipment is included to supply new loads around the boiler area for each of the four units. A 480VAC power feed was pulled from each Essential Services Motor Control Center (MCC), one per unit, to feed new 480VAC power panelboards which in turn feed multiple stepdown transformers and multiple 120/208VAC panelboards as well as two local starters for the new Scanner/igniter cooling air blowers.

Existing 120VAC UPS systems will be utilized to pull one feed for each new DCS cabinet. Each new DCS cabinet will receive one (1) 120VAC UPS feed, one (1) 120VAC house power feed, and one (1) 120VAC house power feed for routed power.

All new heat trace, duct bank, conduit and cable tray were assumed for this project. All new grounding will tie back to the existing ground grid.

The existing air pollution control devices downstream of the Unit 1, 2, 3 & 4 boilers will remain in the gas path while firing on any blend of coal or natural gas. The Unit 1 and 2 control systems include an SCR, an ESP, a wet FGD system, and a wet ESP. The Unit 3 and 4 control systems include limestone boiler injection, an SNCR, a NIDS, and a baghouse. The SCRs and SNCRs will be utilized to reduce NOx emissions while firing on all fuels. The wet scrubbers and NIDS will be utilized to reduce sulfur dioxide (SO_2) while firing on all fuel blends. The ESP's and baghouses will be utilized to reduce PM with all fuel blends. The wet ESP's will be utilized to reduce PM and sulfuric acid (H_2SO_4) on all fuel blends. The only modifications anticipated to the pollution control systems as part of the natural gas co-firing project is a modification to the ammonia feed system to permit potentially lower ammonia feed rates required for high natural gas blends. An allowance has been included for this potential modification on both Units 1 and 2.

A new pair of BRC-410 controllers will be added to an existing PCU for each unit. These controllers will connect to a new remote I/O 3 cabinet lineup (EKPC standard). These cabinets will house the necessary power, communication, S800 I/O, MFT, and termination equipment for all new BMS points. CCS points will be home run back to existing spare I/O. Common hard I/O will home run back to existing spare I/O.

Common soft I/O will connect to an existing Common BRC-410. No new HMI equipment will be necessary. The existing simulator for Units 2 and 4 will be modified to include changes to logic, graphics, and simulator process models.

3.3 Project Scope and Design Assumptions

3.3.1 Project Scope

The site design criteria and project scope matrix included in Appendices A and B form the basis of the co-fire project development effort. The site design criteria and scope matrix provide general design conditions for the plant including plant operational characteristics as well as engineering discipline (Civil, Structural, Mechanical, Electrical, and Instrument and Control) design criteria. These documents were developed, reviewed, and revised in coordination with the Owner to provide a clear and consistent understanding of the major underlying assumptions used in the development of this project.

3.3.2 Key Design Documents

In addition to the design criteria and scope matrix, the following preliminary design documents were developed to form the basis of the project preliminary design and are included in the Appendices attached to this report. These documents were reviewed with the Owner to confirm the basis of understanding of the Project.

- Appendix A: Site Design Criteria
- Appendix B: Scope Matrix
- Appendix C: Project Division of Responsibility Matrix
- Appendix D: Equipment List
- Appendix E: Preliminary Project Scoping Drawings
    - Site and General Arrangement Drawings
    - Electrical Single Line Diagrams
    - Mechanical/Process Piping & Instrument Diagrams
    - Control System Architecture
- Appendix F: Heat Balance Diagrams (NOT USED)
- Appendix G: Water Balance Diagrams (NOT USED)
- Appendix H: Preliminary Subsurface Investigation (NOT USED)

- Appendix I: Noise Assessment (NOT USED)
- Appendix J: Permit Matrix
- Appendix K: Tie-In List and Locations
- Appendix L: Design Fuel Basis
- Appendix M: Water Quality Basis (NOT USED)
- Appendix N: Preliminary Fire Protection Design Basis (NOT USED)
- Appendix O: Life Safety Code and Criteria (NOT USED)
- Appendix P: Risk Matrix
- Appendix Q: Project Schedule
- Appendix R: Capital Cost Estimate
- Appendix S: Cash Flow
- Appendix T: O&M Cost Estimate (NOT USED)

3.4 General Design Criteria

The following criteria were used as the basis for the plant preliminary design.

3.4.1 Operating and Control Philosophy

All Spurlock Units are currently configured to operate solely on coal to generate electricity. The modifications proposed will allow for the use of natural gas (fuel gas) in conjunction with coal to generate the same electrical output. FG operations rely on a stable fuel supply from the selected gas utility company that is of clean and consistent heating value. Operationally, this change will require a modified BMS that will monitor the use of the coal system as well as the FG system. This operation, referred to as co-firing, will fundamentally change the burner management and combustion control systems. Plant Operators will require training on how to monitor both fuels and how to modify boiler load and/or how to switch fuels.

The FG system will be controlled by the BMS and combustion control system. Prior to entering the units, the FG is regulated to 200 psig from the gas utility M&R yard. Once within the custody of EKPC, the FG is filtered for particulates and moisture. FG then is transported to the Plant.

On Unit 1, the burners are currently operated based on the coal mill that supplies them. Only 12 of the 24 burners will be modified to have gas capabilities. There are three (3) burners assigned to one (1) coal mill,

with the eight (8) total mills currently operating independently. Primary air (PA) will be supplied based on the coal mill supply basis and, as such, high excess air may be possible during startup or ramp up conditions. The design approach will be to have one (1) FG SSO per 3 igniters, grouped based on the coal mills. 4 igniter SSO's will be required for 12 igniters, with 3 igniters per SSO. Each burner will have an individual SSO, with 12 total burner SSOs required for the 12 burners being replaced.

Unit 2 will have (eight) 8 new gas burners installed, 2 per corner. One burner will be installed between elevation B and C and the other burner will be installed between elevation C and D on each corner. The design approach will be to have one (1) combined FG / IG SSO skid per burner and igniter set. Each SSO will have a burner and igniter train.

Unit 3 and 4 will have (sixteen) 16 new gas lances added to each unit. In general, two (2) lances will be operated on a single SSO skid. However, one lance on both the front and rear wall will be on their own individual SSO skid.

The existing air pollution control system for each unit will remain in the gas path while firing on any blend of coal or natural gas. The SNCR or SCR will be utilized to reduce NOx emissions. The wet or semi-dry FGD will be utilized to reduce sulfur dioxide (SO_2). The fabric filter or ESP is expected to remove PM.

The Plant will have dedicated full-time operations and maintenance staff. The Plant staffing is expected to remain largely unchanged from current levels.

3.4.2 Design Conditions

Refer to Appendix A for site specific design criteria used as the basis for preliminary design. Refer to Appendix L for gas firing conditions used as the basis for preliminary design.

3.4.3 Redundancy

Overall redundancy within the FG system is not currently included nor determined to be required on a permanently installed basis. Operation of the filter-coalescer could be bypassed on a short-term basis with proper use of provided drains and monitoring of boiler load and flame stability.

The LP regulating skids provided by B&W for the burners and igniters are supplied with a low flow train and a high flow train for split-range operation. Replacement of valves could be accomplished with proper planning and de-rate of the units.

The scanning cooling air blower skids supplied by B&W include a 2x100% blower arrangement.

It is recommended that the highest wear parts for all equipment be stored as a spare within EKPC warehouses. Spare skids for the LP regulating skids are not considered feasible as full replacement would necessitate a unit outage. High wear components include pressure reducing valves, flow control valves, flow metering orifices, pressure and temperature transmitters, thermowells, and gaskets.

3.4.4 Life Safety Considerations

Life and Safety requirements of the effective building code and fire protection code will set the minimum design considerations for the Spurlock Units 1-4 Co-fire Project.

The code requirements are dependent on location, occupancy, and expected hazards present. The M&R yard will be excluded from all considerations as it is being supplied by the gas utility. Actual design codes utilized, and life safety systems should be reviewed by EKPC for the M&R yard as it will reside on EKPC property, though it is not expected that EKPC personnel will frequently enter the M&R yard. Gas piping and equipment will be subject to the NFPA 85 fire protection code and will have venting as required for purging of FG and be subject to a hazardous area study. All areas where FG can be discharged are subject to the hazardous area study. FG piping within the existing unit buildings will require review of all components near the piping and potential leak points. Within the units, NFPA and the applicable building code(s) and OSHA will dictate the necessary life safety systems. The final determination of building occupancy classification, and approval of the planned design features for life & safety are the responsibility of the Authority Having Jurisdiction (AHJ). Therefore, BMcD recommends that EKPC communicate the project design concept to the AHJ early in the detailed design phase and seek preliminary approval of the planned basis of design.

3.4.5 Environmental Design Criteria

The addition of gas firing is not expected to require any additional air quality controls systems. Minimal logic and graphic DCS configuration changes will be likely.

3.4.6 Fuel

Pipeline natural gas will be used to supply fuel to all four Spurlock Units. As a separate project, EKPC will bring a new gas pipeline to the site boundary with a new M&R station owned and operated by the gas pipeline company. A new FGC yard with new FG equipment will be constructed west of the existing Unit 3 and Unit 4 cooling towers. See Appendix E Site Plan for location of the new M&R station and FGC yard.

It is expected that the FG supply pressure at the M&R yard will be an average of 200 psig and can vary up to 15%. The regulated pressure will be based on as-received pressure at all four Units.

Pressure will be monitored and modulated at the inlet to the B&W LP Burner and Igniter Skids to verify 200 psig is always available.

3.4.7 Burner Modifications

The burner modifications required for co-firing Unit 1 will be designed by Babcock & Wilcox (B&W). Preliminary designs provided, and BMcD's industry experience, indicate that the existing coal elbow on the burners will be replaced with new spreader plate elbows that incorporate guide tubes for the B&W SuperSpud© FG burner. Modifications to the burner throat to support the FG burner are possible depending on the condition of the existing dual register burners (DRB). Burner coal vane spreaders will be modified as required to support the air flow patterns needed for the FG burner. This includes replacement of the existing linear actuator on the coal vane spreader.

Burner management and combustion control modifications will be provided by B&W and will be incorporated into the SSO skids and the LP FG header skid as well as the DCS.

For Unit 2, the existing coal burners will not be modified. New gas burners similar to those described for Unit 1 will be installed between existing burner elevations. Modifications to the existing air registers will be required for installation of the new burners.

Coal burners and / or FO warmup guns will not be modified in either Unit 3 or 4. Sixteen (16) new gas lances will be added to each of these units.

3.4.8 Boiler Modifications

The addition of FG to the boilers on Unit 1, 2, 3 & 4 may require potential modifications to units. The primary consideration is boiler pressure and explosion. Potential modifications include, but are not limited to, reinforcement of boiler beams and columns, replacement or reinforcement of boiler backstays, reinforcement of boiler waterwall panels, reinforcement of boiler ductwork, and/or modifications to existing FD/ID/PA fan logic and variable inlet vanes. Costs for boiler modifications are currently excluded from the estimate.

For Units 3 and 4, new penetrations will need to be made in the front wall of the furnace adjacent to the existing coal chutes to accommodate the addition of seven new gas lances. These penetrations will require modifications to the existing refractory lining as well as the existing boiler tubing. New bent tube panels will be installed at each new lance location.

3.4.9 Boiler Air

High level reviews of the existing FD, ID, and PA fans were performed based on the provided fan curves. Each fan is described below.

BMcD is not aware of any current fan limitations on Units 1, 2, 3 and 4. For the case study of burning up to 50% gas there is no case that will negatively impact the ability of the current fans. For Unit 1 the PA, forced draft (FD) and ID fans will all be sufficient for operating with 50% gas in service at any load.

For Unit 2 the PA, FD and ID fans will all be sufficient for operating with 50% gas in service at any load.

For Units 3 and 4 the PA, FD and ID fans will all be sufficient for operating with 50% gas in service at full load capacity. Low load operating conditions are still being studied.

3.4.10 Igniter Modifications

Unit 1 and 2 currently have FO supplied igniters. The igniters are assumed to be Class I igniters based on provided burner drawings showing that the heat input of the igniters is 10% of the burner heat input. On Unit 1, igniters are grouped three (3) igniters to one (1) SSO. Each has an SSO station with atomization supplied by the instrument/service air system. The FO is #2 fuel oil. The conversion for co-fire operations will include removal of the existing igniters and replacement with a dual fuel igniter that can fire either FO or FG. Igniter replacement will only be performed at locations where existing burners are being modified. Where existing burners are not being modified, the existing FO system will also remain as-is. This conversion is assumed to require removal of the existing guide tube in the burner for the igniter with a larger tube to house both igniters. The igniter scanner will be replaced with a B&W/FPS flame detector (flame rod).

Igniter operations currently are performed on a mill grouping basis to match the burners. As previously stated, the igniters currently have a SSO for every FO igniter. This will not be changed as part of the co-fire retrofits. The intent is to only replace the SSO valve station to meet current code requirements and leave all I/O and piping the same to minimize modifications and cost. On FO supply, the igniters will still operate in a mill grouping. When using IG operations, the igniters will fire in a mill grouping, but will isolate the FO and atomization system.

Initial discussions with B&W/FPS indicate that a combined duel fuel igniter is available, but required further evaluation. There is risk that this cannot be installed in the existing burners due to the required size of the guide tube effecting coal distribution. If that is the case, B&W/FPS have stated that the existing FO igniter will not be modified and the IG operated igniter will be installed in a new guide tube.

Separating the igniters would require two (2) independent flame rod detectors and modifications to the existing logic for operation of the igniters with separate I/O.

Operations will select the fuel to be fired from the controls screen. Only one (1) fuel can be utilized per mill grouping. Swapping of fuels for a mill group will require the igniters to be stopped, purged, and then swapping will be allowed.

The existing FO system on Units 2, 3, and 4 will remain unchanged.

3.4.11 Flue Gas

No modifications are currently anticipated for the flue gas ductwork from the boiler to the air quality control system (AQCS) and from the AQCS to and including the stack. As coal operations will require the current conditions, no changes would be warranted. The flue gas operations on FG will have more gas flow and slightly higher pressure, but overall duct loading is expected to decrease due to the reduction in ash. The only potential modification would be reinforcement for boiler implosion as previously stated which will be evaluated during detailed design. Currently, no modifications to the flue gas ductwork are included in the cost estimate.

3.4.12 Ammonia Supply and Storage

Anhydrous ammonia will continue to be delivered by truck to the site. Trucks will include unloading pumps to eliminate the need for an on-site unloading system. The ammonia storage area is located east of the existing units and contains four (4) storage tanks and auxiliary equipment. The existing ammonia system will be maintained for operation of the Unit 1 and Unit 2 SCRs during co-firing. Modifications to the existing systems will be implemented, as needed, for modulating and controlling flow during various fuel blends. These modifications could include the addition of valves and updates to existing control logic. This will be further studied during detailed design. An allowance has been included for both Unit 1 and Unit 2 in the cost estimate for ammonia control valve modifications.

3.4.13 Existing AQCS

The existing air pollution control devices following Unit 1, 2, 3 & 4 boilers will remain in the gas path while firing on any blend of coal or natural gas. The Unit 1 and 2 control systems include an SCR, an ESP, a wet FGD system, and a wet ESP. The Unit 3 and 4 control systems include limestone boiler injection, a SNCR, a NIDS, and a baghouse. The SCRs and SNCRs with the ammonia feed systems will be utilized to reduce NOx emissions while firing on all fuels. The wet scrubbers with limestone feed and NIDS will be utilized to reduce sulfur dioxide (SO_2) while firing on all fuel blends. The ESP's and baghouses will be utilized to reduce PM with all fuel blends. The wet ESP's will be utilized to reduce

PM and sulfuric acid (H_2SO_4) on all fuel blends. The only modifications anticipated to the pollution control systems as part of the natural gas co-firing project is a modification to the ammonia feed system to permit potentially lower ammonia feed rates required for high natural gas blends.

3.4.14 Wastewater

No additional or new wastewater streams will be generated by the co-fire project. Dual fuel operation will utilize existing wastewater treatment systems and discharge points.

3.4.15 Noise Criteria

All equipment, skids, valves, and components installed as part of the project will be specified and designed to be compliant with a 90 dBaC free-field measurements 3'-0" away. Hearing protection is assumed to be required at all times. Additional secondary hearing protection is not assumed at this point and no noise mitigation is included.

3.4.16 Aesthetics and Landscaping

Landscaping consists of seeding for erosion control of disturbed areas only. No other effort is included to improve the aesthetics of the site.

3.4.17 Geotechnical Data

A geotechnical investigation was not performed during the PSR. However, Burns & McDonnell did reference a subsurface investigation for the previous CCR/ELG project on the same site from 2015 provided by S&ME. Borings were taken around the site and used to obtain preliminary geotechnical data to support the construction of the CCR/ELG project. The report suggested the installation of deep foundation for the heavily loaded pipe racks in the scope of work for the CCR/ELG project. It is expected, based on this geotechnical report, that the pipe racks and trusses for this project will be placed on deep foundations. The rest of the foundations on site are expected to be lightly loaded shallow mat foundations. The available geotechnical data recommends designing shallow foundations for an allowable soil bearing pressure of 3,000 psf and for a frost depth of 24". Compacted aggregate fill is expected to be used to ensure that the minimum frost depth is achieved per recommendations from the geotechnical data. Any additional over-excavation and re-compaction are not included for any of the foundations on site.

3.4.18 Structural

Existing plant structural steel framing plans were reviewed in the areas where new skids and major piping and electrical cable tray corridors are anticipated. Structural analysis and / or calculations were not performed as part of this conceptual design effort. However, past similar project experience and

engineering judgment were used to identify exiting members that may likely require reinforcing for the new loading conditions. A preliminary conceptual basis for reinforcing existing structures was included in the cost estimate. The basis will be confirmed and adjusted during detailed design as actual equipment sizes, weights and locations could vary significantly from original assumptions. The estimate assumes the existing structure is in good condition and that structural integrity has not been compromised by damage, corrosion, or any other means.

3.4.19 Construction Power

Construction power will come from U4 spare MCC breaker and will be used with a 480V panelboard at the trailer area. Feeder cabling will be routed in direct buried conduit to the construction trailer area. From there, the voltage will be stepped down and distributed to 120/208V panelboards at each trailer.

3.4.20 Electrical Power Systems

Redundancy will be designed into critical power systems where possible. Redundant 480V power feeds will be used to feed power to the FGC and M&R area transformers with an integrated Auto transfer switch at each area. New 480V and 120/208V power panels will be added to the M&R, FGC, and boiler areas to support power needs. Power for these panelboards will be sourced from existing MCC buckets and existing switchgear. Spare capacity was considered for panel breakers and raceway. A new packaged UPS system will be added to the FGC area and existing UPS panels will be utilized in the boiler area. These UPS systems will power the critical control systems. New lighting will be added around the burner deck and at the new FGC area. Lighting fixtures were assumed to have a short pig-tail cable with a twist-lock receptacle system for an easy swap-out in case a light fixture needs to be replaced. Below grade grounding systems will be added to new areas such as duct bank runs and the FGC area. Above grade grounding will be added via grounding bus bars around the boiler area and surrounding the FGC yard. New grounding will tie into the existing grounding grid. Spare tubes will be added in new duct bank installations to accommodate the future needs of the plant. The estimate assumes new cables, cable trays, and conduits.

3.4.21 Ventilation & Hazardous Area Classification

The addition of FG and IG to the Spurlock Power Plant will require an evaluation of new hazards and processes that are inherent to natural gas being on site.

No changes to currently installed components are included as the layouts of the piping system are preliminary and will change during detailed design. All components in the FG and IG system are assumed to be NEMA 4 rated for a Class I Division I hazardous area. This includes the FG supply at the M&R

interface up to and including the burners and igniters. Existing instruments, junction boxes, and components not being replaced as part of the co-fire modifications by B&W on the boiler are assumed to be compliant, but will be evaluated during detailed design and are a risk to further modifications.

The highest risk to additional scope and cost to the project as it relates to modifications are the instruments located in the basement near the planned FG and IG LP skids. There are expected to be several flanges and valves on the skid and each will have an exclusion zone that may encompass existing instruments, junction boxes, or other components.

An allowance has been included for modifications to the existing boiler building ventilation systems, based on past similar project experience, to help mitigate the buildup of gas in the Units surrounding area.

4.0 PLANT PERFORMANCE & EMISSIONS

Tables 4-1 through 4-3 below shows the preliminary estimated performance of Spurlock Units 1, 2, 3 and 4 in different modes of co-firing operation.

Table 4-1: Spurlock Unit 1 Preliminary Performance Estimates

Spurlock Unit 1 Estimated Performance Summary (DRAFT)				
	100% Load		50% Load	
	100% Coal	50% Gas	100% Coal	100% Gas
Carbon (%)	69.59	69.59	69.59	69.59
Hydrogen (%)	4.47	4.47	4.47	4.47
Oxygen (%)	4.85	4.85	4.85	4.85
Nitrogen (%)	1.40	1.40	1.40	1.40
Sulfur (%)	3.51	3.51	3.51	3.51
Moisture (%)	6.62	6.62	6.62	6.62
Ash (%)	9.56	9.56	9.56	9.56
B&W Calc HHV/lb	12,660	12,660	12,660	12,660
Measured Heating Value (Btu/lb)	12,434	9,540	9,542	9,544
Lower Heating Value (Btu/lb)	12,183	12,183	12,183	12,183
Theo Stoichio Ratio Coal	9.48	9.48	9.48	9.48
Natural Gas HHV (Btu/lb)	23,415	23,415	23,415	23,415
Heat input from NG (%)	0%	50%	0%	100%
Heat Input from Coal (%)	100%	50%	100%	0%
Total Heat Input (mmbtu/hr)	3,251	3,298	1,755	1,807
HI NG (mmbtu/hr)	0	1,649	0	1,807
Gas flow (scfh)	0	1,601	0	1,754
Total flue gas at Econ Exit (lb/hr)	3,287,187	3,131,782	1,775,081	1,604,436
SCR % Leakage (5%) (lb/hr)	3,451,547	3,288,371	1,863,835	1,684,658
Air Heater Leakage (5% of Flue Gas) (lb/hr)	3,615,906	3,452,730	2,028,195	1,849,017
Air Heater Outlet Temp (F)	320	295	320	270
ESP Leakage (3%) (lb/hr)	3,724,383	3,556,312	2,089,040	1,904,488
Wet Scrubber Leakage (3%) (lb/hr)	3,836,115	3,663,001	2,151,712	1,961,623
Wet ESP (lb/hr)	3,836,115	3,663,001	2,151,712	1,961,623
Gross MegaWatts	330	330	165	165
Gross Heat Rate HI/GMW (Btu/kwh)	9,850	9,993	10,638	10,949
Net Power (MW)	300	300	149	149
Net Unit Heat Rate (Btu/kwh)	10,835	10,992	11,820	12,165

Table 4-2: Spurlock Unit 2 Preliminary Performance Estimates

Spurlock Unit 2 Estimated Performance Summary (DRAFT)				
	100% Load		50% Load	
	100% Coal	50% Gas	100% Coal	100% Gas
Carbon (%)	69.59	69.59	69.59	69.59
Hydrogen (%)	4.47	4.47	4.47	4.47
Oxygen (%)	4.85	4.85	4.85	4.85
Nitrogen (%)	1.40	1.40	1.40	1.40
Sulfur (%)	3.51	3.51	3.51	3.51
Moisture (%)	6.62	6.62	6.62	6.62
Ash (%)	9.56	9.56	9.56	9.56
B&W Calc HHV/lb	12,660	12,660	12,660	12,660
Measured Heating Value (Btu/lb)	12,434	9,540	9,542	9,544
Lower Heating Value (Btu/lb)	12,183	12,183	12,183	12,183
Theo Stoichio Ratio Coal	9.48	9.48	9.48	9.48
Natural Gas HHV (Btu/lb)	23,415	23,415	23,415	23,415
Heat input from NG (%)	0%	50%	0%	100%
Heat Input from Coal (%)	100%	50%	100%	0%
Total Heat Input (mmbtu/hr)	5,467	5,546	2,952	3,038
HI NG (mmbtu/hr)	0	2,773	0	3,038
Gas flow (scfh)	0	2,692	0	2,950
Total flue gas at Econ Exit (lb/hr)	5,528,451	5,267,087	2,985,364	2,698,370
Hot ESP Leakage (5%) (lb/hr)	5,804,874	5,530,442	3,134,632	2,833,289
SCR % Leakage (5%) (lb/hr)	6,095,117	5,806,964	3,291,363	2,974,953
Air Heater Leakage (5%) (lb/hr)	6,345,670	6,057,517	3,541,916	3,225,506
Wet Scrubber Leakage (5%) (lb/hr)	6,277,971	5,981,173	3,390,104	3,064,202
Wet ESP Leakage (lb/hr)	6,277,971	5,981,173	3,390,104	3,064,202
Air Heater Outlet Temp (F)	320	295	320	270
Gross MegaWatts	555	555	278	278
Gross Heat Rate HI/GMW (Btu/kwh)	9,850	9,993	10,638	10,949
Net Load (MW)	510	510	250	250
Net Unit Heat Rate (Btu/kwh)	10,719	10,875	11,820	12,165

Table 4-3: Spurlock Units 3 & 4 Preliminary Performance Estimates

Spurlock Unit 3&4 Estimated Performance Summary (DRAFT)				
	100% Load		Min. Load	
	100% Coal	50% Gas	100% Coal	100% Gas
Carbon (%)	69.59	69.59	69.59	69.59
Hydrogen (%)	4.47	4.47	4.47	4.47
Oxygen (%)	4.85	4.85	4.85	4.85
Nitrogen (%)	1.40	1.40	1.40	1.40
Sulfur (%)	3.51	3.51	3.51	3.51
Moisture (%)	6.62	6.62	6.62	6.62
Ash (%)	9.56	9.56	9.56	9.56
B&W Calc HHV/lb	12,660	12,660	12,660	12,660
Measured Heating Value (Btu/lb)	12,434	9,540	9,542	9,544
Lower Heating Value (Btu/lb)	12,183	12,183	12,183	12,183
Theo Stoichio Ratio Coal	9.48	9.48	9.48	9.48
Natural Gas HHV (Btu/lb)	23,415	23,415	23,415	23,415
Heat input from NG (%)	0%	50%	0%	100%
Heat Input from Coal (%)	100%	50%	100%	0%
Total Heat Input (mmbtu/hr)	2,839	2,880	1,844	1,887
HI NG (mmbtu/hr)	0	1,440	0	1,887
Gas flow (scfh)	0	1,398	0	1,832
Total flue gas at Econ Exit (lb/hr)	2,870,841	2,735,118	1,864,442	1,675,586
SCR % Leakage (5%) (lb/hr)	3,014,383	2,871,874	1,957,664	1,759,366
Baghouse Leakage (3%) (lb/hr)	3,104,814	2,958,030	2,016,394	1,812,146
Scrubber Leakage (0%) (lb/hr)	3,197,958	3,046,771	2,076,885	1,866,511
Air Heater Outlet Temp (F)	320	295	320	270
Gross MegaWatts	302	302	181	181
Gross Heat Rate HI/GMW (Btu/kwh)	9,400	9,536	10,175	10,412
Net Unit Load (MW)	268	268	163	163
Net Unit Heat Rate (Btu/kwh)	10,593	10,746	11,305	11,569

4.1 Performance Estimate Basis

BMcD estimated new firing rates using performance data from similar retrofits. BMcD estimated that full load is achievable in a 50% gas co-firing condition. The difference in performance is the difference in water being created when firing natural gas. It is expected to see a drop in boiler outlet temperature.

4.2 Performance Estimate Qualifications

Initial performance may vary as the units are fired with different blends of gas and coal. The thermal resistance of the furnace walls will reduce with additional gas firing and less slag buildup.

4.3 Emissions Estimates

The unit will continue to meet applicable federal and state emission limits through the continued use of the existing air quality control equipment.

5.0 PROJECT EXECUTION PLAN

5.1 General Approach

The estimate is based on a multiple prime contracting approach by Owner. All procurements and contracts will be on Owner paper with support from the OE's engineering, procurement and construction staff. The estimate will be set up such that OE's cost for construction management, field engineering, and startup and commissioning can be removed from OE's cost and carried as an Owner cost, should Owner proceed as the construction manager for the project.

The contracting approach used as a basis for the Project cost estimate was a multiple contract approach. Refer to Appendix C for list of Equipment contracts and Construction contracts. The selected contracting strategy for the Project is a multiple prime contract approach. This approach was selected based on EKPC's input and past experience with recent projects. Under this approach, engineered equipment will be procured directly by EKPC and turned over to the appropriate installation contractors. This approach provides the following benefits:

- Cost savings to EKPC in return for manageable increased Owner's risk.
- Facilitates early award of major equipment procurements to allow detailed design engineering to proceed expeditiously to meet the Project schedule.
- Offers the greatest flexibility for EKPC to be involved in key decisions regarding design.

In the multiple contract approach, Owner and OE will work together to procure the major equipment and construction contracts. The procurement of the long lead time equipment such as the gas firing system equipment and DCS equipment is necessary early in the Project to support detailed design. The contracting approach includes multiple equipment/material contracts and several construction contracts, as shown in Appendix C. The equipment contracts allow Owner to reduce the cost of contractor markup via competitive bidding. There are alternate contracting approaches available, however, these may lead to additional markups on equipment/material contracts. Additionally, the multiple contracting approach allows Owner more input into the equipment selection for the Project and provides more control of the quality of materials purchased.

The equipment contracts were setup in recognition of long lead time items that will need to be ordered early in the Project to support the schedule and are not impacted by the selection of other contractors. For a more detailed list of the scope being provided with each contract, refer to Appendix D – Equipment

List. To assist in understanding the coordination of work between the multiple contracts, including responsibilities for design, fabrication, delivery, receipt & protection, foundations, piping, wiring, erection, commissioning and startup interfaces, refer to Appendix C – Division of Responsibility.

5.2 Construction Management

5.2.1 Project Controls

Engineer will be responsible for developing the initial Level III Project Schedule in coordination with the Owner Scope including:

- Establish project schedule.
- Monitor design and procurement status and update accordingly.
- Develop construction and startup schedules and work with contractors to maintain in field during construction and commissioning activities.

5.2.2 Site Specific Project Documentation / Procedures

Engineer shall coordinate with Owner to develop:

- Overall Project Quality Assurance Plan.
- Site Specific Safety and Security Plan.
- Inspection Test Plan.

5.2.3 Procurement & Materials Management

Engineer shall create technical specifications, work with EKPC to develop approved vendors lists, issue contract specifications for bids, provide technical evaluation of bids, assist Owner in technical and commercial negotiation of contracts, expedite and track deliverables, document control of submittals, review submittals in parallel with Owner, and coordinate/assist Owner with reviewing invoices and managing change order processes.

Engineer will work with Owner to develop template front end commercial documents to issue with procurement packages.

Engineer will track and verify receipt of Owner procured equipment submittals. Logs will be issued to inform Owner of the receipt status.

Procurement packages will be issued for bid through Owner’s processes and software tools.

5.2.4 Startup and Commissioning

The cost estimate assumes the start-up for the Project will be managed by BMcD, including an on-site Startup Manager and Field Engineers provided by BMcD. Vendor representatives, contractors, and Owner's operating personnel will provide assistance, technicians, and craft as needed. Startup and commissioning includes work required to transition the project from construction to full operation and final Owner acceptance.

5.2.5 Performance and Emissions Testing

Overall net plant performance demonstrating output, heat rate, and functional tests will be managed by BMcD and performed by a third party testing contractor. Plant emissions testing will be managed by BMcD and performed by a third party testing contractor. Owner will witness all tests and agree to accepted results.

5.2.6 Engineering

BMcD will serve as the focal point for engineering and design coordination of the Project. BMcD's project manager, project engineering leads, and main support staff will be located in the Engineer's design office. Additionally, preliminary design, procurement specification development, detailed engineering, and modeling will be performed by BMcD. Field Engineering will be supplied by BMcD for the duration of the construction and startup schedule.

5.2.7 Safety & Environmental

The project will require on-site employees and contractors to comply with applicable governmental and local safety regulations, and the Spurlock site-specific safety program. Measures will be taken to provide safe and quality work in a productive manner. The site-specific safety plan will take into consideration project conditions that are potentially hazardous and implement programs that are designed to mitigate safety risks. The Project will comply with local and governmental mandates for environmental controls. Fuel containment practices and spill prevention will be utilized. Prior to mobilization, site-specific safety and environmental plans will be developed specifically for the Project.

5.2.8 Quality

A Project Quality Plan specifically tailored to the Project will be established and implemented, complying with the Quality Program Manual. The Project Quality Plan will describe the quality assurance and quality control requirements, organization, and division of responsibility (DOR) for the project and the procedures to be followed to meet those requirements. Quality audits will be conducted to ensure that systems are followed and that the technical standards are achieved. The Project Quality Plan applies to all

quality activities performed by the contractor's personnel in the management and control of facilities, products and services.

A focus on Quality throughout the construction phase of this project will be critical to the successful achievement of project goals associated with operability, cost, and schedule.

5.2.9 Contracts

Construction contractors will be evaluated and prequalified by Owner and Engineer for safety performance, environmental performance, bonding ability and insurance required to be carried. Contractors that have questionable safety performance will not be selected. Multiple Contract packages will be executed to perform the construction of the project. It is anticipated that specialty contract packages will be segregated by trade and generally follow the Contracting plan. Major Contracted scopes are:

- Site Preparation Work.
- Underground Utilities and Foundations.
- Mechanical Construction.
- Electrical Construction.
- Distributed Control System.
- Site Finishing.
- Site Service Contracts:
    - Subsurface investigation/geotechnical exploration.
    - Surveying.
    - Medical.
    - Testing.
        - Electrical.
        - Performance.
        - Emissions.
        - Noise.
    - Miscellaneous:
        - O&M Manuals & Training.
        - Start-up cleaning.
        - Control System Simulator Update.

5.3 Detailed Engineering

BMcD will execute engineering design as follows:

- During the engineering and procurement phase, Owner involvement is anticipated to understand and incorporate expectations into each phase and aspect of the project.
- Engineer will manage all aspects of technical procurement management. During detailed engineering, BMcD will review vendor engineering documentation and manage interfaces.
- Controlled project documents will be maintained in the Engineer's document management system. This enables all documents associated with the project to be filed in a standardized and accessible system.
- Design engineering results in finished designs, drawings, lists, and technical specifications for procurement and construction.

5.3.1 Architectural Design

The following architectural design engineering services will be performed:

- Design and coordination of pre-engineered metal buildings including plans, sections, elevations, and door schedules.
- Design and coordination of roofing and siding for custom engineered "stick built" buildings and enclosures including plans, sections, elevations, and door schedules.
- Design of interior finishes.
- Review vendor designs and drawings.
- Prepare technical specifications to support contracts.
- Existing wall penetration details.

5.3.2 Civil Design

The following civil design engineering services will be performed:

- Site preparation, fine grading, finish grading, site finishing and site drainage design including construction facilities, roads, parking lots, laydown areas, erosion control, fencing and security.
- Trenching for gas pipe, conduit, and duct bank.
- Restoration and seeding of temporary laydown areas.
- Preparation of pilot trenching investigations and a site survey to locate underground utilities.
- Analysis of geotechnical investigations and soil borings.
- Review vendor designs and drawings.
- Prepare technical specifications and drawings to support contracts.
- Existing road repair, as required.
- SWWP preparation.

5.3.3 Structural Design

The following structural design engineering services will be performed:

- Analysis of geotechnical investigations and soil borings for foundation design.
- Design of shallow and deep foundations for equipment and structures.
- Design of structures in accordance with applicable code, wind, snow, and seismic design criteria.
- Analysis of existing structures for new loading conditions, as required.
- Design of structures including reinforcing steel, structural steel, platforms, stairs, and enclosures.
- Design of supplemental steel supports for piping and cable tray.
- Review vendor designs and drawings.
- Prepare technical specifications and drawings to support contracts.

5.3.4 Mechanical Design

The following mechanical engineering services will be performed:

- Finalize site plan and balance of plant (BOP) equipment layout drawings.
- Prepare specifications for procuring equipment and materials.
- Preform process and system design.
- Design of cathodic protection.
- Finalize P&IDs for piping systems.
- Prepare detailed piping isometrics for large piping. Small-bore piping shall be provided in "Recommended Routing" isometric form for FG piping. Instrument air, service air, service water, and drain piping shall be field routed as indicated on drawings.
- Finalize and maintain General Arrangement drawings.
- Prepare and maintain pipeline, valve, and mechanical device lists.
- Review vendor designs and drawings.
- Prepare technical specification and drawings for equipment procurement and contracts.

5.3.5 Electrical Design

The following electrical design engineering services will be performed:

- Finalize one-line diagrams.
- Prepare low- and medium-voltage auxiliary power system electrical one-line diagrams for metering and protective relaying systems.
- Prepare arrangement drawings for electrical cable trays, raceways, and equipment.
- Prepare grounding plans and details.

- Prepare raceway and circuit lists with the capability to provide interconnection drawings for electrical cable installation.
- Prepare schematic and interconnection diagrams for electrical equipment showing control circuits and equipment interconnections to be used to create a software database for generating circuit schedules and routing cable.
- Prepare lighting plans and details for permanent facilities.
- Prepare communication block diagram for permanent facilities.
- Prepare required load flow and fault calculations to design the power system and procure electrical equipment.
- Provide design of emergency power and essential service alternating current and DC systems.
- Provide lightning protection performance specification.
- Provide freeze protection performance specification.
- Perform arc flash study.
- Provide electrical area hazardous plans.
- Review vendor designs and drawings.
- Prepare technical specifications and drawings to support equipment procurement and contracts.

5.3.6 Instrumentation and Controls Design

The following instrumentation and controls engineering services will be performed:

- Finalize control system architecture drawing.
- Prepare DCS room layout drawing.
- Prepare instrument procurement list/datasheets for BOP instruments.
- Prepare instrument list for BOP instruments including sensors, transmitters, switches, and indicators.
- Prepare instrument installation details for BOP instruments.
- Prepare initial BOP control system I/O list (hard and soft) including instrumentation and electrical system inputs and outputs.
- Develop logic and graphic sketches as necessary.
- Prepare fiber-optic block and termination diagrams for interconnection of plant control system.
- Design field instrumentation cabling from the field devices to the plant control system.
- Review vendor designs and drawings.
- Prepare technical specifications and drawings to support equipment procurement and contracts.

5.3.7 Project Tools

Engineer will use its standard engineering tools to design the project. A three-dimensional computer model of the plant will be developed. Major original equipment manufacturer (OEM) models will be inported into the model as required to complete design. Laser scanning will also be peformed in select areas of the existing Plant to aid in the routing and layout of new systems and strucutres and facilitate interaces with existing infrastructure. Physical drawings will be produced by extracting information from the model. The design tools will also provide for automatic detection of physical interferences and checks for consistency between documents. The design tools will also create a useful tool for operation and constructability reviews througout the project allowing personnel to do a virtual walk through to view access availability for valves, operating areas, maintenance equipment and other similar characteristics. Drawings generated by Engineer will be provided in AutoCAD format to the Owner at the end of the project.

5.4 Constructability

Constructability reviews are an integral part of the overall project execution. Early involvement by the Owner and BMcD's construction management team provides for a solid integration of the design parameters and construction philosophy. The focus will be on project optimization and the following primary constructability issues:

- Master project schedule noting site area constraints, winter work, seasonal road and waterway restrictions, building enclosure, etc.
- Site access.
- Erection sequences.
- Safety during erection.
- Heavy lifts and construction access issues.
- Laydown requirements and areas needed.
- Delivery sequence of equipment.
- Prefabrication areas.
- Procurement procedures.
- Quality control.
- Inspections.
- Vendor services.

5.5 Contract List

Reference Appendix C – Project Division of Responsibility for a list of contracts, interface schedules and responsibilities.

5.6 Procurement Execution

Engineer procurement personnel will leverage recent experience with procuring equipment, materials, and contracts for other power plants of similar scope and size, with the goal of reducing timeframe necessary to conform and award contracts Owner's relationships and master purchase agreements with key suppliers will be leveraged when possible.

5.6.1 Critical Equipment & Materials

Owner will be responsible for procuring all materials and equipment. Significant procurement activities must occur immediately following the Full Notice to Proceed (FNTP), beginning with the procurement of the following equipment and materials:

- FG Burners and SSO Skids.
- FG Igniters and SSO Skids.
- FG Burner LP Skid.
- Fuel Gas (IG) Igniter LP Skid.
- Emergency Safety Valve (ESV).
- Medium Voltage Transformers.
- Packaged UPS System and Panelboards.
- DCS Equipment.

5.6.2 Procurement Summary

The procurement team will be responsible for daily execution of procurement activities throughout the course of the project. Major responsibilities of the team include:

- Provide technical specifications to bid procurements per plan.
- Provide technical evaluations of bid packages.
- Update procurement schedule.
- Coordinate supplier/contractor pre-qualifications.
- Support expediting, logistics and materials management functions.
- Provide quality support with shop inspections and pre-shipment delivery inspections.
- Tracking receipt and control of materials.
- Assist Owner in reviewing invoices.

5.6.3 Procurement Status Reporting

Engineer will use a procurement schedule which is integrated with the overall project schedule. Data reported in the procurement schedule includes specification/requisition dates, request for proposal (RFP) issuance, purchase order (PO) award, and fabrication/delivery durations for each procurement agreement. Initial input comes from integrated construction and engineering schedules and will be updated appropriately throughout the life of the project. All updates (actual dates achieved) are fed back to the Project Schedule, with any discrepancies addressed and resolved to support the needs of the project.

5.7 Construction Planning

BMcD will work with the Owner to develop a Construction Execution Plan to support the December 2029 COD date (for forth, and final unit).

Project execution planning begins well before the construction contractors will mobilize to the site. During detailed design and preparation of construction contracts, BMcD will engage its Pre-Construction team to begin reviewing the preliminary project documents as well as the project risks to begin looking for efficiencies to allow for safe and efficient execution of the project. The Pre-Construction team will work with the Owner and project team to aid in developing an optimized execution strategy for inclusion in the project design through the mobilization phase.

BMcD will participate in regular progress meetings with the Owner and each contractor. During the progress meetings, an in-depth review of the contractor metrics will be reviewed. Metrics include safety, quality, cost, and schedule performance. This time will also be used to follow-up on any outstanding action items required for the efficient execution of each contract. The Client will attend these update meetings and will have the opportunity to engage in the planning activities that occur.

5.7.1 Construction Facilities Plan

The proposed site facility layout drawing has been developed during the Project Definition Phase in a manner that allows for safe egress on to the site for all site personnel. Personnel walk paths have been laid out considering vehicular traffic and access to the site. The craft break trailer location is within proximity to the Workfront and will allow for efficient break times without having any of the craft workers walking long distances over break times.

Appendix E provides the general arrangement site layout for the Project.

5.7.1.1 Craft Parking

The craft parking lot was developed during the Project Definition Phase to allow direct access into the lot without driving through the project site near the craft work area. Existing developed craft parking will be utilized to the greatest extent possible. The layout will not include fencing around the parking lot. The full craft parking lot is shown on the site facility layout drawing.

5.7.1.2 Laydown Area

The proposed site facility layout drawing has been developed to allow for an unobstructed lane to and from the laydown yard. The laydown area was sized appropriately in comparison to similar, historical projects. The laydown area has been laid out to include temporary power connections to allow the construction contractors to utilize this area for preservation activities as well as pre-fabrication activities off the site footprint. The laydown areas outlined in the site facility drawings are currently not enclosed with fencing as they are inside the overall plant fence.

5.7.2 Mobilization and Utilities

Mobilization will include the delivery and placement of the trailer courtyard area. The Owner will mobilize the trailer complex for the site staff team and install their own craft break trailer. Contractors will provide their own office trailers and obtain written approval from Owner prior to staging trailers on site. Owner will supply electrical power disconnect at trailers for use by Contractors. As Contractors mobilize to site, Owner will approve of the placement of the trailers and will assign tool crib areas and lay down space, as required.

5.7.3 Civil Work

Civil work planned for this Project includes site preparation, fine grading, finished grading and site finishing. Prior to major civil work, a subgrade pilot trenching investigation and site survey will take place to identify existing utilities in the area of construction activities. Once utilities are identified, major civil work will start with site preparation. This work will include preparation of new temporary laydown areas, clearing and grubbing (stripping), trenching, bedding, and backfill of FG and duct bank line, stockpiling associated spoils on site, and preparing the site roads for use during construction. Once the site is surfaced, temporary and permanent fencing will be installed to secure the project site.

After all major construction activities have been completed, the site finishing Contractor will mobilize to site to perform the final grade adjustments and restore the areas disturbed by the construction activities.

5.7.4 Structural

The piling Contractor will mobilize to site to begin installing deep foundations for the associated structures throughout the site once the subgrade elevation has been established by the site preparation Contractor. Test piles may be required and approved prior to installation of the production piles. The foundation Contractor will then mobilize to site to begin installing foundations for the associated structures throughout the site once the subgrade elevation has been completed. Mat slab foundations will be poured for pipeline metering and maintenance equipment such as low point drains, filter/separator skid, knockout drum, pigging stations and emergency safety valve skids. Pile caps for pipe rack bents and pipe trusses will be poured on top of the piles at the associated locations. Inside each existing boiler building, new steel framing will be installed for DCS equipment, mechanical skids and associated pipe, vent and electrical cable structural steel supports. These items will either be supported by the new structural steel framing, existing steel framing, or concrete. Items placed on concrete will then be secured with post-installed anchors. If placed on steel, items will be secured to existing steel or new steel framing using bolts or field welds. Grating will need to be cut out for steel support and skid installation if existing grating is present. If handrails impede installation, they will need to be temporarily removed and replaced. As the pipeline and vent lines are routed, steel penetrations will be made in the walls, floor and roof by the mechanical construction contractor. These penetrations will be sealed by the mechanical construction contractor. A structural steel platform for vent line release will be installed on the roof of the boiler area then secured to roof beams using bolts.

5.7.5 Major Equipment Installation

Structural steel and major pieces of equipment will be received and installed or temporarily stored. Smaller components, if not installed immediately, will be received, inventoried, and safely stored and maintained in one of the dedicated storage areas until they are to be installed. Foundations will be complete, tested, and cured before the site begins the receiving process for all major equipment. Major equipment will be planned to be delivered and immediately placed on the associated foundation to eliminate double handling. All major equipment is planned to be placed with a crane.

Burner equipment will be transported to site from the staging area and lifted to each burner deck by crane or mechanical hoist. The coal elbows will be replaced on each burner elevation and modifications will be made on each elevation prior to moving to the next elevation. The regulating skids will be placed at the ground elevation and piping routed from the skids to the branch connection on each elevation. Gas supply piping from each burner and igniter will be routed from the respective equipment termination point to the vertical FG vertical distribution header to minimize stress on the connections.

5.7.6 Mechanical & Electrical BOP

After the Project P&IDs and Electrical One Line Diagrams are established, the Engineer and home office startup team will scope Mechanical and Electrical Systems and develop scoped packages for the procurement and installation of the respective systems. The mechanical system will be assigned to the 5.8320 Contractor (8320) and the electrical system will be assigned to the 5.8410 Contractor (8410). Mechanical and Electrical system turnovers will be required to support the startup and commissioning schedule.

8320 will be provided P&ID's, isometrics for piping 4-inch NPS and larger, recommended routing drawings for piping under 4-inch NPS, general arrangements, and details as needed for the installation of the Owner-supplied equipment. Specifications, details, sketches, photos, and narratives will be supplied. Isometrics will be developed utilizing an assumed spooling approach. 8320 will make the final determination of spooling and field weld locations.

Major long lead electrical cable will be prioritized by system and procured to align with the 8410 construction turnover schedule. As cable tray and conduit raceway installations are completed, cable pulls will commence. A typical approach would be that cables will be installed by area until about sixty percent of the schedule is complete. Cable pulls would then shift to the systems required to support the startup and checkout schedule.

5.8 Start-up and Commissioning

Commissioning is one of the phases with the most risk. Planning for start-up and commissioning defines the systems or sub-systems to be commissioned by scope identification on the Piping & Instrumentation Diagram (P&ID)'s and electrical one-lines. The Commissioning Manager works with the contractors and OEM suppliers to define the isolations required to start up separate areas of the plant to sequence the workflow. During the planning stage, the Commissioning Manager, working with the OEM suppliers, would also define the processes for gas line air blows and other cleaning, and would oversee the turnover process to make sure the facility turnover is documented in the turnover packages.

Project start-up and commissioning provides for documented, safe, timely, and orderly testing, start-up and transfer of packages, systems, and facilities. Engineering, procurement, and construction planning would support early commissioning of as many commissioning packages as practical. Pre-outage checkout and testing of as many packages as possible would distribute the commissioning workload more efficiently, reducing the risks and uncertainties associated with facility start-up and commissioning.

Checkout of each system or sub-system will be completed utilizing Owner Operations staff, and handed over to Operations, system-by-system. At this time, Owner will operate each system as permanent plant equipment with support from contractors on any issues that arise with the equipment. A critical component of the commissioning will be the tuning and testing phase. Tuning for the coal firing, gas firing and co-firing will be critical for stable operation in all operating modes. Commissioning finishes when Performance Testing is completed, and Commercial Operation with full acceptance by the Owner is achieved. The principal commissioning phases include the following:

- Preparation and planning.
- Pre-Commissioning process.
- Commissioning, Tuning and Testing phase.
- Operator training.

5.9 Project Closeout Plan

5.9.1 Engineering Completion and Project Closeout

Field staff will maintain a set of construction drawings and lists and will require contractors to maintain a record of all field changes on the documents. At the completion of construction and startup, the field staff will return a copy of the record set to the design team along with the contractor's record sets. The design team will incorporate the changes into a set of Conformed to Construction Records documents.

6.0 PROJECT SCHEDULE

6.1 General

The project schedule is based on a COD of December 2029 for the final Unit (Unit 4) and is included in Appendix Q to this report. The schedule encompasses activities from permitting through commercial operation. The schedule reflects a 28-month plan for the construction and commissioning period. The schedule reflects an EpCM contracting approach. Table 1-1 reflects the major milestones for the project.

6.2 Permitting

EKPC is responsible for permitting activities with BMcD's support. In general, the permitting critical path is through preparation and receipt of the EPA's EA application and approval. The NEPA EA must be received before engineering and procurement full notice to proceed (FNTP). Note that construction cannot break ground until the Air Permit is received, however, it is expected to be in hand well before construction commencement.

6.3 Engineering

The engineering for the project is outlined in Section 5.0. An engineering timeframe has been included in the project schedule that, generally, supports issuing Issued for Construction drawings at construction contract award to minimize rework and revisions in the field.

6.4 Major Equipment

The project schedule is based on current delivery lead times including 18-20 months for the DCS equipment and 14-16 months for the gas firing (burner) equipment. The critical path of the project runs through the gas firing system and DCS equipment procurement and delivery, and then through erection and commissioning.

6.5 Construction

Construction is planned to begin with construction facilities, site prep, underground utilities, and piling in September 2027. This work is expected to continue through Winter 2027/2028. Foundation installation follows which is to be completed Spring 2028. Major equipment deliveries are scheduled to begin Fall 2027 to support steel and pipe installation of the common pipe rack exterior the boiler buildings. Steel and piping installation inside the Unit 2 and Unit 3 boiler buildings will also commence in Fall 2027 as well. Burner and igniter modifications for Units 2 and 3 are planned during Spring 2028 outages. Major equipment and material deliveries will through 2028 to support Fall 2028 outages for Units 1 and 4.

During the Fall 2028 outages, equipment modifications at the Unit 1 and 4 burner fronts will be performed. BOP construction will be ongoing throughout 2028. The intent of the schedule is to complete all major mechanical and electrical construction activities by late 2028 to be ready for gas arriving on site in early 2029. Spring 2029 outages for Units 2 and 3 and Fall 2029 outages for Units 1 and 4 are planned for final tie-ins prior to startup and commissioning.

6.6 Commissioning

Preliminary commissioning activities will be performed using construction power which will be fed from the existing plant electrical system. The Plant electrical and mechanical systems are commissioned in a sequence to support tuning and testing of gas firing systems for gas firing and co-firing operation. For Units 1 and 2, initial testing and tuning will be performed at 50% gas firing operation at full load, then ramping to match existing boiler and turbine ramping rates. System operations continue with bringing in coal for tuning at various co-firing fuel ratios and load points. Unit startup on gas firing will be tested and tuned, for low load operation. For Units 3 and 4, initial testing and tuning will be performed after units are started up on coal and they are now. From there, gas will be brought in slowly while coal is backed down. Tuning of existing AQCS equipment under various co-firing cases will also be performed to prepare for performance and emissions compliance testing. Once the Plant is capable of reliable full load operation on 50% gas and co-firing cases, performance testing is performed in accordance with the American Society of Mechanical Engineers (ASME) Performance Test Codes.

6.7 Critical Path

For a COD of December 2029 for all four units with the multiple prime construction contracting approach, the critical path is awarding the gas firing system and DCS equipment packages to support receipt of equipment vendor submittals to support detailed plant design and support construction package development. Preparation of site prep, piling, foundation, mechanical, and electrical construction packages leads to award and mobilization for construction. DCS equipment delivery and erection, and the checkout and commissioning of the FGC equipment and gas firing equipment to be used for commissioning of the plant is the critical path of construction. Check out and preliminary commissioning of each FO and FG igniter and burner component will be followed by a two to three month tuning and testing period prior to Substantial Completion and Commercial Operation.

7.0 CAPITAL COST ESTIMATES

7.1 General

The capital cost estimate for the proposed Spurlock Units 1-4 Co-fire Project is included in Appendix R. The estimated cost for converting all four units, inclusive of contingency and Owner's cost, is [redacted]

7.2 Cost Estimating Methodology and Assumptions

Burns & McDonnell performed a detailed cost estimate in a "bottoms up" fashion based on an EpCM contracting methodology. The following describes the methodology used in the development of the cost estimate:

- Estimates are based on the assumptions and project scope described in this Report. Design parameters and scope typically defined by these studies are estimated based on information provided by EKPC, preliminary calculations and BMcD experience.
- Contracting Methodology: Estimate assumes a multi-prime subcontractor approach with all equipment procured by EKPC. Overhead and fees were estimated based on current market conditions and assuming all scope, schedule, performance, payment, and warranty risk will be covered by EKPC.
- Major Engineered and Balance of Plant Equipment: Budgetary quotes and in-house information from similar projects were utilized. It should be noted that budgetary quotes received from equipment vendors were based on a 0-100% gas co-fire conversion scope and not the current 0-50% gas co-fire scope. Refreshed equipment budgetary pricing was not obtained from the equipment suppliers after the requested scope change. Internal adjustments were made to the estimate to account for the scope changes.
- Construction Estimates: Construction commodities were estimated using recent pricing from similar projects, and budgetary vendor quotes. Quantify take-offs were performed for each discipline specific to this project and supplied to a variety of Subcontractors to confirm erection and installation pricing and approach. It should be noted that budgetary quotes received from construction contractors were based on a 0-100% gas co-fire conversion scope and not the current 0-50% gas co-fire scope. Refreshed budgetary pricing was not obtained from the construction contractors after the requested scope change. Internal adjustments were made to the estimate to account for the scope changes based on unit rates conditioned from the original budgetary bids.
- Project will be executed with durations similar to those shown on the Project schedule with the objective of achieving the Project milestone dates. It is assumed the Project will be executed with

a schedule sufficient to minimize overtime. A 50-hour workweek was assumed as a means of providing an incentive to attract labor. This includes 40 hours of straight time and 10 hours of overtime for normal construction periods. A 60-hour workweek was assumed during commissioning and start-up. No additional overtime is included to accommodate a compressed work schedule.

- Labor Rates: Labor rates and productivity factors were developed based on BMcD in-house information and subcontractor pricing the Lexington, KY area.
- Project Indirects: Estimates are based on Burns & McDonnell's experience and executing EpCM projects of similar scope.
- Several major assumptions were used in developing the capital cost estimate. These assumptions include the following:
    - Commercial operation of the equipment is assumed to be December 2029 for the final unit. The Units are assumed to have staggered outages with the Unit 1 and Unit 4 outage being in Fall 2028 and Unit 2 and Unit 3 outage in Spring 2029.
    - Labor is assumed to be a combination of union and nonunion labor and available without excessive hourly incentives or incentive packages. However, per diem was included for several trades based on subcontractor feedback.
    - Estimate is based on the availability of housing being in the Project area (e.g., trailer parks, campgrounds, local housing, and local hotels).
    - Contingency is included at 15% for Project estimate contingency. Owner's contingency for discretionary expenditures is included in Owner's Costs.
    - Cost for Builder's Risk Insurance was based on 1% of the total project costs.
    - No sales tax was included.
    - No financing fees or interest during construction was included.
- The preliminary gas firing system for co-firing the Unit 3 and Unit 4 CFB boilers is a "first-of-its-kind" design. Therefore, to increase confidence in the feasibility of the conceptual design, BMcD subcontracted with Reaction Engineering, Inc. (REI) to create a CFD model of the Unit 3 furnace. The model results show that co-firing the units on 50% gas at full load appears technically feasible.

7.3 Direct Cost Basis

The following methods were used for development of the direct cost.

- Internal development of quantities by discipline.

- Subcontractor pricing based on the quantities and information developed, reviewed against internal data.

7.3.1 Engineered Equipment

The equipment supply includes the procurement of all major equipment by the Owner. Refer to the Project Division of Responsibility (DOR) included in Appendix C for a listing of anticipated equipment and material supply contracts. The equipment supply cost includes the supply of specified equipment as well as the transportation cost to the site, technical field advisers, and training. Refer to Table 7-1 below for a listing of all contract packages utilized in development of the cost estimate including how each contract cost was sourced.

Table 7-1: Equipment & Subcontract Pricing Source

Contract No.	Contract Name	Target Price Source
5.1240	Gas Firing System	Bid - Budgetary
5.2490	Piping Specials	EQ (Email Quote)
5.2520	Manual and Actuated Valves	EQ (Email Quote)
5.2762	Fuel Gas Conditioning	Bid - Budgetary
5.4310	Pre-Engineered Metal Buildings	EQ (Email Quote)
5.4520	Fabricated Steel	EQ (Email Quote)
5.5680	Cathodic Protection	In-House
5.6110	Distributed Control System (DCS)	Bid - Budgetary
5.6210	Instruments	In-House
5.6220	Plant Simulator	EQ (Email Quote)
5.8210	Piling	Bid - Budgetary
5.8320	Civil / Fdns / UG Utilities / Mech Construction	Bid - Budgetary
5.8410	Electrical Construction	Bid - Budgetary
5.9010	Subsurface Investigation	In-House
5.9020	Surveying	In-House
5.9230	Electrical Testing	In-House
5.9250	Performance Testing	In-House
5.9260	Emissions Testing	In-House
5.9400	O&M Manuals / Training	In-House
5.9610	Startup Cleaning Services	In-House

Equipment installation includes the receiving, initial inspection, and erection of all equipment, as well as the installation of vendor pipe supplied with the equipment.

Productivity factors for the equipment installation were derived from Burns & McDonnell past project information and construction rates for the project area.

7.3.2 Site Development

The site development scope includes site preparation along with construction laydown, trailer, and parking areas. Excavation and backfill for underground utilities are included but underground pipe supply and installation is included elsewhere. This scope also includes estimated quantities for the structural excavation required for foundation construction. Concrete, formwork, and red powder is included in the civil scope, but conduit and cables in ductbank are included elsewhere. Site finishes including paving and gravel are included. No costs for dewatering and disposing of groundwater were included.

The civil scope of work material quantities were derived from a preliminary site grading sketch developed from the site GA and general topography data. The labor rate, production rates, and material prices were constructed from BMcD previous project metrics and estimates for construction in the project area.

7.3.3 Concrete

The concrete scope includes cast-in-place concrete for the support of equipment, buildings, and miscellaneous utility supports. For reinforcing steel, a density of rebar per unit of concrete was provided by engineering for internal estimating purposes. For formwork quantities, basic quantity information was developed relative to the type of concrete such as mats, walls, slabs, etc. from which were estimated formwork quantities.

7.3.4 Piling

The piling quantities were estimated using the site arrangement, equipment information from similar projects, engineering estimates of equipment and structure loads, or engineer developed loads based on conceptual design. Auger-cast pile lengths and capacities were assumed based on previous projects and existing piles on site. Auger cast piles are anticipated to be used to support almost all of the major pipe racks and trusses. Micro piles are anticipated in tighter areas where auger cast rigs will not be feasible. Piling costs were developed from Burns & McDonnell previous project estimates for construction in the project area and verified using contractor pricing and input.

7.3.5 Structural Steel

The structural steel scope of work includes pipe support steel for the gas conditioning equipment, gas line feeding the unit, cable tray throughout the site, and vent lines routed throughout the unit. Additionally, the

scope includes support steel for skids and a roof platform to access the vent lines. The existing structure may require reinforcing for new loading from the gas skids and mechanical pipeline installation. Potential reinforcement locations and quantities were estimated based on past projects. Miscellaneous steel such as platforms, grating, handrail, stairs and ladders are included for structure access that is not otherwise provided as part of the equipment contracts.

The structural steel scope of work was estimated from conceptual layout of equipment, skids, and piping. Platform areas based upon information shown or implied from the site GA. The structural productivity rates, wage rates, and material pricing were based on BMcD previous project history for construction in the area and verified using subcontractor pricing and input.

7.3.6 Painting & Coatings

The painting scope includes field touch up painting of factory coated equipment to repair damage during construction. Outdoor and indoor structural steel is finish painted to match existing coating system. Pipe priming and finish coating is assumed to be applied in the shop and estimated as material cost. Field coating at field welds and touch up is included. Pipe labeling is also included.

7.3.7 Piping

The piping scope of work includes above and below ground piping supply and installation. Vendor supplied pipe is included in the equipment installation cost. The piping scope covers purchase of pipe, fittings, flanges, valves, specials, bolt-up kits, supports, and pre-fabricated pipe. Purchase of piping specials and large valves is carried in the equipment pricing. Furnish and install costs for cathodic protection are carried in the equipment pricing. The piping scope of work is included elsewhere for trenches (civil scope), heat trace (electrical scope), insulation (insulation scope); touch up painting (painting) or pipe labeling (painting). The piping scope of work includes applicable non-destructive evaluation (NDE), pre and post weld heat treatment (PWHT), and hydrotesting.

The piping estimate was based on a takeoff from the general arrangement with P&IDs. Using these quantities, pricing for bulk material, valves, pipe fabrication was based on BMcD recent project pricing and budgetary quotes. The labor estimate was based on rates in the area and verified using contractor pricing and input.

7.3.8 Electrical

The electrical scope includes supply and installation of all raceway including cable and conduits in underground ductback (ductbank concrete in civil cost), above grade rigid conduit and cable tray systems with grounding and all required supports. It also includes the installation of all cable and terminations.

Terminations include wire labels, cable tags, connectors, continuity testing, and Hi-Pot testing. Temporary construction power includes installation, lighting, and maintenance. Equipment includes transformers, heat trace, communications systems, and lightning protection.

The electrical estimate was completed using take off quantities that were derived from a combination of: one line drawings and the equipment layout.

7.3.9 Instrumentation & Controls

The instrumentation scope of work includes a mix of electrical and mechanical installation costs. The instruments are supplied by the equipment vendors and by the mechanical installation contractor for the BOP systems (included in equipment pricing). The instrumentation estimate was completed based on installation rates in conjunction with instrument budgetary email quotes and in-house information from similar projects.

7.4 Indirect Cost Estimate Basis

The following methods were used for indirects:

- The Construction Management (CM), Startup Management, and Construction Indirects were estimated based on the project field staffing plan, the project execution schedule, and project historical indirect costs. Construction Management excludes field engineering cost. Field engineering is included in Engineering cost. Construction management costs include escalation to support the project schedule. Also included are the CM staff expenses including travel, living expenses, and site offices.
- Engineering costs include escalation to support the project schedule. The engineering estimate includes home office engineering and field engineering.
- Construction permits including electrical and building permits are not included.
- It is assumed builders risk insurance is provided by Owner.

7.4.1 Taxes

Sales and use tax are not included in the estimate.

7.4.2 Construction Labor Basis

Labor rates and productivity factors were developed based on information from contractor feedback and Burns & McDonnell historical information.

7.4.2.1 Labor Wage Rates & Expenses

Wage rates were taken from building trade contracts through 2024 for the area and compared against budgetary pricing received for each scope of work. Labor costs include wages, fringes, payroll taxes and insurance. Also included are costs for small tools and consumables, temporary facilities, field supervision, scaffolding and construction equipment, per diems and retention incentives, as well as contractor overheads and profit.

7.4.2.2 Work Hours

The estimate assumes shifts are 50 hour work weeks with anything over 40 hours as premium time at 1.5 times the base wage rate to attract labor.

7.4.2.3 Labor Housing

The estimate is based on housing being available in the Project area (trailer parks, camp grounds, local housing, and local hotels).

7.4.2.4 Labor Per Diem

Craft per diem is included in the wage rate.

7.4.2.5 Retention Plan

Contractors will manage the labor turnover. No funds were added to the estimate for excessive labor turnover rate.

7.4.3 Escalation

Escalation was included at the following rates: engineered equipment – 5% per annum; construction labor – 5% per annum; materials – 5% per annum; construction equipment – 5% per annum; engineering / construction management – 5% per annum. Escalation has not been included but is shown as an estimated value for two cases, a COD date of mid-2029 and a COD date of December 2029.

7.4.4 Project Contingency

A Project estimate contingency of 15% of the overall Project cost was included. It is included to cover accuracy of pricing and commodity estimates for the defined Project scope. This contingency is not intended to cover changes in the general Project scope (i.e. addition of buildings, addition of redundant equipment, addition of systems, etc.) nor major shifts in market conditions that could result in significant increases in contractor margins, major shortages of qualified labor, significant increases in escalation, or major changes in the cost of money (interest rate on loans).

The overall level of contingency is considered adequate to cover normal deviations in pricing and normal deviations in the assumptions used to develop the project costs. However, it is likely not adequate to cover significant deviations from the project assumptions or major changes in market conditions. Deviations that may cause the project costs to exceed the estimated costs inclusive of contingency include excessive inflation (>3%), extreme high demand for major equipment due to proposed regulations, extreme shortage of qualified labor, extreme shortage of qualified construction contractors, change in contracting approach, and other similar changes. Such changes may be reflective of a moderate to high amount of new power plant or industrial plant construction or plant environmental retrofits.

7.4.5 Owner's Costs & Contingency

Owner's costs as provided by EKPC are included in the estimate. Appendix R includes a listing of Owner's costs included in the estimate. An Owner's contingency of 10% of total Owner's cost was included in the estimate.

7.5 Risk Analysis

A project risk matrix was developed to highlight potential risks to the project as well as assumed mitigation. Major risks include the "first of a kind" design for the co-fire conversion of the Unit 3 and Unit 4 CFB's, labor uncertainty, late equipment delivery, adverse weather conditions, etc. The risk matrix is shown in Appendix P.

7.6 Cash Flow

A cash flow based on the Project schedule, contracting approach, and the cost estimate was developed and is included in Appendix S.

7.7 Operations & Maintenance Estimates

The differential (new vs. existing) operating and maintenance (O&M) cost for Spurlock was determined by comparing recent historical O&M costs to future estimated O&M costs based on plant operating experience. The Spurlock Units 1-4 Co-fire Project is estimated to reduce annual variable operating costs by approximately 46% and annual maintenance costs by approximately 4%.

7.8 Qualifications

BMcD's estimates, analysis, and recommendations contained in this report are based on professional experience, qualifications, and judgment. BMcD has no control over weather; cost and availability of labor, material, and equipment; labor productivity; energy or commodity pricing; demand or usage; population demographics; market conditions; changes in technology; and other economic or political

factors affecting such estimates, analysis, and recommendations. Therefore, BMcD makes no guarantee or warranty (actual, expressed, or implied) that actual results will not vary, perhaps significantly, from the estimates, analysis, and recommendations contained herein.

8.0 CONCLUSIONS AND RECOMMENDATIONS

8.1 Conclusions

The information and costs developed in this study will be used for EKPC board review of project viability. If the project is board approved, then Burns & McDonnell recommends the Owner proceed with Project execution activities in order to meet a COD as determined by the Owner. In effort to reduce Project cost and schedule risks, Burns & McDonnell recommends that the Owner consider the following activities prior to receiving RUS approval:

- Perform CFD modeling for Units 1 and 2 to finalize gas firing system design and configuration.
- Finalize CFD modeling for Units 3 & 4 to refine conceptual design of gas firing system.
- Negotiate and award gas firing system contract to allow vendor design and submittals to progress.
- Monitor other major equipment lead-times.
- Continue preparation of air permitting and other permitting applications.
- Use geotechnical findings from the investigation to refine civil and structural design basis.

Burns & McDonnell recommends Owner evaluate the project economics based on cost and performances presented in this report. If Plant economics are favorable, Burns & McDonnell recommends Owner proceed/continue with necessary project execution activities in order to meet a Substantial Completion date as determined by Owner.

APPENDIX A – SITE DESIGN CONDITIONS

SECTION 1.1 – SITE DESIGN CRITERIA

1.01 SUMMARY:

A. This Section summarizes the design criteria and parameters for the Spurlock Units 1, 2, 3, and 4 cofire project. Supplier shall use these criteria to develop budgetary pricing to furnish Equipment and Materials described herein.

B. The Materials specified are the minimum requirements and are not intended to limit to a single design approach. Supplier shall provide higher grade Materials where required to provide the specified service life.

C. Supplier shall provide Submittals sealed by a Professional Engineer, registered in the Commonwealth of Kentucky, as required by statute. This shall include, but is not limited to, structural drawings, calculations, and loads as required by Kentucky Building Code-2018.

1.02 SITE SPECIFIC DATA:

A. This Section includes the basic site/Project information and certain design criteria applicable to the Project. This information is general in nature and may be additionally defined within the Specifications. Where additionally defined or specified within the Specifications, the Specification criteria shall control. If additional specific information regarding the Site is required, Supplier shall obtain such information from Engineer.

B. Building Code of Record: All Work shall be in accordance with the Kentucky Building Code – 2018 including all appendices, amendments, reference standard(s), and the following:

1. Wind Design: Per Kentucky Building Code – 2018 and the following:
   a. Vult = 120 mph Basic Ground Wind Speed at 33 feet above ground (3-second gust) for Risk Category III and IV Building and other Structures.
   b. I_W = 1.00.
   c. Exposure C.
   d. No wind shielding shall be considered.
   e. Design to include Topographic K_{zt} and Directionality K_d Factors as applicable per code.
   f. Structures and equipment to be permanently located indoors shall be designed for no less than a 5 psf ‘wind’ load.
2. Snow Design: Per Kentucky Building Code – 2018 and the following:
   a. Ground snow load = 20 PSF.
   b. I_S = 1.1.
   c. Design to include Exposure C_e and Thermal C_t Factors as applicable per code.
   d. Design to include drifting increases when applicable due to adjacent structures.
   e. Include rain-on-snow load increase for ‘roof’ areas sloped less than ½ inch per foot.
3. Ice Loads: Per Kentucky Building Code – 2018 and the following:
   a. Nominal Ice Thickness t = 0.75 in.
   b. Concurrent Wind Speed V_c = 30 mph
   c. I_i = 1.25.
   d. I_W = 1.00.
4. Seismic Design: Per Kentucky Building Code – 2018 and the following:
   a. Seismic Importance Factor I_E = 1.25.
   b. Mapped Spectral Accelerations:
      (1) Short Period S_S = 0.168 g, S_{DS} = 0.18 g
      (2) 1-second Period S_1 = 0.076 g, S_{D1} = 0.122 g
   c. Site Class D.
5. Structures and Equipment shall be considered as Occupancy Category III.

C. Site Conditions:
1. Elevation:
a. Spurlock Power Station: Approximately 540 ft above mean sea level (MSL).
2. Unless otherwise noted, criteria referenced below is based on ASHRAE 2021 edition of climatic data for Cincinnati, OH (Station #724297).
3. Plant Site Frost Depth: Per Kentucky Building Code – 2018, a minimum depth of 30 in. or erecting on solid rock.
4. Precipitation:
a. Average Annual Rainfall: 41.1 inches.
b. Design Storm (24-hour, 10-year): NOAA Atlas 14

Duration	1-year Return Period	10-year Return Period	25-year Return Period	100-year Return Period
24-hour	2.44 inches	4.21 inches	5.05 inches	6.52 inches
6-hour	1.76 inches	3.07 inches	3.68 inches	4.75 inches
1-hour	1.17 inches	2.03 inches	2.40 inches	2.98 inches

5. HVAC Outdoor Design Temperatures:

HVAC Design Conditions						
Location	Cincinnati, OH		2021 ASHRAE Weather Station (WMO#)	724297		
Ambient Design Conditions						
Summer (F)		Winter (F)		50 Year Extreme Conditions (F)		
0.4%, DB/MCWB	1%, DB/MCWB	99.6%, DB	99%, DB	Min, DB	Max, DB	Max, WB
92.4/75.0	89.8/74.4	7.1	12.6	-20.5	104.3	85.4

D. Freeze protection design conditions: -20˚F with 20 mph coincident wind.
E. Noise control: All Equipment provided by Supplier shall be designed to comply with an average near-field noise requirement of 85 dBA measured 3 feet horizontally from the base of the equipment and 5 feet above floor level or personnel platform. Testing shall be performed in accordance with ASME PTC-36. In addition, provide octave band sound levels for each piece of Equipment furnished for Owner and Engineer review.

1.03 UTILITIES:

A. Compressed Air:

SERVICE	DEW POINT	PRESSURE	MAX. TEMP
Service Air	-40 °F	60 - 110 psig	125 °F
Instrument Air	-40 °F	60 - 110 psig	125 °F

B. Electrical Power:

VOLTAGE	PHASE	FREQUENCY HZ	USER

480 V	3	60	Motors (½ < HP ≤ 200)
120 V	1	60	Motors (≤ ½ HP)
120 V	1	60	Instrumentation
480 V	3	60	Welding Receptacles
208 V / 120 V	3	60	General Service / Lighting
120 V	1	60	Convenience receptacles
24 VDC	-	-	Controls – Digital Input
125 VDC	-	-	DC Power Supply

1.04 FUEL OIL SUPPLY:

A. Backup fuel: Ultra Low Sulphur Fuel Oil

PRODUCT SPECIFICATIONS

3.23.1 **SPECIFICATIONS FOR FUNGIBLE 15 ppm SULFUR DIESEL FUEL GRADE 62**

EPA Designation: MVNRLM, Motor vehicle diesel fuel, 15 ppm sulfur

Cancels Previous Issues of Grade 62

PRODUCT PROPERTY	ASTM Test Method	Test Results Minimum	Maximum	Note
Gravity API	D4052	30		
Flash Point, °F				
Pensky-Martin	D93	130		
Physical Distillation, °C(°F)	D86			[W]54
50%			Report	
90%		282(540)	338(640)	
End Point			366(690)	
or Simulated Distillation, °C(°F)	D2887			[W]54
50% recovered			Report	
90% recovered		300(572)	356(673)	
End Point			421(790)	
Color ASTM	D6045		2.5	
Color Visual		Undyed		
Viscosity, cSt @ 40°C (104°F)	D445	1.9	4.1	
Pour Point	D97			2
Cloud Point	D2500			2

Corrosion, 3 hrs. @ 50°C (122°F)	D130		1		
Total Sulfur, ppmwt	D5453		11	Origin	3
			14	Delivery	
Cetane Number	D613	40			[C]4
Aromatics (Volume %)	D1319		31.7		
or Aromatics by Cetane Index	D976	40			
Ash, wt.%	D482		0.01		
Carbon Residue: Ramsbottom					
on 10% Bottom	D524		0.35		
BS&W, vol.%	D2709				
	or equivalent		< 0.05		
Thermal stability, 90 minutes					
150°CPad rating,					
DuPont scale			7		
OR					
Thermal stability	D6468				
Y/Green		73%			
W Unit		65%			
OR					
Oxidation stability, mg/100 ml	D2274		2.5		
Haze rating @ 25°C (77°F)	D4176				
	Procedure 2		2		
Nace Corrosion	TM0172	B+ (Origin)			
Electrical					
Conductivity, pS/m @ 21°C(70°F)	D2624		250		

1.05 GENERAL EQUIPMENT DESIGN CRITERIA:

A. Equipment shall be designed for a service life of not less than 30 years.

B. Equipment and components located outdoors or exposed to outdoor temperatures shall be designed for operation and start up under cold temperature conditions down to the site extreme ambient minimum dry bulb temperature. This shall include protection of temperature sensitive electrical components. Pressure piping, vessels, valves, or other pressure components located outdoors shall be designed to meet the minimum outdoor design temperature without the need for reliance on heat tracing. This may require using ASTM A-333 and selecting valves suitable for cold weather service. Consideration for low temperature service shall be given to all design aspects, including all steel, selection of gaskets and seals, drainage of condensate, as well as ensuring materials are of sufficient ductility.

C. All equipment and materials shall be assembled at the factory prior to shipment to the fullest extent practical. Equipment shall be skid mounted on common skids with interconnecting piping and control wiring to the extent allowed within shipping constraints.

D. Furnished Equipment, Materials, and skid assemblies shall be rated for operation in a Class 1, Division 2, Group D hazardous (classified) location, as defined by NEC Articles 500 and 501. Conduit sealing compound shall not be installed until after the successful completion of factory testing and Owner approval.

E. All Equipment and Materials for the Project shall comply with the Occupational Safety and Health Administration (OSHA) Regulations and Standards 29CFR1910. If conflicts between Kentucky Building – 2018 and OSHA occur, Kentucky Building Code – 2018 shall control. All Work performed on Site shall comply with OSHA Regulations and Standards 29CFR1926 and 29CFR1926 Subpart R, and Kentucky OSHA Regulations and Standards.

F. All Work shall be in compliance with local, county, state, federal regulations, codes, standards, laws, and ordinances.

G. Asbestos and lead containing material is strictly prohibited in the Equipment furnished under this Contract.

H. Coating/Painting: Unless specified more explicitly in the technical Specifications, all equipment and manufactured components (valves, instruments, electrical cabinets, etc.) shall be factory finished with manufacturer's standard coating system suitable for the intended final service conditions and environment without need for any additional field painting. All exterior and interior structural steel shall be hot dip galvanized.

I. Standards of Design and Workmanship:
   1. The finished Work and/or product shall be complete in all respects. All hardware shall be manufactured, fabricated, assembled, finished, and documented with the workmanship of the highest quality throughout, and all of the components shall be new.
   2. The Work shall be carried out in accordance with best recognized practices and customary industry quality unless otherwise specified within the technical sections of this specification.

PART 2 - PRODUCTS - NOT APPLICABLE.

PART 3 - EXECUTION – NOT APPLICABLE.

END OF SECTION 1.1

APPENDIX B – SCOPE MATRIX

East Kentucky Power Cooperative
Spurlock Units 1-4 Cofire
Scope Assumptions Matrix

BURNS McDONNELL

		Y/N	Number	% Capacity (per Unit)	Notes
GENERAL PROJECT INFORMATION					
Project Description		-	-	-	Dual fuel conversion to allow Units 1, 2, 3, & 4 to operate on coal, natural gas, or a combination of both - up to 50% natural gas co-firing.
	Project Location	-	-	-	Maysville, Mason County, KY.
	Site Description	-	-	-	Existing brownfield site at Spurlock Power Station. Unit 1: 300-net MW pulverized coal; Unit 2: 510-net MW pulverized coal, 30MW equiv. steam to paper mill; Unit 3: 268-net MW circulating fluidized bed (CFB); Unit 4: 268-net MW CFB.
	Design Fuel	-	-	-	Current fuel: Sub-bituminous with high sulfur content (ILB - Illinois Basin Coal) New natural gas pipeline routed to site. Target up to 50% natural gas blending. Retain fuel oil igniter capabilities (ultra low sulfur fuel oil).
	Heat Rejection	-	-	-	No changes to existing main cooling system.
	Operation	-	-	-	Baseloaded with outages for maintenance
	Capacity Factor	-	-	-	Pending air permit modification
	Contracting Approach	-	-	-	Multi-prime.
	Labor	-	-	-	Union or Non-Union.
	Project Liquidated Damages	-	-	-	Schedule and performance for each contract.
	Project Bonding /LOC	-	-	-	100% Bonding.
	Project COD Dates	-	-	-	Dec-29
	Project Expansion	-	-	-	None considered
MECHANICAL SYSTEMS/EQUIPMENT					
STG					
	Heat Balance Study	Y	-	-	Perform heat balance study during execution.
	TWIPS Study	N	-	-	TWIPS study not included.
SCR & AMMONIA SYSTEM					
	Ammonia Flow Control Study Analysis	Y	4	100%	Add one mini skid at each unit.
	SCR Catalyst Study	Y	2	100%	Study reactivity of catalyst. Catalyst replacement not included in cost estimate. Applicable to Unit 1 & Unit 2. Economizer exit gas temperature prediction.
AUXILIARY STEAM					
	Aux Boiler	N	-	-	No aux boilers currently utilized. No gas-fired or dual fuel aux boilers to be included for startup.
	Reboiler	Y	1	100%	Include in REI study. Reboiler only gets heat from steam.
CIRCULATING WATER - N/A					
CLOSED COOLING WATER (CCW) - N/A					
COMPRESSED AIR					
	System Evaluation	Y	-	-	Study to evaluate compressed air capabilities. Procurement contract and cost of additional equipment (if needed) not included. BMcD will provide additional requirements.
CONDENSATE SYSTEM - N/A					
CHEMICAL FEED					
	Odorizer	N			Odorizer not included.
DEMINERALIZED WATER SYSTEM - N/A					
FEEDWATER SYSTEM - N/A					
FIRE PROTECTION					
	Design Basis	Y	-	-	NFPA 850 recommended practice.
	Insurer/special requirements	Y	-	-	FM Global
	Gas Detection and Fire Protection	Y	-	-	Gas detection and alarm.
	Hazardous Area Classification Study	Y	-	-	Cost for study during execution included.
	Remote I/O Room / Building	Y	-	-	Per NFPA 13. Coordinate with existing fire protection system.
FUEL OIL					
	Storage Tanks	N	-	-	Retaining existing capacity.
	Dual Fuel Study	Y	4	100%	Study dual fuel options and provide recommendation.
	Igniter & Warm-up Gun	Y	4	100%	No change to firing rate.
HVAC SYSTEMS					
	Remote I/O Room	Y	TBD	100%	As required for occupied buildings and electrical rooms
MAKE-UP WATER - N/A					
NATURAL GAS					
	General	Y	-	-	New off-site natural gas pipeline routed to site by Owner. No gas chromatograph.
	Compression	N	-	-	Not required. Minimum supply pressure to site is 200 psig.
	Metering & Regulation	N	-	-	Will be by gas supplier.
	Gas Yard - Units 1, 2, 3 & 4	Y	1	100%	
	Fuel Gas Filter Separator	Y	1	100%	
	Fuel Gas Drains Tank	Y	1	100%	
	Building Heating	N	-	-	No building included in pricing at gas yard. A canopy will be provided.
COMBUSTION FIRING SYSTEM					
	Combustion Air Evaluation	Y	-	-	Includes Units 1, 2, 3 & 4.
	Unit 1	Y	-	-	
	Emergency Safety Valve (NFPA 850)	Y	1	100%	
	FG/IG LP (low pressure) Control Skid	Y	2	100%	
	Dual Fuel Burner SSO (safety shutoff) Skid	Y	12	100%	1 SSO for each dual fuel burner
-	Dual Fuel Igniter SSO (safety shutoff) Skid	Y	4	100%	1 SSO for 3 dual fuel igniters, grouped per mill
	FG (Fuel Gas)/Coal Dual Fuel Burner	Y	12	100%	
	Dual Fuel Flame Detectors	Y	24	100%	2 per dual fuel burner, one for the fuel gas flame and one for igniter flame
	IG (Igniter Gas)/Oil Dual Fuel Igniter	Y	12	100%	One dual fuel igniter for each dual fuel burner
	Scanner/Igniter Cooling/Igniter Combustion Air Blower Skid (per vendor recommendation)	Y	1	100%	May or may not require this equipment, to study in detailed design
	FG Flow Meter	Y	2	100%	
	IG Flow Meter	Y	2	100%	
	Unit 2	Y	-	-	
	Emergency Safety Valve (NFPA 850)	Y	1	100%	
	FG/IG LP (low pressure) Control Skid	Y	1	100%	
	FG/IG combined SSO (safety shutoff) Skid	Y	8	100%	A/B, B/C, C/D, D/E, new gas burners. A/B and D/E retain oil capacity.
	FG (fuel gas) Burner	Y	8	100%	A/B, B/C, C/D, D/E, new gas burners. A/B and D/E retain oil capacity.
	Flame Detectors (gas only)	Y	16	100%	2 flame detectors per burner, one for the igniter flame and one for the fuel gas flame
	IG Igniters	Y	8	100%	
	Scanner/Igniter Cooling/Igniter Combustion Air Blower Skid (per vendor recommendation)	Y	1	100%	New equipment to be installed
	FG Flow Meter	Y	1	100%	
	IG Flow Meter	Y	1	100%	
	Unit 3 & 4 (Qty per Unit)	Y	-	-	
	Emergency Safety Valve (NFPA 850)	Y	1	100%	
	Gas Lance LP (low pressure) Control Skid	Y	2	100%	

BURNS McDONNELL

		Y/N	Number	% Capacity (per Unit)	Notes
	FG Lance SSO Skid	Y	9	100%	
	FG Lance, 110 mmBtu/hr	Y	7	100%	
	FG Lance, 85 mmBtu/hr	Y	9	100%	
	Combustion Air Supply Duct, SA-to-Lamces	Y	1	100%	
	Scanner/Igniter Cooling/Igniter Combustion Air Blower Skid (per vendor recommendation)	Y	1	100%	
	Lance Flow Meter	Y	2	100%	
POTABLE WATER - N/A					
SAMPLE ANALYSIS					
	Gas Chromatograph	N	-	-	Not included. Assumed will be M&R yard or gas supplier.
SANITARY SEWER - N/A					
STEAM					
	Steam Generator Heat Balance Evaluation	Y	3	100%	Included in Reaction Engineering International's CFD study.
	Reboiler Capacity Evaluation	Y	-	-	Evaluation inlcuded.
STEAM BYPASS - N/A					
WASTEWATER					
	Confirm MOC for equipment in from FGD inlet to stack outlet on all units.				Assume quenching or cooling the flue gas must be maintained even when firing on natural gas firing.
	Determine quencher (existing FGD) blowdown rate and estimate quality.				Assume rate will be equal or less than current rate.
	Evaluate the existing systems to treat the new blowdown flow and quality.				Assume existing WWT system can treat future wastewater.
COMPRESSED GAS - N/A					
CATHODIC PROTECTION					
	Underground Steel Piping	Y	-	-	Cathodic protection system will be galvanic anode type, if required.
	Underground Steel Tanks	N	-	-	
DEMOLITION		Y	-	-	TBD
FUTURE ACCOMMODATIONS		N	-	-	
CONTROLS					
Equipment Control					
	Plant Control System (DCS)	Y	-	-	Modify existing ABB DCS as necessary utilizing S800 I/O and BRC410 controllers. Upgrade existing equipment as necessary i.e. existing controller is block limited and a newer controller is necessary for additional blocks.
	Remote I/O	Y	-	-	Remote IO rather than long runs when possible
	Plant Historian	Y	-	-	Add points to existing historian. Will increase license as necessary.
	Offsite Interfaces	Y	-	-	Will update existing interfaces as necessary
Plant Simulator		Y	-	-	EKPC to confirm.
Instrumentation					
	Redundancy	Y	-	-	Critical processes/instruments
	Transmitters	Y	-	-	Plant standard
	HART	Y	-	-	Hardwire feedback is used for control
	Performance Testing	Y	-	-	
Continuous Emissions Monitoring System		N	-	-	Existing.
Communication		Y	-	-	Datalinks for Gas Chromatograph (if installed)
	Dispatching	Y	-	-	Modify as necessary. Do not foresee any change.
NERC CIP Requirements		Y	-	-	Design to CIP medium.
HMI		Y	-	-	No new HMI equipment. Modify existing graphics.
ELECTRICAL					
Generator Step-Up Transformers:					
	Steam Turbine	N	4	100%	Assume we will utilize existing STG GSU transformers and they are in good working condition.
Auxiliary/Reserve Transformers:					
	Reserve Auxiliary Transformer	N			
	Auxiliary	N		100%	Assume we will utilize existing auxiliary transformers and they are in good working condition.
Generator Buses:					
	Steam Turbine	N	4	100%	Self-cooled, Isolated Phase Bus: 1x100% for STG. Size based on capacity. Assume we will utilize existing IPB and they are in good working condition.
Generator Circuit Breakers:					
	Steam Turbine	N	4	100%	Generator Circuit Breaker in Isolated Phase Bus for Synchronization. Assume we will utilize existing GCBs and they are in good working condition.
Electrical Equipment Enclosures:		N	TBD	100%	Will expand existing DCS room.
Switchgear:					
	4160V Switchgear	N	-	-	Will need to perform tests to ensure existing equipment is in good working condition prior to adding/modifying loads. Breakers may need to be refurbished.
	480V Switchgear	N	-	-	Will need to perform tests to ensure existing equipment is in good working condition prior to adding/modifying loads. Breakers may need to be refurbished.
Motor Control Centers:					
	480 V MCCs	N	-	-	Will need to perform tests to ensure existing equipment is in good working condition prior to adding/modifying loads. Breakers/starters may need to be added through the course of the project depending on existing spare breaker/starter quantities.
Emergency Power:					
	Uninterruptible Power (UPS)	N	-	-	We will need to evaluate the condition of the UPS and capacity for any updates to existing system.
	DC System	N	-	-	We will need to evaluate the condition of the batteries and capacity for any updates to existing system.
Standby Diesel Generator		N	-	-	
Stand Alone Control Systems					
	Fire Protection/Detection	N	-	-	See fire protection section in Mechanical for details
	Plant HVAC	N	-	-	See HVAC section in Mechanical for details
	Building/Site Security	N	-	-	
	Plant Communications	N	-	-	

East Kentucky Power Cooperative
Spurlock Units 1-4 Cofire
Scope Assumptions Matrix

BURNS McDONNELL

		Y/N	Number	% Capacity (per Unit)	Notes
On-Line Battery Monitoring:		N	-	-	Assume an existing battery monitor is in place or is not desired.
Lighting					
	Normal	Y	-	-	Only lighting required for the project (upgrades / additions at the burner fronts) are included.
	Emergency Egress	N	-	-	
Grounding		Y	-	-	Any new equipment will be grounding through existing system.
Lightning Protection - N/A		N	-	-	
Freeze Protection		Y	-	-	Heat tracing designed to maintain 40F for fluids subject to freezing based on size and service
Electrical Studies:					
	Load Flow, voltage drop, short circuit	Y	-	-	Will perform a complete evaluation of the auxiliary system with deleted and added loads. Need to ensure short circuit, loading, and motor starting acceptable with new design.
	Protective coordination/relay settings	Y	-	-	Will need to evaluate protective device coordination and perform updates to settings for proper coordination and to minimize arc flash impacts.
	Arc Flash	Y	-	-	Will perform a complete arc flash risk assessment for the site.
Cabling		Y	-	-	New cable tray and conduit as needed. Will evaluate existing cable tray system for reuse where possible.
Transmission / Interconnection:		N	-	-	Per EKPC
TRANSMISSION					
Switchyard - N/A					
CIVIL/STRUCTURAL					
Existing Facilities		Y	-	-	Brownfield site.
Layout Considerations		Y	-	-	Reuse part of existing infrastructure and road from previous coal plant construction
Guardshack		N			Existing Spurlock gaurdshack used.
Site Security		-	-	-	Included in Owner's costs
Landscaping		N	-	-	Minimal landscaping included. Disturbed areas will be seeded for erosion control.
Fence		N	-	-	Assume existing perimeter security fence is adequate for new plant. Restore any disturbed fencing.
Disposal of Spoils		-	-	-	Excess spoils will be hauled off-site. Hazardous materials not accounted for in project estimate.
Soils Conditions / Stability		-	-	-	Use geotech report from CCR job as reference. No subsurface investigation is included in the scope of work for this PSR phase. Will incldue cost for investigation during execution.
Soil Improvement		N	-	-	No soil improvement is assumed. Use geotech report from CCR job as reference. No subsurface investigation is included in the scope of work for this PSR phase. Will incldue cost for investigation during execution.
Subsurface Rock		N	-	-	Assume no rock excavation required. Use geotech report from CCR job as reference. No subsurface investigation is included in the scope of work for this PSR phase. Will incldue cost for investigation during execution.
Subsurface water		N	-	-	Assume no engineered dewatering system (well-points). Use geotech report from CCR job as reference. No subsurface investigation is included in the scope of work for this PSR phase. Will incldue cost for investigation during execution.
Cut/Fill		Y	-	-	Use existing site materials to grade the site and avoid off-site borrow.
Disposal of debris		-	-	-	Disposed of off-site, as required.
Permanent Stormwater		-	-	-	Existing. New surface water drainage ditches and piping to collect and direct to offsite outfall. Regrading as required to follow existing drainage paths.
Construction Stormwater		-	-	-	Erosion control will be in accordance with state and local guidelines and regulations and will include best management practices such as silt fence, rock check dams, slope protection, construction exits, and stormwater pond(s) for construction and permanent. A SWPPP will be prepared during execution.
Roads		N	-	-	Existing plant roads to allow for deliveries via truck. Plan on new drive extension to M&R yard - rock surfacing.
Surfacing		N	-	-	It is assumed that no repaving will be required. If new maintenance roads are required, they will need to be covered with crushed rock.
Soil Bearing Capacity		-	-	-	Pressumptive soil bearing pressure values per IBC assumed for preliminary sizing during PSR. To be confirmed with subsurface investigation during execution.
Foundation type		-	-	-	Deep foundation system assumed for utility rack foundations. Shallow slab / mat foundations to frost depth assumed for miscellaneous equipment and minor support foundations that are lightly loaded.
Demolition (Foundation)		N	-	-	Assuming no demolition of existing foundations or modifications to existing foundations will need to be made.
Steel Modifications (Wall and Roof)		Y	-	-	Pipe penetrations in wall and roof panels included. Steel modifications and replacement of paneling, girts, ect. for equipment installation excluded unless specifically indicated in PSR deliverables.
Steel Modifications (Grating & Guardrail)		Y			Grating and guardrail modifications for boiler deck venting and boiler pipe supports included, as required. Existing paint likely to contain lead. Include abatement in pricing.
Maintenance cranes		N	-	-	
Access Platforms		Y	-	-	Assuming pipe venting extends 15'-0" above topmost structural steel elevation. Will provide support and access to vent for maintenance. Access platforms included around gas skids, as required. Assuming stair access unless otherise indicated in PSR deliverables.
Column/Beam Reinforcement		Y	-	-	Modifications and / or reinforcing of existing structural steel is included in the estimate based on preliminary pipe routing and past project experience. These assumption will be confirmed and / or revised during execution.
Structural Steel Supports		Y	-	-	Structural steel supports included, as required, for venting and boiler pipes, cable trays and potential ductwork. Assuming non-stressed pipe supports. Assumed gas line below grade from custody transfer point to units. No above grade pipe racks incldued.
Boiler Wall Modifications		Y	-	-	Included, as required, based on resutls of CFD model study.
Canopies / Enclosures		Y	-	-	Canopies for gas conditioning equipment included.
CONSTRUCTION					
Utilities					
	Power	Y	-	-	Construction power from existing Spurlock facility
	Communication	Y	-	-	Tie-in to existing system
	Construction Water	Y	-	-	Tie-in to existing Spurlock facility service water system
	Potable Water	Y	-	-	Tie-in to existing Spurlock facility potable water system
	Sanitary	Y	-	-	Portable facilities provided by construction contractors
Parking		Y	-	-	Temporary construction parking to be identified.
Gate Entry					
	Main	-	-	-	Existing Spurlock guard shack.

East Kentucky Power Cooperative
Spurlock Units 1-4 Cofire
Scope Assumptions Matrix

BURNS McDONNELL

		Y/N	Number	% Capacity (per Unit)	Notes
	Personnel/Craft	-	-	-	Existing Spurlock contractor entrance and guard shack.
	Delivery	-	-	-	Existing Spurlock contractor entrance and guard shack.
Construction Field Office / Trailers					
	Owner	Y	-	-	Trailers in Owners Costs.
	Engineer	Y	-	-	Trailers in Owners Costs.
	Vendors	Y	-	-	Trailers in Owners Costs.
	Contractors	Y	-	-	Trailers in Owners Costs.
	Site Services	Y	-	-	Trailers in Owners Costs.
Laydown area		Y	-	-	On site areas to be identified
Warehouses		Y	-	-	Existing warehouse is full; Contractor will provide necessary storage space during construction.
OWNER COSTS / MISC.					
Permits					
	See Permit Matrix	Y	-	-	EKPC w/ BMcD Support.
Owner's Costs					
	Project Development	Y	-	-	Allowance included in Owner Cost.
	Owner's Operations Personnel	Y	-	-	Allowance included in Owner Cost.
	Owner's Project Management	Y	-	-	Allowance included in Owner Cost.
	Owner's Engineer	N	-	-	
	Owner's Legal Counsel	Y	-	-	Allowance included in Owner Cost.
	Political Concessions / Area Development Fees	N	-	-	
	Permitting & License Fees	Y	-	-	Allowance included in Owner Cost.
	Land	N	-	-	Brownfield, existing
	Water Rights Costs	N	-	-	Existing
	Water Infrastructure and Supply to Site	N	-	-	Existing
	Natural Gas Infrastructure and Supply to Site	Y	-	-	Cost carried in separate project.
	Labor Camp	N	-	-	
	Permanent Plant Operating Spare Parts	N	-	-	
	Maintenance Tools & Equipment	N	-	-	
	Permanent Plant Equipment & Furnishings	N	-	-	
	Sales Tax	Y	-	-	Sales tax is excluded, other than for non-permanent consumables and supplies
	Escalation	N	-	-	All escalation excluded (during execution and for future start and COD)
	Owner's Contingency	Y	-	-	Allowance included in Owner Cost.
	Interest During Construction	N	-	-	Excluded
	Temporary Utilities	Y	-	-	Included in capital costs.
	Startup Testing Fuels and Consumables	Y	-	-	Allowance included in Owner Cost.
	Operator training	Y	-	-	Allowance included in Owner Cost.
	Owner's Construction Trailer	Y	-	-	Allowance included in Owner Cost.
	Site Security	N	-	-	By EKPC. Cost not included.
	Hazardous material abatement	Y	-	-	Sampling, testing, and abatement for lead paint. Allowance included in Owner Cost.
GENERAL ASSUMPTIONS					
	Reuse of Existing Equipment and Systems	Y	-	-	Existing equipment, piping, cables, etc. are in adequate working order and can be reused without modifications
EXCLUSIONS					
	Taxes	-	-	-	Sales, use, gross receipts, property, and other types.
	Insurance	-	-	-	Except Builder's Risk carried in Owner Cost.
	Sound abatement above normal supply	-	-	-	
	Aesthetic landscaping other than erosion control	-	-	-	
	High escalation assocated with extreme market conditions	-	-	-	
	Transmission / Interconnection	-	-	-	
	Financing fees	-	-	-	
	Interest during construction	-	-	-	

APPENDIX C – PROJECT DIVISION OF RESPONSIBILITY

East Kentucky Power Cooperative
Spurlock Units 1-4 Cofire
Division of Responsibility

Contract No.	Description	Design Criteria / Functional Design	Technical Specification RFP	Detailed Design	Procure / Supply	Fabricate / Deliver	Receive / Maintenance	Erect / Install	Power Wiring	Control Wiring	Testing	Start-up	Commissioning	Remarks
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
BMcD	**BMcD (Engineer/Construction Manager)**													
	Temporary Services													
	Dumpsters / Refuse / Recyclables	-	-	-	BMcD	BMcD	BMcD	-	-	-	-	-	-	
	Temporary Toilets	-	-	-	BMcD	BMcD	BMcD	-	-	-	-	-	-	
	Construction Trailers	-	-	-	BMcD	BMcD	BMcD	-	-	-	-	-	-	Craft Break Trailers
	Electrical Distribution Panels to Work	Contractors	Contractors	Contractors	Contractors	Contractors	Contractors	Contractors	Contractors	Contractors	Contractors	Contractors	Contractors	
	Parking	Owner	Owner	Owner	Owner	Owner	Owner	Owner	Owner	Owner	Owner	Owner	Owner	
	BMcD Construction Trailer	-	-	-	-	-	-	-	-	-	-	-	-	
	Trailer(s)				BMcD / Contractors	BMcD / Contractors	BMcD / Contractors							Contractors to provide trailers for their staff as necessary. BMcD will provide trailers for BMcD and Owner's staff.
	Card Readers / Security Entrance and Exit				Owner	Owner	Owner							
	Badges				Contractors	Contractors	Contractors							Contractors to provide badges with appropriate contract tracing requirements
	Gate Access Equipment (including call box stand)				Owner	Owner	Owner							
	Communication Phone/Internet				BMcD / Contractors	BMcD / Contractors	BMcD / Contractors							Each contractor to provide hot spots as needed for their on-site staff.
	Janitorial Services				BMcD	BMcD	BMcD							
	Potable Water				BMcD / Contractors	BMcD / Contractors	BMcD / Contractors							Each to supply water for their own employees
	Office Consumables				BMcD / Contractors	BMcD / Contractors	BMcD / Contractors							Each to supply office supplies for their own staff employees
Common	**Common Areas - Shared Site Items and Services**													
	Temporary Services	-	-	-	-	-	-	-	-	-	-	-	-	
	Dumpsters / Refuse / Recyclables				8110 / 8320	8110 / 8320	8110 / 8320							8110 will supply and maintain for all Project Contractors until 8320 takes over and maintain for all Project Contractors until Substantial Completion
	Hand Wash Stations				BMcD	BMcD	BMcD							
	Temporary Toilets				BMcD	BMcD	BMcD							
	Heated Bathroom Trailer (by Break Trailers)				BMcD	BMcD	BMcD							
	Miscellaneous				-	-	-							
	Snow Removal				8110 / 8320	8110 / 8320	8110 / 8320							Common Areas Only, Work Areas by each Contractor
Owner	**Owner Supplied**													
	Taxes	-	-	-	-	-	-	-	-	-	-	-	-	Owner to provide tax exemption certificate to BMcD and BMcD to provide to Suppliers and Contractors
	Insurance	BMcD	-	-	Supplier / Contractor	Supplier / Contractor	-	-	-	-	-	-	-	Each Supplier and Contractor to provide their own insurance.
	Builders Risk	Owner	Owner	Owner	Owner	Owner	Owner	Owner	Owner	Owner	Owner	Owner	Owner	
	Permitting	-	-	-	-	-	-	-	-	-	-	-	-	
	Natural Gas Supply Permitting	-	-	-	Owner	-	-	-	-	-	-	-	-	
	Water Rights	-	-	-	Owner	-	-	-	-	-	-	-	-	
	Environmental Assessment		-	-	Owner	-	-	-	-	-	-	-	-	
	NPDES Mods		-	-	Owner	-	-	-	-	-	-	-	-	
	Building Permits	-	-	-	Owner	-	-	-	-	-	-	-	-	
	LOTO's	Owner / BMcD / Contractors	-	-	-	-	-	-	-	-	-	-	-	BMcD's LOTO program will be met until the system is turned over to the plant.
	Hot Work Permits	Owner / BMcD / Contractors	-	-	-	-	-	-	-	-	-	-	-	
	Initial Fills & Consumables	-	-	-	Owner	-	-	8320	-	-	-	-	-	8320 to Support first fills
	Lubricating Oil	-	-	-	Owner	-	-	8320	-	-	-	-	-	8320 to Support first fills
	Natural Gas	-	-	-	Owner	-	-	-	-	-	-	-	-	
	Startup Power	-	-	-	Owner	-	-	-	-	-	-	-	-	
	Startup Water	-	-	-	Owner	-	-	-	-	-	-	-	-	
	Test Power Sales & Grid Coordination	-	-	-	Owner	-	-	-	-	-	-	-	-	
	Natural Gas Supply Infrastructure (Metering Yard)	-	-	-	Owner	-	-	-	-	-	-	-	-	
	Communications / Security Equipment	-	-	-	Owner	-	-	-	-	-	-	-	-	See Site Security Below
	Conmunications / Security Infrastructure	-	-	-	Owner	-	-	-	-	-	-	-	-	See Site Security Below
	Operating Spare Parts	-	-	-	Owner	Owner	Owner	Owner	-	-	-	-	-	
	Landscaping	-	-	-	Owner	Owner	Owner	Owner	-	-	-	-	-	
	Signage (Plant exterior permanent signage)	-	-	-	Owner	Owner	Owner	Owner	-	-	-	-	-	
	Construction Power Cost (metered)		-	-	Owner	-	-	-	-	-	-	-	-	
1240	**Gas Firing System**													
	IG (Igniter Gas)/Oil Dual Fuel Igniter	BMcD	BMcD	1240	1240	1240	8320	8320	8410	8410	BMcD/1240	BMcD/1240	BMcD/1240	
	Igniter Oil SSO (safety shutoff) Skid	BMcD	BMcD	1240	1240	1240	8320	8320	8410	8410	BMcD/1240	BMcD/1240	BMcD/1240	
	New Igniter Oil (IO) Equipment (per Vendor Recommendation)	BMcD	BMcD	1240	1240	1240	8320	8320	8410	8410	BMcD/1240	BMcD/1240	BMcD/1240	
	FG (Fuel Gas)/Coal Dual Fuel Burner	BMcD	BMcD	1240	1240	1240	8320	8320	8410	8410	BMcD/1240	BMcD/1240	BMcD/1240	
	Burner supports	BMcD	BMcD	1240	1240	1240	8320	8320	-	-	-	-	-	
	Combustion air flow register	BMcD	BMcD	1240	1240	1240	8320	8320	-	-	BMcD/1240	BMcD/1240	BMcD/1240	
	FG Flex Hoses	BMcD	BMcD	1240	1240	1240	8320	8320	-	-	-	-	-	
	IG (igniter gas) Flex Hoses	BMcD	BMcD	1240	1240	1240	8320	8320	-	-	-	-	-	
	Flame Detector	BMcD	BMcD	1240	1240	1240	8320	8320	8410	8410	BMcD/1240	BMcD/1240	BMcD/1240	
	Gaskets	BMcD	BMcD	1240	1240	1240	8320	8320	-	-	-	-	-	
	Gas Spuds	BMcD	BMcD	1240	1240	1240	8320	8320	-	-	BMcD/1240	BMcD/1240	BMcD/1240	
	High Energy Spark Igniters (HESI)	BMcD	BMcD	1240	1240	1240	8320	8320	8410	8410	BMcD/1240	BMcD/1240	BMcD/1240	

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Contract No.	Description	Design Criteria / Functional Design	Technical Specification RFP	Detailed Design	Procure / Supply	Fabricate / Deliver	Receive / Maintenance	Erect / Install	Power Wiring	Control Wiring	Testing	Start-up	Commissioning	Remarks
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	Linear actuator for burner register modulation	BMcD	BMcD	1240	1240	1240	8320	8320	8410	8410	BMcD/1240	BMcD/1240	BMcD/1240	
	Sight Glass	BMcD	BMcD	1240	1240	1240	8320	8320	-	-	-	-	-	
	Swirler	BMcD	BMcD	1240	1240	1240	8320	8320	-	-	-	-	-	
	FG/IG LP (low pressure) Control Skid	BMcD	BMcD	1240	1240	1240	8320	8320	8410	8410	BMcD/1240	BMcD/1240	BMcD/1240	
	Burner actuated shutoff valve	BMcD	BMcD	1240	1240	1240	8320	8320	8410	8410	BMcD/1240	BMcD/1240	BMcD/1240	
	Burner pressure regulating valve (PRV)	BMcD	BMcD	1240	1240	1240	8320	8320	8410	8410	BMcD/1240	BMcD/1240	BMcD/1240	
	Burner Automated Vent Valve	BMcD	BMcD	1240	1240	1240	8320	8320	8410	8410	BMcD/1240	BMcD/1240	BMcD/1240	
	Burner pressure indicating transmitter	BMcD	BMcD	1240	1240	1240	8320	8320	8410	8410	BMcD/1240	BMcD/1240	BMcD/1240	
	Igniter actuated shutoff valve	BMcD	BMcD	1240	1240	1240	8320	8320	8410	8410	BMcD/1240	BMcD/1240	BMcD/1240	
	Igniter automated vent valve	BMcD	BMcD	1240	1240	1240	8320	8320	8410	8410	BMcD/1240	BMcD/1240	BMcD/1240	
	Igniter pressure regulating valve (PRV)	BMcD	BMcD	1240	1240	1240	8320	8320	8410	8410	BMcD/1240	BMcD/1240	BMcD/1240	
	Igniter pressure indicating transmitter	BMcD	BMcD	1240	1240	1240	8320	8320	8410	8410	BMcD/1240	BMcD/1240	BMcD/1240	
	FG/IG combined SSO (safety shutoff) Skid	BMcD	BMcD	1240	1240	1240	8320	8320	8410	8410	BMcD/1240	BMcD/1240	BMcD/1240	
	FG Burner Gas Actuated Double Block Valve	BMcD	BMcD	1240	1240	1240	8320	8320	8410	8410	BMcD/1240	BMcD/1240	BMcD/1240	
	FG Burner Gas Actuated Vent Valve	BMcD	BMcD	1240	1240	1240	8320	8320	8410	8410	BMcD/1240	BMcD/1240	BMcD/1240	
	IG Actuated Double Block Valve	BMcD	BMcD	1240	1240	1240	8320	8320	8410	8410	BMcD/1240	BMcD/1240	BMcD/1240	
	IG Actuated Vent Valve	BMcD	BMcD	1240	1240	1240	8320	8320	8410	8410	BMcD/1240	BMcD/1240	BMcD/1240	
	Scanner/Igniter Cooling/Combustion Air Blower Skid	BMcD	BMcD	1240	1240	1240	8320	8320	8410	8410	BMcD/1240	BMcD/1240	BMcD/1240	
	Scanner/Igniter Cooling/Combustion Air Blower A	BMcD	BMcD	1240	1240	1240	8320	8320	8410	8410	BMcD/1240	BMcD/1240	BMcD/1240	
	Scanner/Igniter Cooling/Combustion Air Blower B	BMcD	BMcD	1240	1240	1240	8320	8320	8410	8410	BMcD/1240	BMcD/1240	BMcD/1240	
	Scanner/Igniter Cooling/Combustion Air Line Flex Hoses (per boiler)	BMcD	BMcD	1240	1240	1240	8320	8320	8410	8410	BMcD/1240	BMcD/1240	BMcD/1240	
	FG Flow Meter	BMcD	BMcD	1240	1240	1240	8320	8320	8410	8410	BMcD/1240	BMcD/1240	BMcD/1240	
	IG Flow Meter	BMcD	BMcD	1240	1240	1240	8320	8320	8410	8410	BMcD/1240	BMcD/1240	BMcD/1240	
2320	**General Service Pipe**													
	Below Grade BOP Pipe	BMcD	BMcD	2320	2320	2320	8110	8110	-	-	8110	-	-	
	Above Grade BOP Pipe	BMcD	BMcD	2320	2320	2320	8320	8320	-	-	8320	-	-	
2490	**Miscellaneous Piping Specials**													
	Burner Purge Hose	BMcD	BMcD	2490	2490	2490	8320	8320	-	-	-	-	-	
	Igniter Purge Hose	BMcD	BMcD	2490	2490	2490	8320	8320	-	-	-	-	-	
	Burner Stack Purge Hose	BMcD	BMcD	2490	2490	2490	8320	8320	-	-	-	-	-	
	Igniter Stack Purge Hose	BMcD	BMcD	2490	2490	2490	8320	8320	-	-	-	-	-	
	Burner LP Skid Purge Hose	BMcD	BMcD	2490	2490	2490	8320	8320	-	-	-	-	-	
	Burner LP Skid Purge Hose	BMcD	BMcD	2490	2490	2490	8320	8320	-	-	-	-	-	
	Igniter LP Skid Purge Hose	BMcD	BMcD	2490	2490	2490	8320	8320	-	-	-	-	-	
	Igniter LP Skid Purge Hose	BMcD	BMcD	2490	2490	2490	8320	8320	-	-	-	-	-	
	ESV Purge Hose	BMcD	BMcD	2490	2490	2490	8320	8320	-	-	-	-	-	
	FGC LP Sweep Hose	BMcD	BMcD	2490	2490	2490	8320	8320	-	-	-	-	-	
	Filter-Separator Purge Hose	BMcD	BMcD	2490	2490	2490	8320	8320	-	-	-	-	-	
	M&R Sweep Purge Hose	BMcD	BMcD	2490	2490	2490	8320	8320	-	-	-	-	-	
	Drain Tank Purge Hose	BMcD	BMcD	2490	2490	2490	8320	8320	-	-	-	-	-	
	FGC Yard Eyewash Station and Safety Shower	BMcD	BMcD	2490	2490	2490	8320	8320	8410	8410	8320	BMcD	BMcD	
	Backflow Preventers	BMcD	BMcD	2490	2490	2490	8320	8320	-	-	-	-	-	Eye wash potable water connection
2491	**Below Grade Piping Specials**													
	Fire Hydrants	BMcD	BMcD	2491	2491	2491	8110	8110	-	-	-	-	-	8110 to excavate & backfill for installation
	Post Indicator Valves	BMcD	BMcD	2491	2491	2491	8110	8110	-	-	-	-	-	8110 to excavate & backfill for installation
	Buried Valves	BMcD	BMcD	2491	2491	2491	8110	8110	-	-	-	-	-	8110 to excavate & backfill for installation
2521	**Low Pressure Cast Steel Valves**													
	Low Pressure Cast Steel Valves	BMcD	BMcD	2521	2521	2521	8320	8320	-	-	2521	BMcD	BMcD	
2531	**Special Service Control Valves**													
	Emergency Safety Valve (NFPA 850)	BMcD	BMcD	2531	2531	2531	8320	8320	8410	8410	2531	BMcD	BMcD	
2550	**Safety and Relief Valves**													
	Safety and Relief Valves	BMcD	BMcD	2550	2550	2550	8320	8320	-	-	2550	BMcD	BMcD	HP Fuel Gas Relief Valves
2570	**Fuel Gas Ball Valves**													
	High Pressure Fuel Gas Valves	BMcD	BMcD	2550	2550	2550	8320	8320	-	-	2550	BMcD	BMcD	High Pressure Fuel Gas Valves & Nitrogen Purge
2762	**Fuel Gas Conditioning**													
	Drains Tank	BMcD	BMcD	2762	2762	2762	8320	8320	8410	8410	2762 / BMcD	2762 / BMcD	2762 / BMcD	
	Fuel Gas Drains Tank Flame Arrestor	BMcD	BMcD	2762	2762	2762	8320	8320	-	-	2762 / BMcD	2762 / BMcD	2762 / BMcD	
	Coalescing Filter-Separator	BMcD	BMcD	2762	2762	2762	8320	8320	8410	8410	2762 / BMcD	2762 / BMcD	2762 / BMcD	
	Filter-Separator Sump/Drains Tank	BMcD	BMcD	2762	2762	2762	8320	8320	8410	8410	2762 / BMcD	2762 / BMcD	2762 / BMcD	
	Sump/Drains Tank Automated Drain Valve	BMcD	BMcD	2762	2762	2762	8320	8320	8410	8410	2762 / BMcD	2762 / BMcD	2762 / BMcD	
4520	**Fabricated Steel**													
	Pipe/Cable Tray rack and supports	BMcD	BMcD	BMcD	4520	4520	8320	8320	-	-	-	-	-	
	Equipment Support Framing & Access Grating Steel	BMcD	BMcD	BMcD	4520	4520	8320	8320	-	-	-	-	-	
	Existing Beam & Column Reinforcing	BMcD	BMcD	BMcD	4520	4520	8320	8320	-	-	-	-	-	
5120	**Auxiliary / Station Service Transformers**													
	MV Transformer	BMcD	BMcD	BMcD	5120	5120	8410	8410	8410	8410	5120 / 8410	BMcD	BMcD	
	Packaged UPS	BMcD	BMcD	BMcD	5120	5120	8410	8410	8410	8410	5120 / 8410	BMcD	BMcD	
	MV Cabling	BMcD	BMcD	BMcD	5120	5120	8410	8410	8410	8410	5120 / 8410	BMcD	BMcD	
	Power panelboards	BMcD	BMcD	BMcD	5120	5120	8410	8410	8410	8410	5120 / 8410	BMcD	BMcD	
	Small Dry-type transformers	BMcD	BMcD	BMcD	5120	5120	8410	8410	8410	8410	5120 / 8410	BMcD	BMcD	
5330	**480V Motor Control Centers & MV Switchgear**													
	MCC Bucket retrofit, testing and PM work.	BMcD	BMcD	5330/BMCD	5330	5330	8410	8410	8410	8410	8410/ 5330	BMcD / 5330	BMcD / 5330	
	MV SWGR testing, retrofit and PM work.	BMcD	BMcD	5330/BMCD	5330	5330	8410	8410	8410	8410	8410/ 5330	BMcD / 5330	BMcD / 5330	

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6110	**Distributed Control System**													
	BOP DCS	BMcD	BMcD	6110	6110	6110	8410	8410	8410	8410	BMcD / 6110	BMcD / 6110	BMcD / 6110	
	Controls Console	BMcD	BMcD	6110	6110	6110	8410	8410	8410	8410	BMcD	BMcD	BMcD	
6210	**Instruments**													
	Instruments	BMcD	BMcD	6210	6210	6210	8320	8320	8410	8410	BMcD / 6210	BMcD	BMcD	Calibrated in Factory
	Pressure/Temperature/Flow Transmitters	BMcD	BMcD	6210	6210	6210	8320	8320	8410	8410	BMcD / 6210	BMcD	BMcD	
	Pressure Gauges	BMcD	BMcD	6210	6210	6210	8320	8320	-	-	BMcD / 6210	BMcD	BMcD	
	Temperature Gauges	BMcD	BMcD	6210	6210	6210	8320	8320	-	-	BMcD / 6210	BMcD	BMcD	
	Flow Elements	BMcD	BMcD	6210	6210	6210	8320	8320	-	-	BMcD / 6210	BMcD	BMcD	
8110	**Site Preparation / Foundation / UG Utilities**													
	Temporary Services													
	Construction Water	-	-	-	8110	8110	8110	8110	-	-	-	-	-	for Contractors Work from Contractor furnished terminal point.
	Construction Temporary Power & Maintenance	-	-	-	8110	8110	8110	8110	-	-	-	-	-	Temporary Power to be provided by Contractor via generators until the temporary power is available from Owner. Temp Power will be shared by all Contractors onsite when they mobilize. Contractor is responsible for temp power for Contractors Work from Contractor furnished
	Snow Removal	-	-	-	-	-	8110	8110	-	-	-	-	-	Main site entrance road, plant roads and for Contractors Work Snow Removal responsibility will be turned over to 8110 / 8320 following their mobilization
	Barricades	-	-	-	8110	8110	8110	8110	-	-	-	-	-	
	Construction Trailers	-	-	-	8110	8110	8110	-	-	-	-	-	-	
	Site Maintenance		-	-	-	-	-	-	-	-	-	-	-	
	Erosion control and SWPPP	BMcD	BMcD	BMcD	8110	8110	8110	8110	-	-	-	-	-	
	Dust Control	-	-	-	-	-	8110	8110	-	-	-	-	-	While onsite Responsibility will be turned over to 8320 following 8110 demobilization
	Miscellaneous		-	-	-	-	-	-	-	-	-	-	-	
	Testing: Compaction, Concrete	BMcD	BMcD	-	8110	-	-	-	-	-	8110	-	-	
	Licensing	-	-	-	8110	8110	8110	-	-	-	-	-	-	for Contractors Work
	Vapor barrier(s)	BMcD	BMcD	BMcD	8110	8110	8110	8110	-	-	-	-	-	
	Survey & Layout including setting permanent benchmarks	BMcD	BMcD	8110	8110	8110	-	8110	-	-	-	-	-	Responsible for establishing site monuments & benchmarks. Establish one control drawing for project.
	Civil Work		-	-	-	-	-	-	-	-	-	-	-	
	Clearing, stripping, and stock piling - including all trees, limbs, stumps, and brush.	BMcD	BMcD	BMcD	8110	8110	8110	8110	-	-	-	-	-	
	Stabilized Construction Entrance(s)	BMcD	BMcD	BMcD	8110	8110	8110	8110	-	-	8110	-	-	
	Temporary Roads: Heavy Haul, Laydown, Parking, Trailers, Equipment storage, and assembly areas	BMcD	BMcD	BMcD	8110	8110	8110	8110	-	-	8110	-	-	To remain in place at end of project. All areas to be re-dressed, skimmed, leveled, and graded to drain (as required) upon completion
	Fencing - Temporary	BMcD	BMcD	BMcD	8110	8110	8110	8110	-					
	Geotextile and 6" Aggregate Surfacing		-	-	-	-	-	-	-	-	-	-	-	
	Laydown Areas		BMcD	BMcD	8110	8110	8110	8110	-	-	8110	-	-	
	Construction Parking		BMcD	BMcD	8110	8110	8110	8110	-	-	8110	-	-	
	Construction Trailer Area		BMcD	BMcD	8110	8110	8110	8110	-	-	8110	-	-	
	Earthwork, Grading, Trenching	BMcD	BMcD	BMcD	8110	8110	8110	8110	-	-	8110	-	-	Materials assumed to be non-hazardous.
	Stormwater Drainage Piping		BMcD	BMcD	8110	8110	8110	8110	-	-	8110	-	-	
	Dewatering		-	-	-	-	-	-	-	-	-	-	-	
	Stormwater Management during construction		BMcD	BMcD	8110	8110	8110	8110	-	-	-	-	-	
	Rough and Final Grading & Drainage	BMcD	BMcD	BMcD	8110	8110	8110	8110	-	-	8110	-	-	Materials assumed to be non-hazardous.
	Site Finishes		-	-	-	-	-	-	-	-	-	-	-	
	Site Restoration including reseeding	BMcD	BMcD	BMcD	8110	8110	8110	8110	-	-	-	-	-	All disturbed areas to be restored.
	Remove Silt Fencing		BMcD	BMcD	8110	8110	8110	8110	-	-	-	-	-	
	Pipe Bollards	BMcD	BMcD	BMcD	8110	8110	8110	8110	-	-	-	-	-	
	Fencing - Permanent	BMcD	BMcD	BMcD	8110	8110	8110	8110	-	-	-	-	-	
	Concrete Surfacing, including sidewalks and curbs	BMcD	BMcD	BMcD	8110	8110	8110	8110	-	-	-	-	-	
	Repair to Ashpalt Road Surfaces		BMcD	BMcD	8110	8110	8110	8110	-	-	-	-	-	
	Foundations - formwork, shoring/bracing, appurtenances, embeds, cast-in-place anchor bolts, curing, sealing	-	-	-	-	-	-	-	-	-	-	-	-	
	Fuel Gas Conditioning Yard Foundations	BMcD	BMcD	BMcD	8110	8110	8110	8110	-	-	8110	-	-	
	Emergency Safety Valve Skid Foundation	BMcD	BMcD	BMcD	8110	8110	8110	8110	-	-	8110	-	-	
	Flow Meter Foundations	BMcD	BMcD	BMcD	8110	8110	8110	8110	-	-	8110	-	-	
	Low Point Drain Isolation Valve Foundations	BMcD	BMcD	BMcD	8110	8110	8110	8110	-	-	8110	-	-	
	Nitrogen Purge Foundations	BMcD	BMcD	BMcD	8110	8110	8110	8110	-	-	8110	-	-	
	Pigging Station Foundations	BMcD	BMcD	BMcD	8110	8110	8110	8110	-	-	8110	-	-	
	Miscellaneous Pipe & Cable Tray Support Foundations	BMcD	BMcD	BMcD	8110	8110	8110	8110	-	-	8110	-	-	
	Minor Foundations	-	-	-	-	-	-	-	-	-	-	-	-	
	Door Stoops and Approach Slabs	BMcD	BMcD	BMcD	8110	8110	8110	8110	-	-	8110	-	-	To be protected down below frost line.
	Ladder and Stair Landings	BMcD	BMcD	BMcD	8110	8110	8110	8110	-	-	8110	-	-	Not required to be protected down to frost
	Excavation, backfill and compaction for all civil, mech and elec	BMcD	BMcD	BMcD	8110	8110	8110	8110	-	-	8110	-	-	
	Mechanical Underground(s) - piping, fittings.	-	-	-	-	-	-	-	-	-	-	-	-	

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	Potable Water System		BMcD	BMcD	2320	2320	8110	8110	-	-	8110	-	-	
	Connection to Site Potable Water Main	BMcD	BMcD	BMcD	2320	2320	8110	8110	-	-	8110	BMcD	BMcD	Including Hot Tap; Inspection/permit cost by BMcD
	Fire Protection System		BMcD	BMcD	2320	2320	8110	8110	-	-	8110	BMcD	BMcD	
	Connection to Site Fire Protection Water Main		BMcD	BMcD	2320	2320	8110	8110	-	-	8110	8110	8110	Including Hot Tap; Inspection/permit cost by BMcD
	Fuel Gas System		BMcD	BMcD	2320	2320	8110	8110	-	-	8110	BMcD	BMcD	
	Electrical Underground(s)	-	-	-	-	-	-	-	-	-	-	-	-	
	Duct bank(s), electrical conduit, turn-ups, pull boxes	BMcD	BMcD	BMcD	8110	8110	8110	8110	-	-	8110	8410	8410	Concrete, reinforcing & embeds by 8110
	Handholes / Manholes	BMcD	BMcD	BMcD	8110	8110	8110	8110	-	-	-	-	-	
	Grounding Grid	BMcD	BMcD	BMcD	8110	8110	8110	8110	-	-	8110	8410	8410	
8210	**Piling**													
	Temporary Services													
	Construction Water	-	-	-	8210	8210	8210	8210	-	-	-	-	-	for Contractors Work from Contractor furnished terminal point.
	Construction Temporary Power & Maintenance	-	-	-	8210	8210	8210	8210	-	-	-	-	-	Temporary Power to be provided by Contractor via generators until the temporary power is available from Owner. Temp Power will be shared by all Contractors onsite when they mobilize. Contractor is responsible for temp power for Contractors Work from Contractor furnished
	Construction Trailers	-	-	-	8210	8210	8210	-	-	-	-	-	-	
	Miscellaneous	-	-	-	-	-	-	-	-	-	-	-	-	
	Survey & Layout	BMcD	BMcD	BMcD	8210	8210	8210	8210	-	-	8210	8210	8210	
	Test Piling	BMcD	BMcD	BMcD	8210	8210	8210	8210	-	-	8210	-	-	
	Material Testing	BMcD	BMcD	BMcD	8210	-	-	-	-	-	8210	-	-	
	Production Piles	-	-	-	-	-	-	-	-	-	-	-	-	
	Pipe Rack	BMcD	BMcD	BMcD	8210	8210	8210	8210	-	-	-	-	-	
8320	**Mechanical Construction**													
	Temporary Services													
	Construction Water	-	-	-	8320	8320	8320	8320	-	-	-	-	-	for Contractors Work from Contractor furnished terminal point.
	Construction Temporary Power & Maintenance	-	-	-	8320	8320	8320	8320	-	-	-	-	-	Temporary Power to be provided by Contractor via generators until the temporary power is available from Owner. Temp Power will be shared by all Contractors onsite when they mobilize. Contractor is responsible for temp power for Contractors Work from Contractor furnished
	Construction Trailers	-	-	-	8320	8320	8320	-	-	-	-	-	-	
	Miscellaneous	-	-	-	-	-	-	-	-	-	-	-	-	
	Survey & Layout	BMcD	BMcD	BMcD	8320	8320	8320	8320	-	-	8320	8320	8320	
	Initial Fills & Consumables		-	-	Owner	-	8320	-	-	-	-	8320	8320	8320 to Support first fills for chemicals, oils, gases, and fuels
	Post-Installed Anchor Bolts	-	-	-	-	-	-	-	-	-	-	-	-	
	Equipment	BMcD	BMcD	BMcD	8320	8320	8320	8320	-	-	-	-	-	
	Pipe Supports & Supplemental Steel	BMcD	BMcD	BMcD	8320	8320	8320	8320	-	-	-	-	-	
	Electrical Supports		BMcD	BMcD	8320	8320	8320	8320	-	-	-	-	-	
	Building Penetrations (Interior & Exterior)	-	-	-	-	-	-	-	-	-	-	-	-	
	Misc exterior wall and roof penetrations sealing	BMcD	BMcD	N/A	8320 / 8410	8320 / 8410	8320 / 8410	8320 / 8410	-	-	-	-	-	All penetrations by other Contractors shall be sealed by the respective Contractor.
	Mechanical Aboveground(s) - piping, fittings, hardware to / from tie-in(s) to / from terminal point(s)	-	-	-	-	-	-	-	-	-	-	-	-	
	Instrument Air System	BMcD	BMcD	BMcD	2320	2320	8320	8320	-	-	8320	BMcD	BMcD	
	Compressed Gas System		BMcD	BMcD	2320	2320	8320	8320	-	-	8320	BMcD	BMcD	
	Fuel Gas System	BMcD	BMcD	BMcD	2320	2320	8320	8320	-	-	8320	BMcD	BMcD	
	Fuel Oil System		BMcD	BMcD	2320	2320	8320	8320	-	-	8320	BMcD	BMcD	
	Service Water System		BMcD	BMcD	2320	2320	8320	8320	-	-	8320	BMcD	BMcD	
	Potable Water System	BMcD	BMcD	BMcD	2320	2320	8320	8320	-	-	8320	BMcD	BMcD	
	Miscellaneous Structural Steel Erection		-	-	-	-	-	-	-	-	-	-	-	
	Platform Structures		BMcD	BMcD	4520	4520	8320	8320	-	-	8320	-	-	
	Pipe Support Supplemental Steel		BMcD	BMcD	4520	4520	8320	8320	-	-	8320	-	-	
	Stairs		BMcD	BMcD	4520	4520	8320	8320	-	-	8320	-	-	
	Ladders		BMcD	BMcD	4520	4520	8320	8320	-	-	8320	-	-	
	Handrail		BMcD	BMcD	4520	4520	8320	8320	-	-	8320	-	-	
	Grating/Floor Plate		BMcD	BMcD	4520	4520	8320	8320	-	-	8320	-	-	
	Canopies		BMcD	BMcD	4520	4520	8320	8320	-	-	8320	-	-	
	Existing Steel Framing Reinforcing		BMcD	BMcD	4520	4520	8320	8320	-	-	8320	-	-	
	Instrument Tubing, fittings, valves	BMcD	BMcD	BMcD	6210	6210	8320	8320	-	-	8320	BMcD	BMcD	As required for Instrument and actuated valve installations.
	Grouting	-	-	-	-	-	-	-	-	-	-	-	-	
	Structural steel	BMcD	BMcD	BMcD	8320	8320	8320	8320	-	-	8320	-	-	
	Pipe Supports	BMcD	BMcD	BMcD	8320	8320	8320	8320	-	-	8320	-	-	
	Equipment	BMcD	BMcD	BMcD	8320	8320	8320	8320	-	-	8320	-	-	
	Field Coating		-	-	-	-	-	-	-	-	-	-	-	
	Coating of all field welds	BMcD	BMcD	BMcD	8320	8320	8320	8320	-	-	-	-	-	
	Touch-up (All Pipe and Equipment)	BMcD	BMcD	BMcD	8320	8320	8320	8320	-	-	-	-	-	
	Insulation and Lagging		-	-	-	-	-	-	-	-	-	-	-	

East Kentucky Power Cooperative
Spurlock Units 1-4 Cofire
Division of Responsibility

Contract No.	Description	Design Criteria / Functional Design	Technical Specification RFP	Detailed Design	Procure / Supply	Fabricate / Deliver	Receive / Maintenance	Erect / Install	Power Wiring	Control Wiring	Testing	Start-up	Commissioning	Remarks
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	Equipment Insulation / Personnel Protection		BMcD	BMcD	8320	8320	8320	8320	-	-	-	-	-	
	Piping Insulation / Personnel Protection	BMcD	BMcD	BMcD	8320	8320	8320	8320	-	-	-	-	-	
	Scaffolding (areas as required for consturction activities)		BMcD	BMcD	8320	8320	8320	8320	-	-	-	-	-	
8410	**Electrical Installation**													
	Temporary Services	-	-	-	-	-	-	-	-	-	-	-	-	
	Construction Water	-	-	-	8410	8410	8410	8410	-	-	-	-	-	for Contractors Work from Contractor furnished terminal point.
	Construction Temporary Power & Maintenance	BMcD	BMcD	BMcD	8410	8410	8410	8410	8410	-	8410 (for initial main power connections)	BMcD (for initial main power connections)	BMcD (for initial main power connections)	Temp Power will be shared by all Contractors onsite when they mobilize. Contractor is responsible for temp power for Contractors Work from Contractor furnished terminal point.
	Construction Trailers	-	-	-	8410	8410	8410	-	-	-	-	-	-	
	Wiring / Raceway / Accessories & Appurtenances	-	-	-	-	-	-	-	-	-	-	-	-	
	Above Grade Conduit	BMcD	BMcD	BMcD	8410	8410	8410	8410	-	-	-	-	-	
	Cable Tray	BMcD	BMcD	8410	8410	8410	8410	8410	-	-	-	-	-	
	Medium Voltage Cable Pulls/Terminations	BMcD	BMcD	BMcD	8410	8410	8410	8410	8410	8410	8410	BMcD	BMcD	
	600V Power Cable Pulls/Terminations		BMcD	BMcD	8410	8410	8410	8410	8410	8410	8410	BMcD	BMcD	
	Instrumentation & Control Cable Pulls/Terminations		BMcD	BMcD	8410	8410	8410	8410	8410	8410	8410	BMcD	BMcD	
	Network/Fiber Cable Pulls/Terminations	BMcD	BMcD	BMcD	8410	8410	8410	8410	8410	8410	-	-	-	
	Pull Boxes/Junction Boxes		BMcD	BMcD	8410	8410	8410	8410	8410	8410	8410	BMcD	BMcD	
	Lighting & Devices (Fixtures, Receptacles, Contactors, Photocells, Disconnect Switches)	BMcD	BMcD	BMcD	8410	8410	8410	8410	8410	8410	8410	BMcD	BMcD	
	Above Grade Grounding and bus bars	BMcD	BMcD	BMcD	8410	8410	8410	8410	-	-	8410	-	-	
	Power Distribution Equipment retrofit (MCC buckets)	BMcD	BMcD	BMcD	5330	5330	8410	8410	8410	8410	8410	BMcD	BMcD	
	Transformers	BMcD	BMcD	BMcD	5120 / 5130	5120 / 5130	8410	8410	8410	8410	8410	BMcD	BMcD	
	UPS Equipment (Packaged)	BMcD	BMcD	BMcD	5430	5430	8410	8410	8410	8410	8410	BMcD	BMcD	
	Panelboards													
	Lightning Protection		-	-	-	-	-	-	-	-	-	-	-	
	Lightning Protection		BMcD	8410	8410	8410	8410	8410	8410	-	-	-	-	
	Heat Trace		-	-	-	-	-	-	-	-	-	-	-	
	Heat Trace Cable, Junction Boxes, Disconnects, Etc.		BMcD	8410	8410	8410	8410	8410	8410	8410	8410	BMcD	BMcD	
	Instrumentation & Controls		-	-	-	-	-	-	-	-	-	-	-	
	Instrument Stands		BMcD	8410	8410	8410	8410	8410	-	-	-	-	-	
	Instrument Enclosures		BMcD	8410	8410	8410	8410	8410	8410	8410	8410	BMcD	BMcD	
9010	**Subsurface Investigation**													
	Geotechnical Investigation	-	BMcD	-	-	-	-	-	-	-	9010	-	-	
9020	**Surveying**													
	Surveying	-	BMcD	-	-	-	-	-	-	-	9020	-	-	
9030	**Pilot Trenching**													
	Pilot Trenching	-	BMcD	-	-	-	-	-	-	-	9030	-	-	
9130	**Medical Services**													
	Medical Services	-	BMcD	-	-	-	-	-	-	-	9130	-	-	
9230	**Electrical Testing**													
	Electrical Testing	BMcD	BMcD	9230	-	-	-	-	-	-	9230	-	-	Detailed design referring to testing plans, procedures, etc. as required
9250	**Performance Testing**													
	Burners	BMcD	BMcD	BMcD	9250	9250	-	-	-	-	9250	9250	9250	Need to Review with CTG OEM
	Igniters		BMcD	BMcD	9250	9250	-	-	-	-	9250	9250	9250	Need to Review with HRSG OEM
	Emissions Testing	-	BMcD	BMcD	9250	9250	-	-	-	-	9250	9250	9250	
9260	**Emisions Testing**													
	Emissions Testing	BMcD	BMcD	BMcD	9260	9260	-	-	-	-	9260	9260	9260	
9270	**Noise Testing**													
	Noise Testing	BMcD	BMcD	BMcD	9270	9270	-	-	-	-	9270	9270	9270	
9400	**O&M Manuals and Training**													
	O&M Manuals / Training Manuals	BMcD	BMcD	BMcD	9400	9400	-	-	-	-	-	-	-	
	Training	BMcD	BMcD	BMcD	9400	9400	-	-	-	-	-	-	-	
9610	**Start-up Cleaning Services**													
	Fuel Gas Pipe Pigging	BMcD	BMcD	BMcD	9610	9610	9610	9610	-	-	9610 / BMcD	9610 / BMcD	9610 / BMcD	
	Fuel Gas Pipe Air Blows	BMcD	BMcD	BMcD	9610	9610	9610	9610	-	-	9610 / BMcD	9610 / BMcD	9610 / BMcD	

APPENDIX D – EQUIPMENT LIST

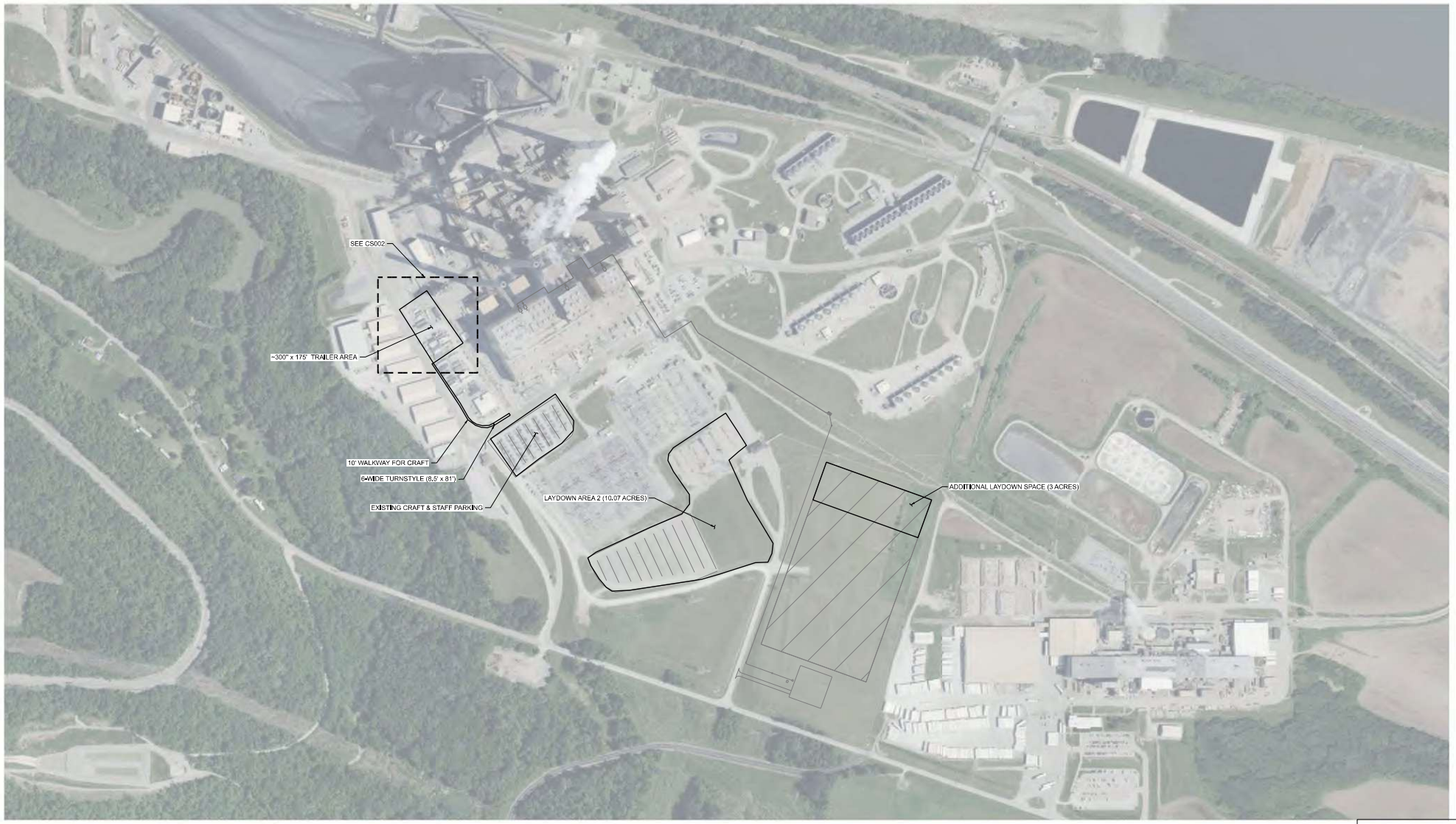
East Kentucky Power Cooperative
Spurlock Units 1-4 Cofire
Equipment List

Furnish By	Description	Tag No.	# Qty	Ins. Thick	Heat Trace	Recv'd By	Install By	Power Wiring	Control Wiring	Anchor Bolts	Grout	Location	Component	Voltage	Phase	Rated Power (kW)	Notes
1240	**Gas Firing System**																
	Unit 1																
	FG/IG LP (low pressure) Control Skid		2	0"	N	8320	8320	8410	8410	Post-installed	N/A	Unit 1	4 actuated valves				
	FG actuated shutoff valve		4	0"	N	N/A	N/A	N/A	N/A	N/A	N/A	Unit 1	Solenoid Valve	125 VDC		Estimate 0.1	Pneumatic actuator with 125 VDC solenoid valve
	FG Flow Control Valve (FCV)		2	0"	N	N/A	N/A	N/A	N/A	N/A	N/A	Unit 1					Spring and diaphragm actuator with positioner
	FG FCV (100% redundant train)		2	0"	N	N/A	N/A	N/A	N/A	N/A	N/A	Unit 1					Spring and diaphragm actuator with positioner
	FG pressure indicating transmitter		6	0"	N	N/A	N/A	N/A	N/A	N/A	N/A	Unit 1					
	IG actuated shutoff valve		4	0"	N	N/A	N/A	N/A	N/A	N/A	N/A	Unit 1	Solenoid Valve	125 VDC		Estimate 0.1	Pneumatic actuator with 125 VDC solenoid valve
	IG Flow Control Valve (FCV)		2	0"	N	N/A	N/A	N/A	N/A	N/A	N/A	Unit 1					
	IG FCV (100% redundant train)		2	0"	N	N/A	N/A	N/A	N/A	N/A	N/A	Unit 1					
	IG pressure indicating transmitter		6	0"	N	N/A	N/A	N/A	N/A	N/A	N/A	Unit 1					
	Burner SSO (safety shutoff) Skid		12	0"	N	8320	8320	8410	8410	N/A	N/A	Unit 1	3 Actuated Valves; Solenoids	125 VDC		Estimate 0.1 Each	
	Igniter SSO (safety shutoff) Skid		4	0"	N	8320	8320	8410	8410	N/A	N/A	Unit 1	3 Actuated Valves; Solenoids	125 VDC		Estimate 0.1 Each	
	FG (Fuel Gas)/Coal Dual Fuel Burner		12	0"	N	8320	8320	8410	8410	N/A	N/A	Unit 1					Burner Register Assumed at 5000 lbs Burner Nozzle Assumed at 1500 lbs Tube Panels not Included at this time
	Combustion air flow register		12	0"	N	N/A	N/A	N/A	N/A	N/A	N/A	Unit 1					
	Flame Detector		24	0"	N	N/A	N/A	8410	8410	N/A	N/A	Unit 1					1 flame detector per dual fuel burner = 12 flame detectors 1 flame detector per dual fuel igniter = 12 flame detectors 24 FLAME DETECTORS, TOTAL"
	Gaskets		12	0"	N	N/A	N/A	N/A	N/A	N/A	N/A	Unit 1					
	Gas Spuds		12	0"	N	N/A	N/A	N/A	N/A	N/A	N/A	Unit 1					
	Linear actuator for burner register modulation		12	0"	N	N/A	N/A	8410	8410	N/A	N/A	Unit 1	120 VAC			TBD	Will have separate junction box
	Sight Glass		12	0"	N	N/A	N/A	N/A	N/A	N/A	N/A	Unit 1					
	Swirler		12	0"	N	N/A	N/A	N/A	N/A	N/A	N/A	Unit 1					
	IG (Igniter Gas)/Oil Dual Fuel Igniter		12	0"	N	8320	8320	8410	8410	N/A	N/A	Unit 1	Spark Igniter	120 VAC		0.24 kW	2.31 Starting Amps
	FG Burner Flex Hoses		12	0"	N	8320	8320	N/A	N/A	N/A	N/A	Unit 1					
	IG Igniter Flex Hoses		12	0"	N	8320	8320	N/A	N/A	N/A	N/A	Unit 1					
	Scanner/Igniter Cooling/Igniter Combustion Air Blower Skid (per vendor recommendation)		1	0"	N	8320	8320	8410	8410	N/A	N/A	Unit 1	2 blowers				2x100% blowers on each skid; Estimate 10 hp, 480 VAC each
	Scanner/Igniter Cooling/Combustion Air Blower A		1	0"	N	N/A	N/A	N/A	N/A	N/A	N/A	Unit 1	Motor	480 VAC	3	Estimate 10	
	Scanner/Igniter Cooling/Combustion Air Blower B		1	0"	N	N/A	N/A	N/A	N/A	N/A	N/A	Unit 1	Motor	480 VAC	3	Estimate 10	
	Scanner Air/Igniter Cooling Air/Igniter Combustion Air Line Flex Hoses		36	0"	N	8320	8320	N/A	N/A	N/A	N/A	Unit 1					
	FG Flow Meter		2	0"	N	8320	8320	8410	8410	N/A	N/A	Unit 1					Shipped loose and installed in BOP piping
	IG Flow Meter		2	0"	N	8320	8320	8410	8410	N/A	N/A	Unit 1					Shipped loose and installed in BOP piping
	Unit 2																
	FG/IG LP (low pressure) Control Skid		1	0"	N	8320	8320	8410	8410	Post-installed	N/A	Unit 2	4 actuated valves			Estimate 0.1 Each	
	FG actuated shutoff valve		2	0"	N	N/A	N/A	N/A	N/A	N/A	N/A	Unit 2	Solenoid Valve	125 VDC		Estimate 0.1	Pneumatic actuator with 125 VDC solenoid valve
	FG Flow Control Valve (FCV)		1	0"	N	N/A	N/A	N/A	N/A	N/A	N/A	Unit 2					Spring and diaphragm actuator with positioner
	FG FCV (100% redundant train)		1	0"	N	N/A	N/A	N/A	N/A	N/A	N/A	Unit 2					Spring and diaphragm actuator with positioner
	FG pressure indicating transmitter		3	0"	N	N/A	N/A	N/A	N/A	N/A	N/A	Unit 1					
	IG actuated shutoff valve		2	0"	N	N/A	N/A	N/A	N/A	N/A	N/A	Unit 2	Solenoid Valve	125 VDC		Estimate 0.1	Pneumatic actuator with 125 VDC solenoid valve
	IG Flow Control Valve (FCV)		1	0"	N	N/A	N/A	N/A	N/A	N/A	N/A	Unit 2					
	IG FCV (100% redundant train)		1	0"	N	N/A	N/A	N/A	N/A	N/A	N/A	Unit 2					
	IG pressure indicating transmitter		3	0"	N	N/A	N/A	N/A	N/A	N/A	N/A	Unit 2					
	FG/IG combined SSO (safety shutoff) Skid		8	0"	N	8320	8320	8410	8410	N/A	N/A	Unit 2	6 Actuated Valves; Solenoids	125 VDC		Estimate 0.1 Each	
	FG (Fuel Gas) Burner		8	0"	N	8320	8320	8410	8410	N/A	N/A	Unit 2					
	Burner supports		8	0"	N	N/A	N/A	N/A	N/A	N/A	N/A	Unit 2					
	Combustion air flow register		8	0"	N	N/A	N/A	N/A	N/A	N/A	N/A	Unit 2					
	Gaskets		8	0"	N	N/A	N/A	N/A	N/A	N/A	N/A	Unit 2					
	Gas Spuds		8	0"	N	N/A	N/A	N/A	N/A	N/A	N/A	Unit 2					
	Linear actuator for burner register modulation		8	0"	N	N/A	N/A	8410	8410	N/A	N/A	Unit 2		120 VAC		TBD	Will have separate junction box
	Sight Glass		8	0"	N	N/A	N/A	N/A	N/A	N/A	N/A	Unit 2					
	Swirler		8	0"	N	N/A	N/A	N/A	N/A	N/A	N/A	Unit 2					
	Flame Detectors		16	0"	N	8320	8320	8410	8410	N/A	N/A	Unit 2					

East Kentucky Power Cooperative
Spurlock Units 1-4 Cofire
Equipment List

Furnish By	Description	Tag No.	# Qty	Ins. Thick	Heat Trace	Recv'd By	Install By	Power Wiring	Control Wiring	Anchor Bolts	Grout	Location	Component	Voltage	Phase	Rated Power (kW)	Notes
	IG Igniter		8	0"	N	8320	8320	8410	8410	N/A	N/A	Unit 2	Spark Igniter	120 VAC		0.24 kW	2.31 Starting Amps
	FG Burner Flex Hoses		8	0"	N	8320	8320	N/A	N/A	N/A	N/A	Unit 2					
	IG Igniter Flex Hoses		8	0"	N	8320	8320	N/A	N/A	N/A	N/A	Unit 2					
	Scanner/Igniter Cooling/Igniter Combustion Air Blower Skid (per vendor recommendation)		1	0"	N	8320	8320	8410	8410	N/A	N/A	Unit 2	2 blowers				2x100% blowers on each skid; Estimate 10 hp, 480 VAC each
	Scanner/Igniter Cooling/Combustion Air Blower A		1	0"	N	N/A	N/A	N/A	N/A	N/A	N/A	Unit 2	Motor	480 VAC	3	Estimate 10	
	Scanner/Igniter Cooling/Combustion Air Blower B		1	0"	N	N/A	N/A	N/A	N/A	N/A	N/A	Unit 2	Motor	480 VAC	3	Estimate 10	
	Scanner Air/Igniter Cooling Air/Igniter Combustion Air Line Flex Hoses		24	0"	N	8320	8320	N/A	N/A	N/A	N/A	Unit 2					
	FG Flow Meter		1	0"	N	8320	8320	8410	8410	N/A	N/A	Unit 2					Shipped loose and installed in BOP piping
	IG Flow Meter		1	0"	N	8320	8320	8410	8410	N/A	N/A	Unit 2					Shipped loose and installed in BOP piping
	Units 3 & 4 (Quantities per Unit)																
	Gas Lance LP (low pressure) Control Skid		2	0"	N	8320	8320	8410	8410	N/A	No	Units 3 & 4	2 actuated valves				
	Lance actuated shutoff valve		4	0"	N	N/A	N/A	N/A	N/A	N/A	N/A	Units 3 & 4	Solenoid Valve	125 VDC		Estimate 0.1	Pneumatic actuator with 125 VDC solenoid valve
	Lance Flow Control Valve (FCV)		2	0"	N	N/A	N/A	N/A	N/A	N/A	N/A	Units 3 & 4					Spring and diaphragm actuator with positioner
	Lance FCV (100% redundant train)		2	0"	N	N/A	N/A	N/A	N/A	N/A	N/A	Units 3 & 4					Spring and diaphragm actuator with positioner
	FG Lance SSO Skid, one per lance		9	0"	N	8320	8320	8410	8410	N/A	N/A	Units 3 & 4	3 Actuated Valves; Solenoids			Estimate 0.1 Each	
	FG Lance		16	0"	N	8320	8320	8410	8410	N/A	N/A	Units 3 & 4					
	FG Lance Flex Hoses		16	0"	N	8320	8320	N/A	N/A	N/A	N/A	Units 3 & 4					
	Lance Flow Meter		2	0"	N	8320	8320	8410	8410	N/A	N/A	Units 3 & 4					Shipped loose and installed in BOP piping
	Common Equipment																
2520	**Manual and Actuated valves**																
1240	Emergency Safety Valve (NFPA 850)		4	0"	N	8320	8320	8410	8410	N/A	N/A	Units 1, 2, 3 & 4	Solenoid Valve	125 VDC		Estimate 0.1	
	LP Skid Burner Outlet Automated Vent Valve		3	0"	N	8320	8320	8410	8410	N/A	N/A	Units 1, 2, 3 & 4	Solenoid Valve	125 VDC		Estimate 0.1	
	LP Skid Igniter Outlet Automated Vent Valve		3	0"	N	8320	8320	8410	8410	N/A	N/A	Units 1, 2, 3 & 4	Solenoid Valve	125 VDC		Estimate 0.1	
	LP Skid Lance Outlet Automated Vent Valve		4	0"	N	8320	8320	8410	8410	N/A	N/A	Units 3 & 4	Solenoid Valve	125 VDC		Estimate 0.1	
2762	**Fuel Gas Conditioning**																
	Y-Strainer		1	2"	Y	N/A	N/A	N/A	N/A	N/A	N/A	Fuel Gas Conditioning Yard					In line stainer
	Filter-Coealscer Skid		1	2"	Y	8320	8320	8410	8410	Post-installed	2"	Fuel Gas Conditioning Yard					
	Sump/Drains Tank Automated Drain Valve		1	0"	N	N/A	N/A	N/A	N/A	N/A	N/A	Fuel Gas Conditioning Yard	Solenoid Valve	125 VDC		Estimate 0.1	
	Filter Vessel Level Indicator with Switch		2	2"	Y	N/A	N/A	N/A	N/A	N/A	N/A	Fuel Gas Conditioning Yard					
	Filter Vessel Differential Pressure Transmitter		1	2"	Y	N/A	N/A	N/A	N/A	N/A	N/A	Fuel Gas Conditioning Yard					

APPENDIX E – PRELIMINARY PROJECT SCOPING DRAWINGS



PRELIMINARY - NOT FOR CONSTRUCTION

no.	date	by	ckd	description
B	9/20/24	AB	RNO	ISSUED WITH PSR
A	07/10/24	AB	RNO	UPDATE FOR 50% GAS CO-FIRE

OVERALL SITE PLAN

0 200' 400'
SCALE IN FEET

NORTH

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
Burns & McDonnell Engineering Company, Inc
FIRM LICENSE NO. 43

designed E. LIEN | detailed C. JACOBS

EAST KENTUCKY POWER COOPERATIVE

MASON COUNTY, KENTUCKY

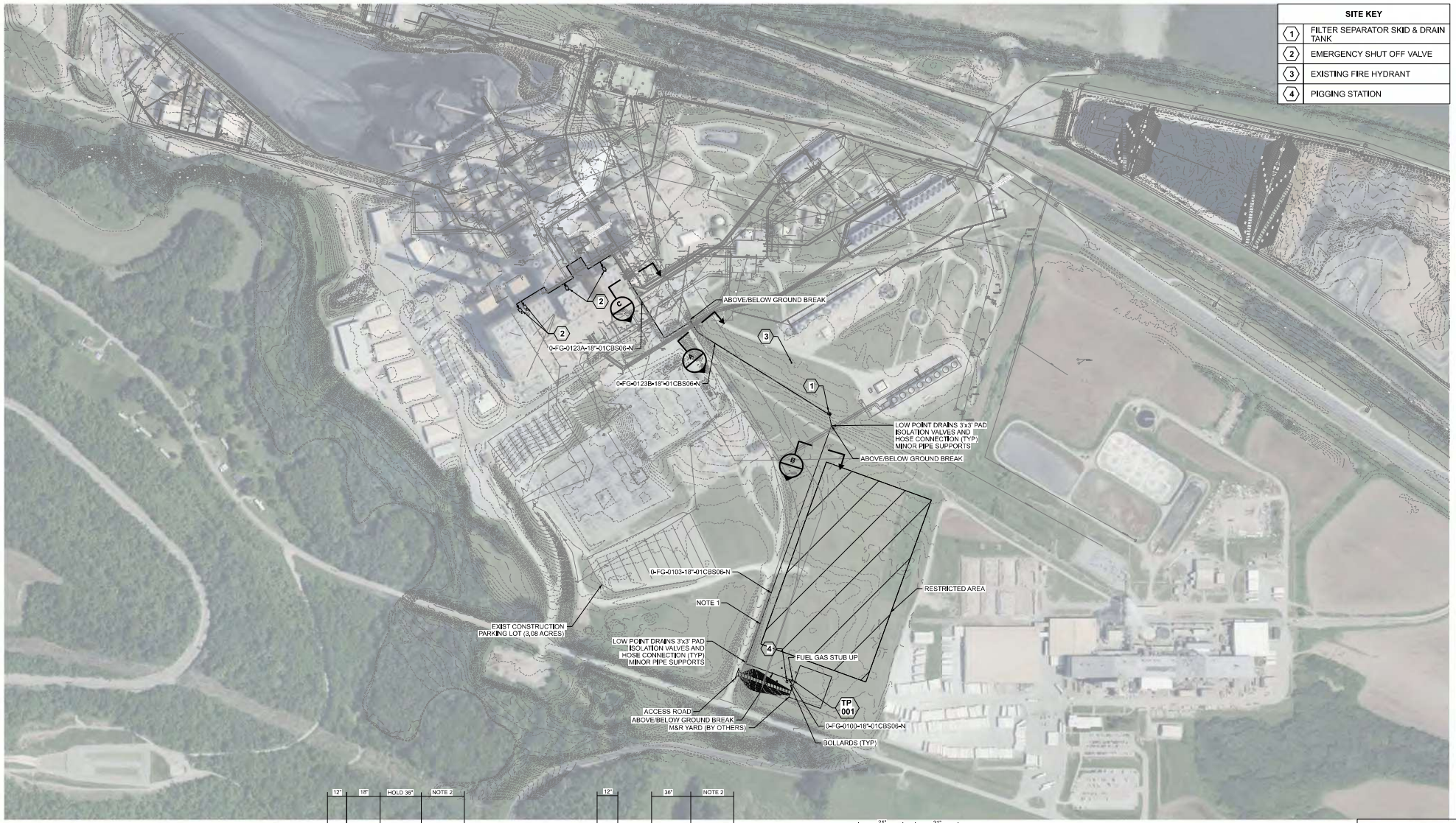
SPURLOCK POWER STATION
CONSTRUCTION FACILITIES PLAN
OVERALL SITE PLAN

project 164714 | contract

drawing **CS001** — rev. **B**

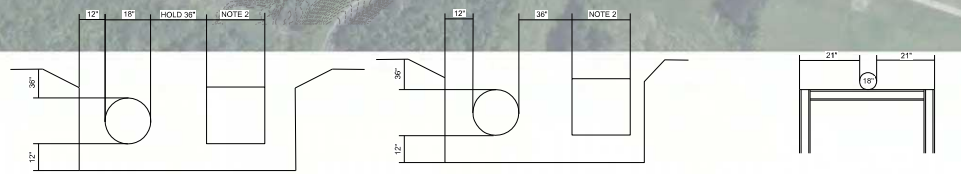
sheet of sheets

file 164714CS001.DGN



NOTES:

1. PIPE DEPTH SHALL BE NO LESS THAN 36" BELOW GRADE, UNLESS DIRECTED OTHERWISE.
2. DUCT BANK DETAILS SHALL BE PER ELECTRICAL DETAILS.



BELOW GRADE CROSS SECTION A
NOT TO SCALE

BELOW GRADE CROSS SECTION B
NOT TO SCALE

PIPE RACK CROSS SECTION C
NOT TO SCALE

PRELIMINARY - NOT FOR CONSTRUCTION

no.	date	by	ckd	description
B	9/20/24	AB	RNO	ISSUED WITH PSR
A	07/10/24	AB	RNO	UPDATE FOR 50% GAS CO-FIRE

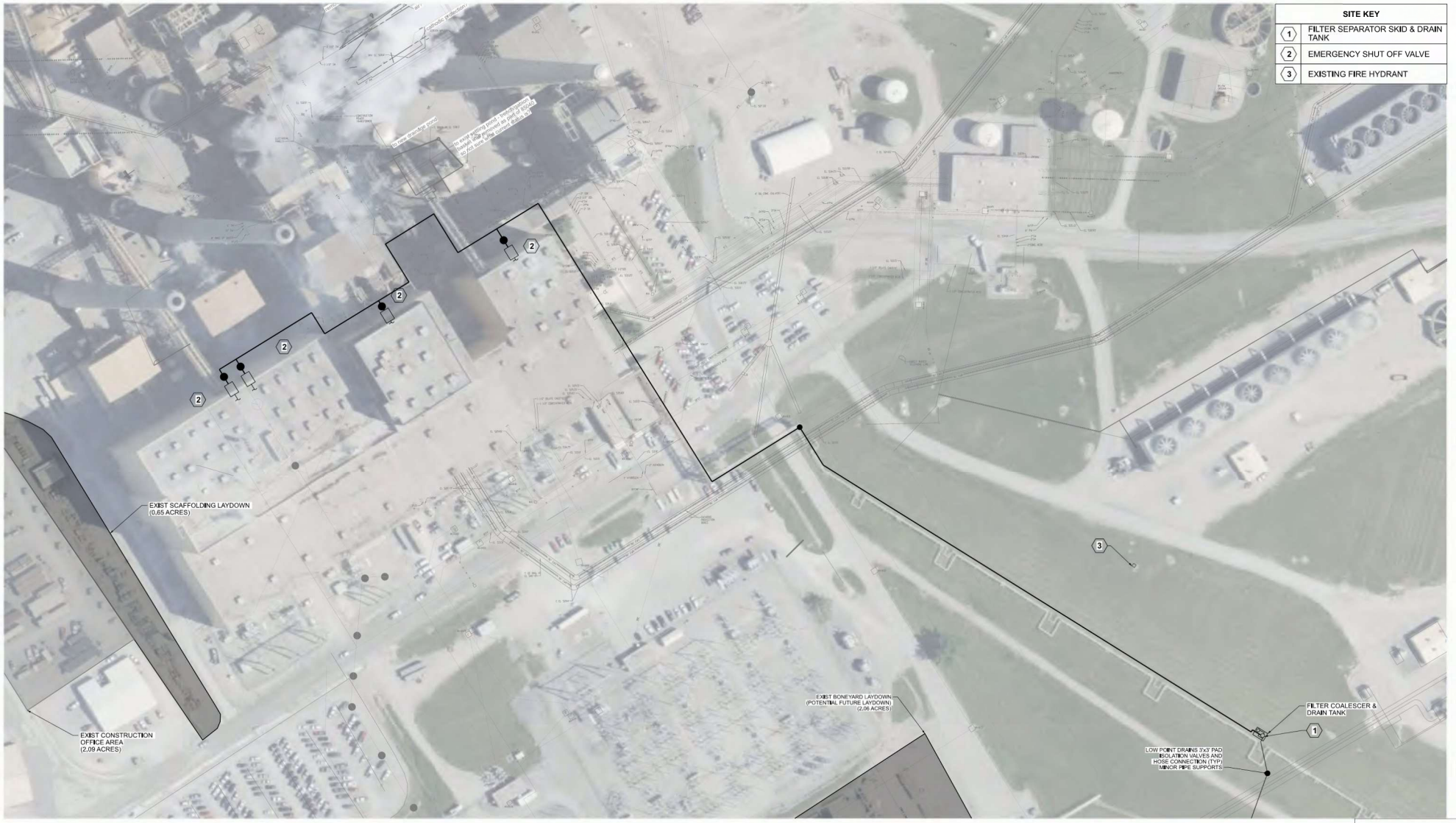
OVERALL SITE PLAN
0 200' 400'
SCALE IN FEET

NORTH

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
Burns & McDonnell Engineering Company, Inc
FIRM LICENSE NO. 43
designed A. VENTURA
detailed C. JACOBS

EAST KENTUCKY POWER COOPERATIVE
MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION
GRADING PLAN
project 164714
contract
drawing GA001
rev. B
sheet of sheets
file 164714GA001.DGN



PRELIMINARY - NOT FOR CONSTRUCTION

no.	date	by	ckd	description
B	9/20/24	AB	RNO	ISSUED WITH PSR
A	07/10/24	AB	RNO	UPDATE FOR 50% GAS CO-FIRE

OVERALL SITE PLAN

0 60' 120'
SCALE IN FEET

NORTH

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
Burns & McDonnell Engineering Company, Inc
FIRM LICENSE NO. 43

designed A. VENTURA | detailed C. JACOBS

EAST KENTUCKY POWER COOPERATIVE

MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION

GAS CONDITIONING YARD PLAN

project 164714 | contract

drawing GA002 — rev. B

sheet of sheets

file 164714GA002.DGN

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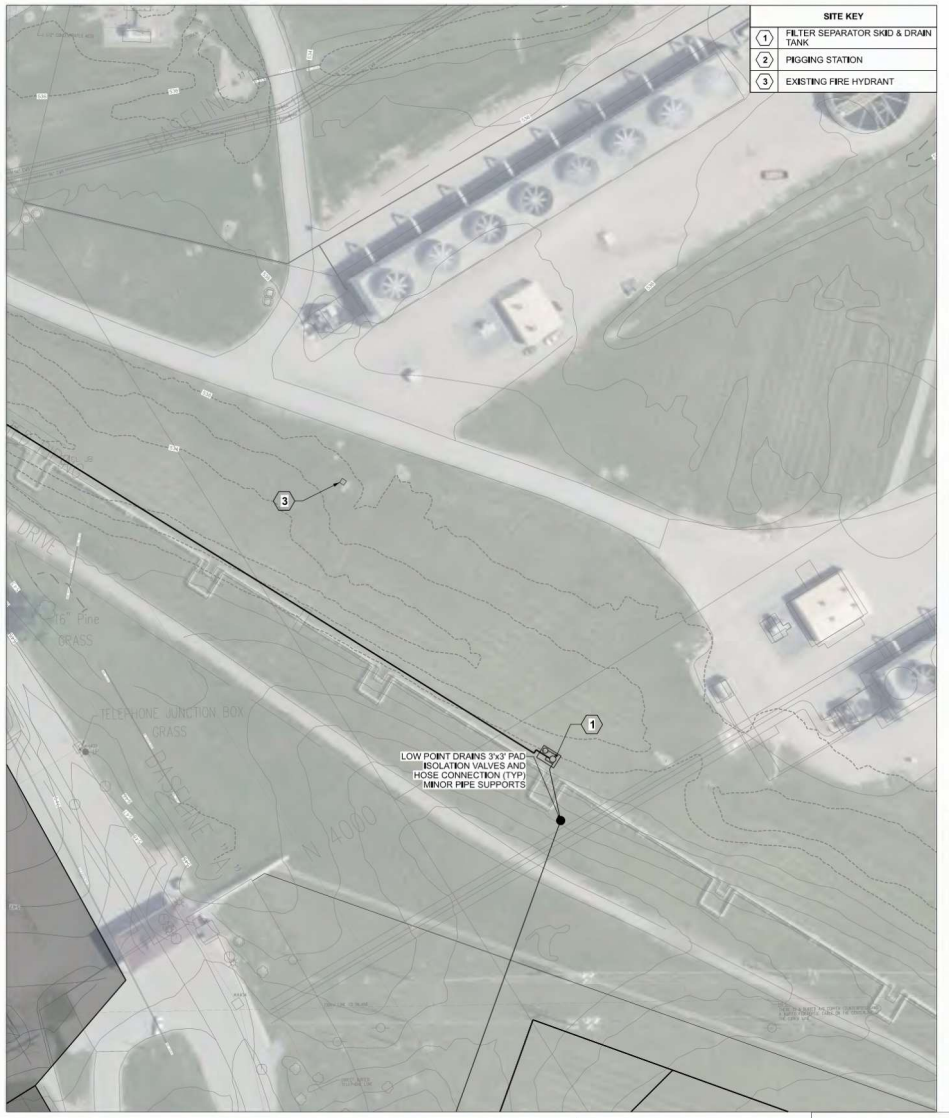
7/12/2024

0 50' 100'
SCALE IN FEET

NORTH



0 50' 100'
SCALE IN FEET

NORTH

PRELIMINARY - NOT FOR CONSTRUCTION

no.	date	by	ckd	description
B	9/20/24	AB	RNO	ISSUED WITH PSR
A	07/10/24	AB	RNO	UPDATE FOR 50% GAS CO-FIRE

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
Burns & McDonnell Engineering Company, Inc
FIRM LICENSE NO. 43
designed A. VENTURA
detailed C. JACOBS

EAST KENTUCKY POWER COOPERATIVE

MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION

SITE PLAN

project 164714 | contract

drawing **GA003** | rev. **B**

sheet of sheets

file 164714GA003.DGN

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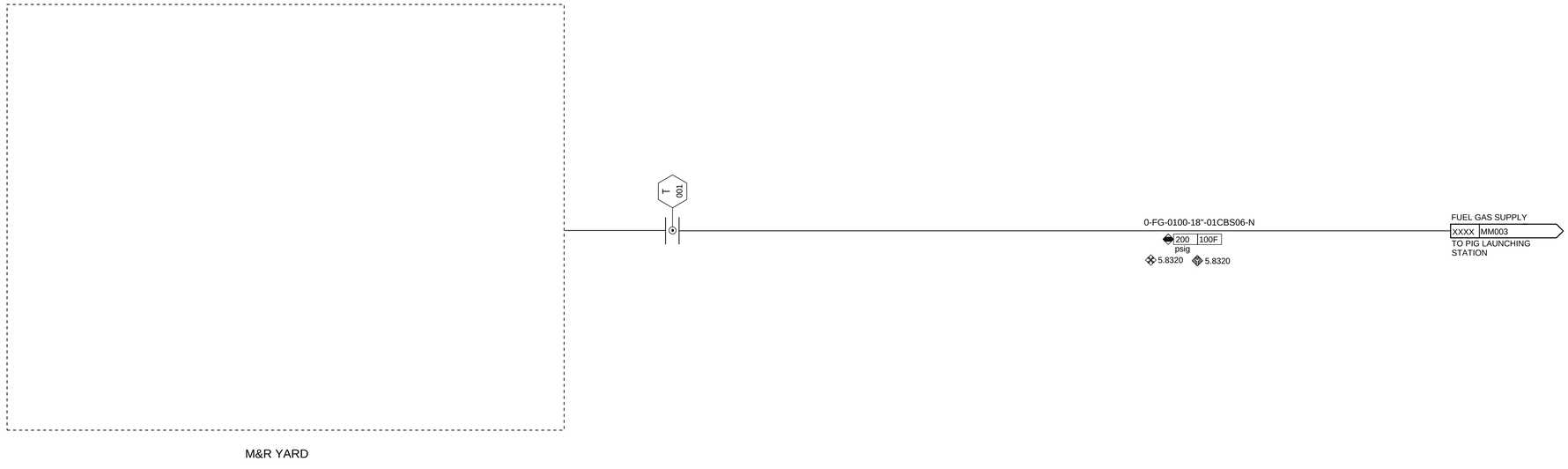
7/12/2024



Scale For Microfilming
Millimeters
Inches

PRELIMINARY - NOT FOR CONSTRUCTION

no.	date	by	ckd	description
C	9/20/24	AB	AB	ISSUED WITH PSR
B	06/13/24	AB	AB	IFOR - UPDATED FOR 50% GAS
A	02/02/24	AB	MED	ISSUED FOR OWNER REVIEW

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO. 43

designed: A. BHALCHANDRA
detailed:

EAST KENTUCKY POWER COOPERATIVE

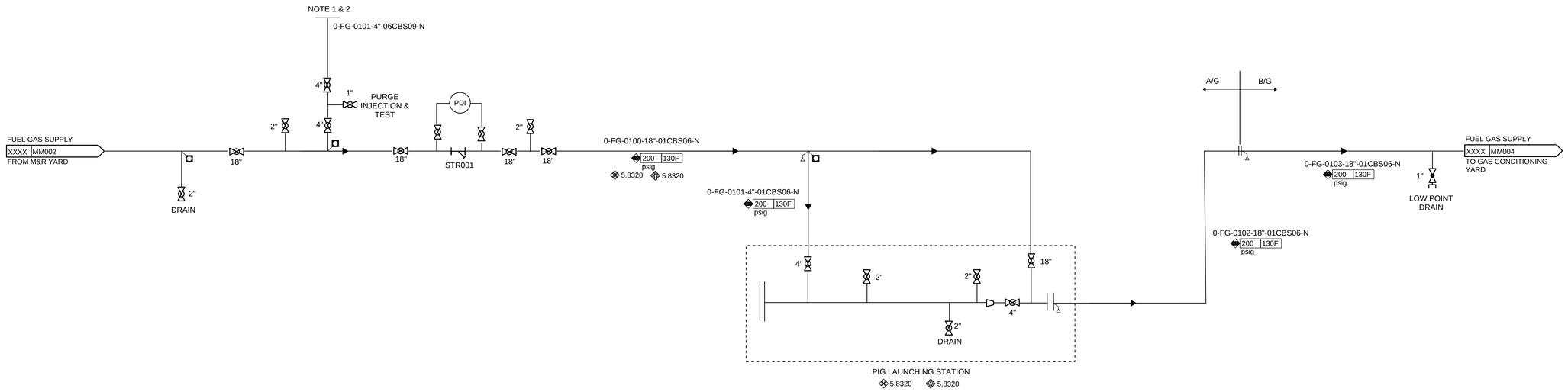
SPURLOCK CO-FIRE PROJECT
SPURLOCK STATION
MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION
METERING AND REGULATING (M&R) YARD

project: 164714
contract: -
drawing: MM002
rev.: C
sheet: of: sheets:
file:

\\bmcd.burnsmcd.com\dfs\Clients\ENR\EKPC\164714_SPURCONVPSR\2_Design\Civil\Dwgs\Sketches\Archive\164714SKC001.dgn

NOTES:
1) VENT SHALL BE ROUTED AT LEAST 10' ABOVE GRADE
2) VENT SHALL TERMINATE WITH RAMS HORN AND BIRD SCREENS



PRELIMINARY - NOT FOR CONSTRUCTION

no.	date	by	ckd	description
C	9/20/24	AB	AB	ISSUED WITH PSR
B	06/13/24	AB	AB	IFOR - UPDATED FOR 50% GAS
A	02/02/24	AB	MED	ISSUED FOR OWNER REVIEW

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO. 43
designed A. BHALCHANDRA
detailed

EAST KENTUCKY POWER COOPERATIVE
SPURLOCK CO-FIRE PROJECT
SPURLOCK STATION
MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION
PIG LAUNCHING STATION

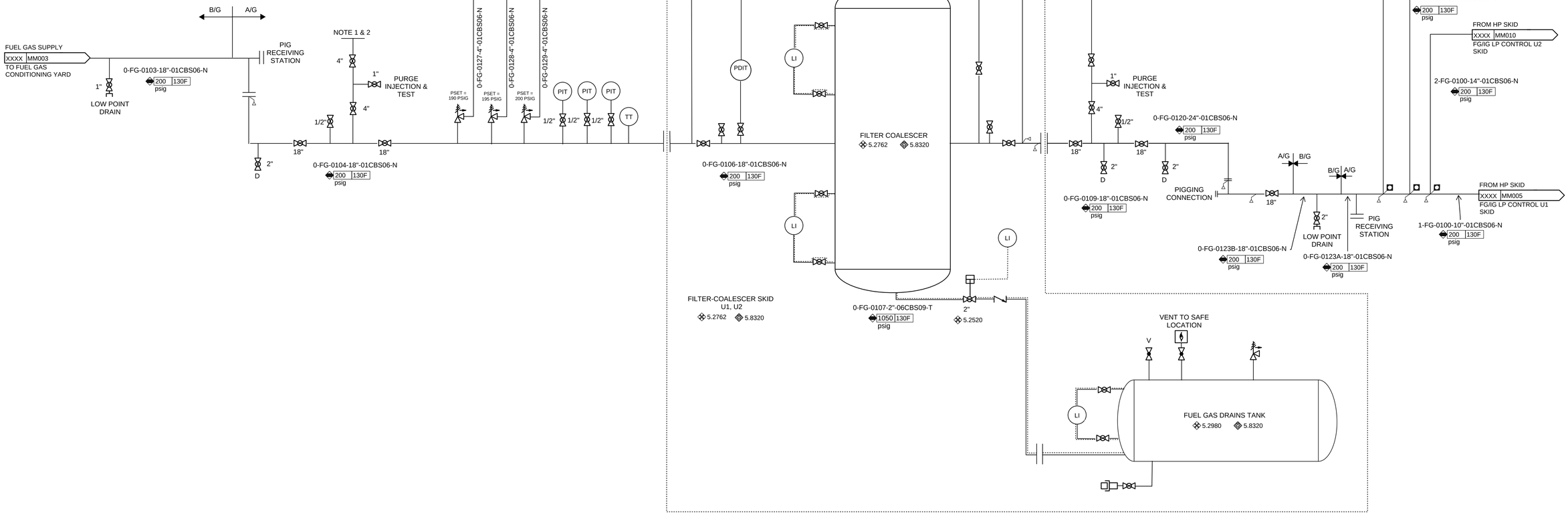
project	contract
164714	-

drawing	rev.
MM003	C

sheet of sheets
file

\\bmcd.burnsmcd.com\dfs\Clients\ENR\EKPC\164714_SPURCONVPSR\2_Design\Civil\Dwgs\Sketches\Archive\164714SKC001.dgn

NOTES:
1) VENT SHALL BE ROUTED AT LEAST 10' ABOVE GRADE
2) VENT SHALL TERMINATE WITH RAMS HORN AND BIRD SCREENS



PRELIMINARY - NOT FOR CONSTRUCTION

no.	date	by	ckd	description
C	9/20/24	AB	AB	ISSUED WITH PSR
B	06/13/24	AB	AB	IFOR - UPDATED FOR 50% GAS
A	02/02/24	AB	MED	ISSUED FOR OWNER REVIEW

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO. 43
designed A. BHALCHANDRA
detailed

EAST KENTUCKY POWER COOPERATIVE
SPURLOCK CO-FIRE PROJECT
SPURLOCK STATION
MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION
FUEL GAS KNOCKOUT DRUM AND FILTER/SEPARATOR SKID

project 164714 | contract -
drawing MM004 | rev. C
sheet | of | sheets
file

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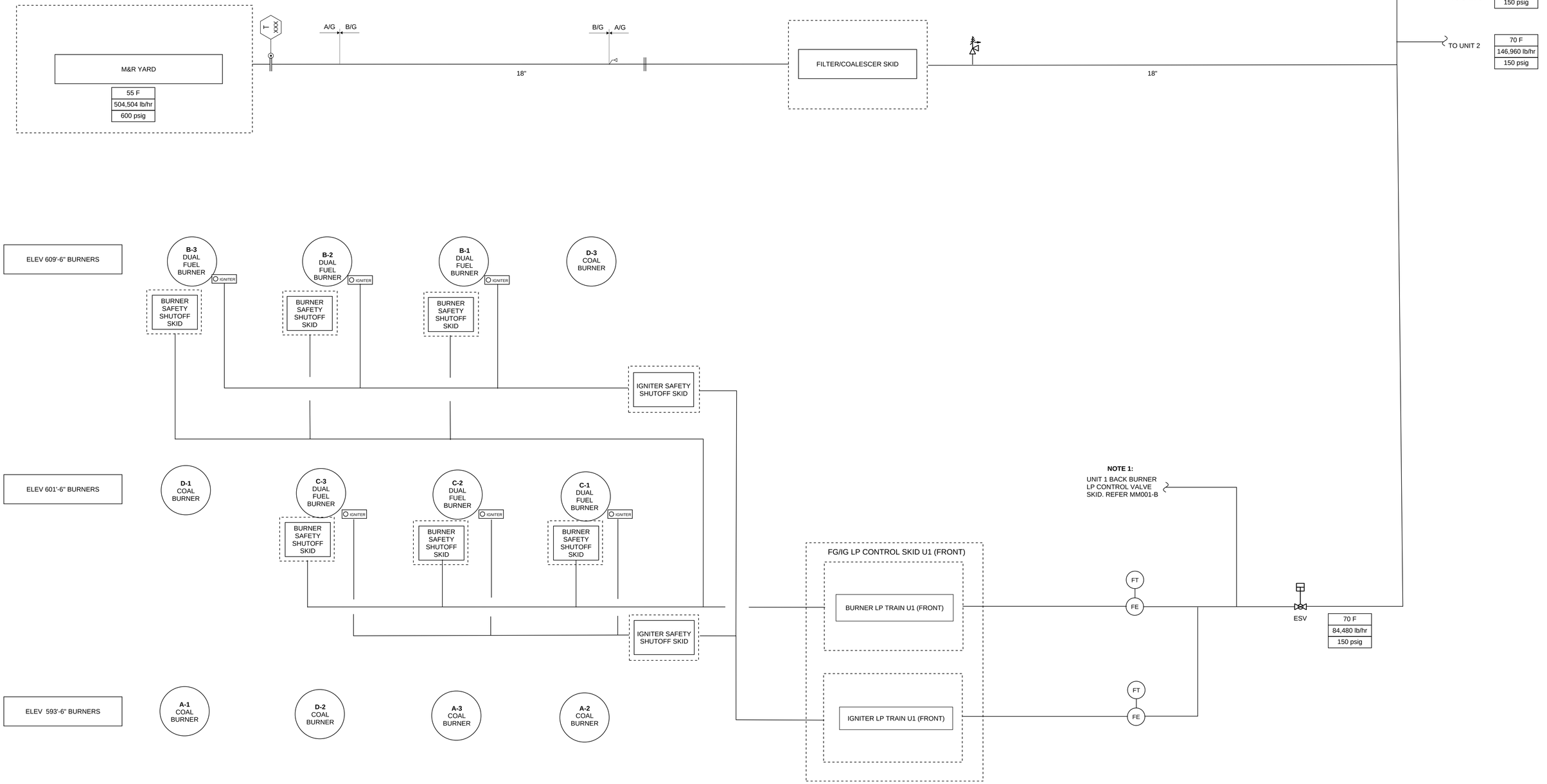

NOTES:
1. THERE ARE AN ADDITIONAL 12 BURNERS AND 12 IGNITERS LOCATED ON THE REAR SIDE OF UNIT 1. THE REAR BURNERS AND IGNITERS HAVE THE SAME ARRANGEMENT AS THE FRONT BURNERS AND IGNITERS. REFER TO MM001-B.

PRELIMINARY - NOT FOR CONSTRUCTION

no.	date	by	ckd	description
B	06/05/24	AB	AB	IFOR - UPDATED FOR 50% GAS CONVERSION
A	02/02/24	AB	MED	ISSUED FOR OWNER REVIEW

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO. 43
designed: A. BHALCHANDRA
detailed:

EAST KENTUCKY POWER COOPERATIVE

SPURLOCK CO-FIRE PROJECT
SPURLOCK STATION
MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION
PROCESS FLOW DIAGRAM
UNIT 1 FRONT

project: 164714 | contract: -
drawing: MM001-A | rev: B
sheet: | of | sheets:
file:

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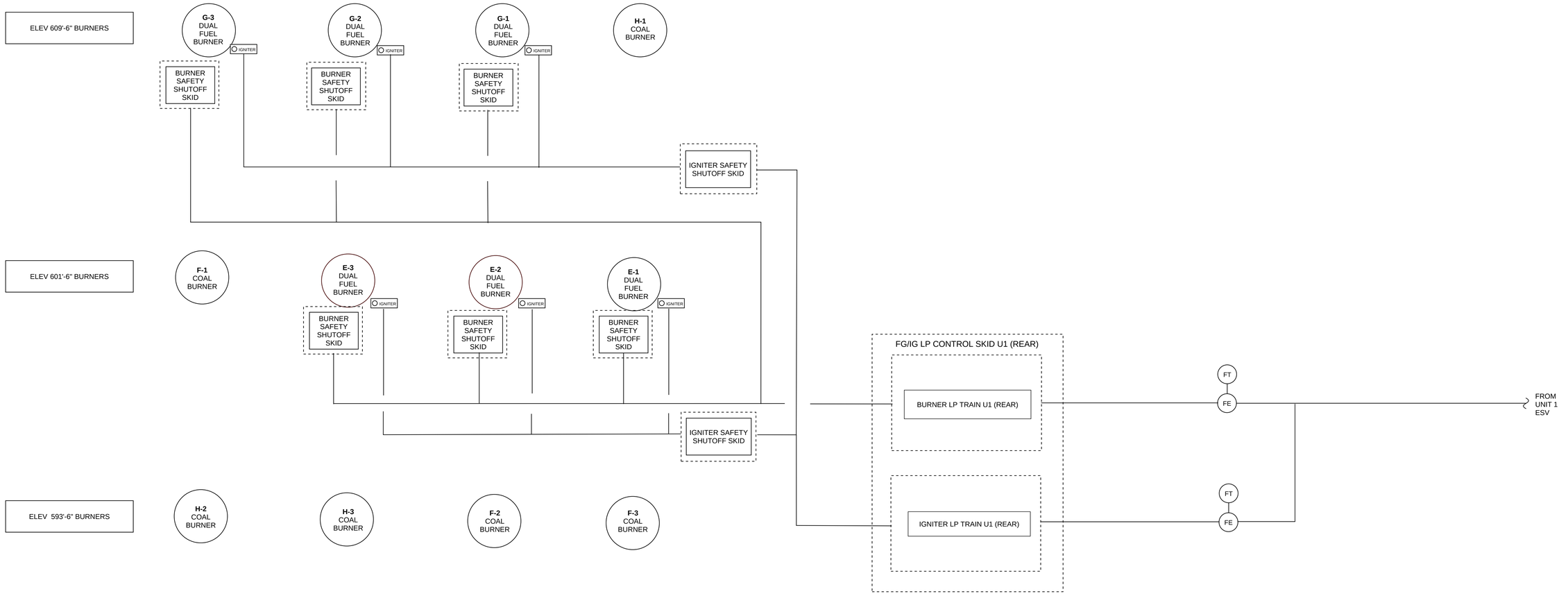

PRELIMINARY - NOT FOR CONSTRUCTION

no.	date	by	ckd	description
B	06/05/24	AB	AB	IFOR - UPDATED FOR 50% GAS CONVERSION
A	02/02/24	AB	MED	ISSUED FOR OWNER REVIEW

no.	date	by	ckd	description

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO. 43
designed A. BHALCHANDRA
detailed

EAST KENTUCKY POWER COOPERATIVE

SPURLOCK CO-FIRE PROJECT
SPURLOCK STATION
MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION
PROCESS FLOW DIAGRAM
UNIT 1 REAR

project 164714 | contract -
drawing MM001-B | rev. B
sheet | of | sheets
file

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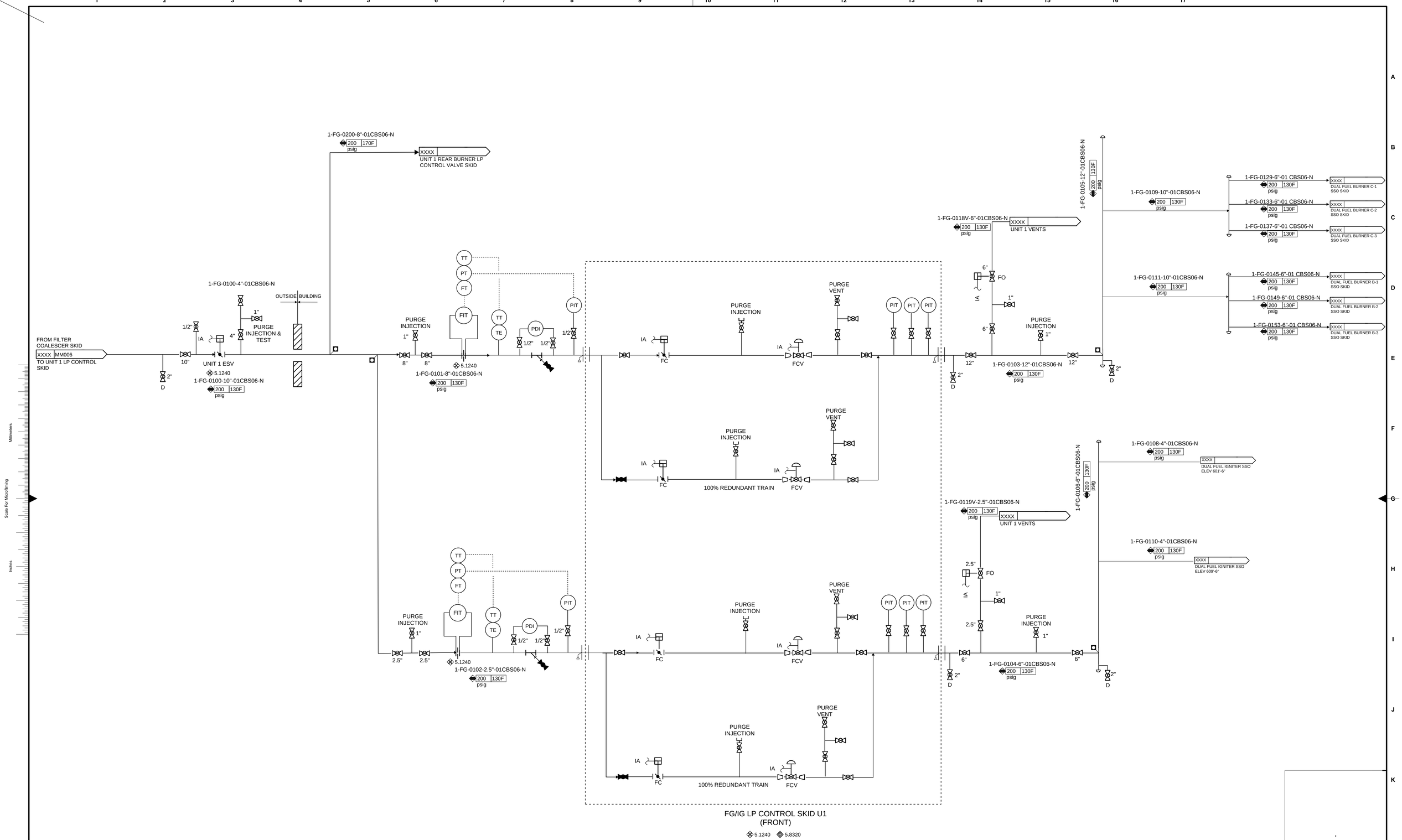
Millimeters
Scale For Microfilming
Inches



FG/IG LP CONTROL SKID U1
(FRONT)

5.1240 5.8320

PRELIMINARY - NOT FOR CONSTRUCTION

no.	date	by	ckd	description
B	06/11/24	AB	AB	IFOR - UPDATED FOR 50% GAS
A	02/02/24	AB	MED	ISSUED FOR OWNER REVIEW

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO. 43
designed A. BHALCHANDRA
detailed

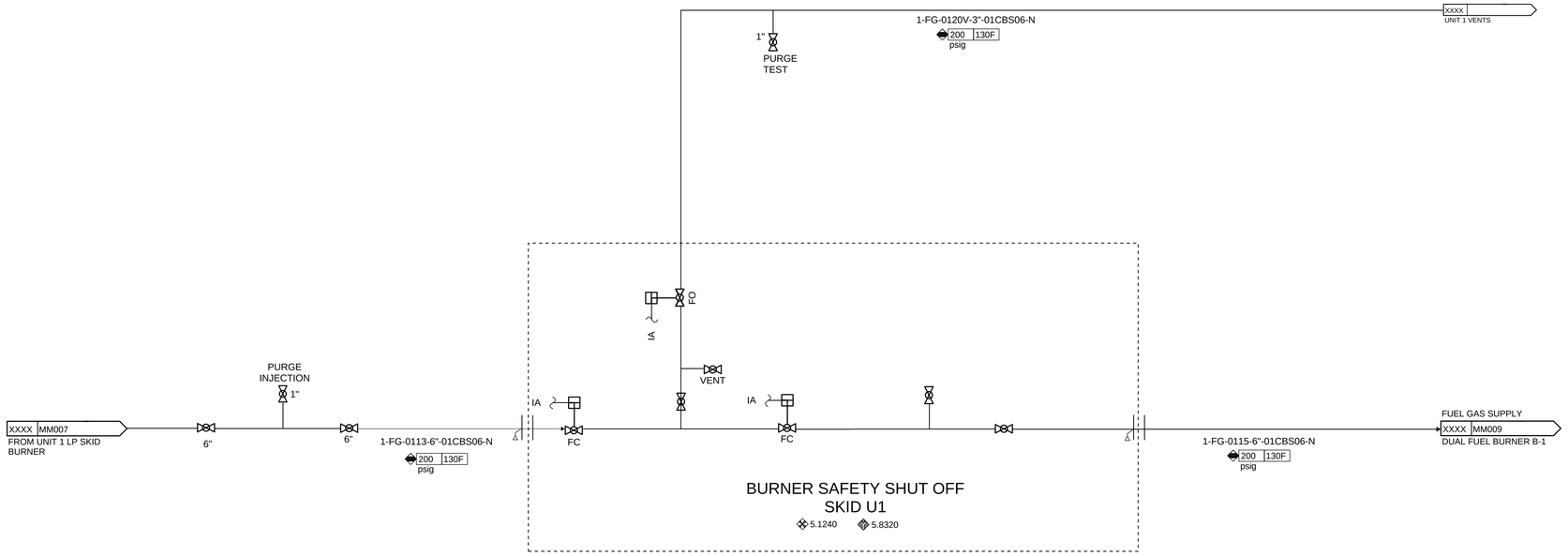
EAST KENTUCKY POWER COOPERATIVE

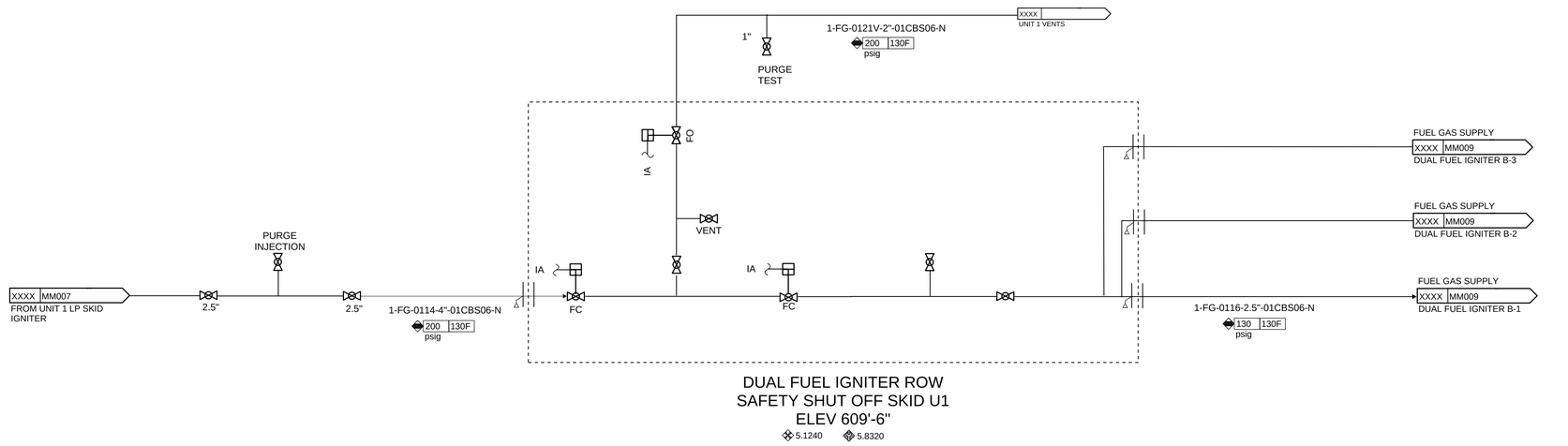
SPURLOCK CO-FIRE PROJECT
SPURLOCK STATION
MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION
FG/IG LP CONTROL SKID U1
(FRONT)

project	contract
164714	-
drawing	rev.
MM007	B
sheet	of sheets
file	

\\bmcd.burnsmcd.com\dfs\Clients\ENR\EKPC\164714_SPURCONVPSR\2_Design\Civil\Dwgs\Sketches\Archive\164714SKC001.dgn





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no.	date	by	ckd	description
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A	02/02/24	AB	MED	ISSUED FOR OWNER REVIEW

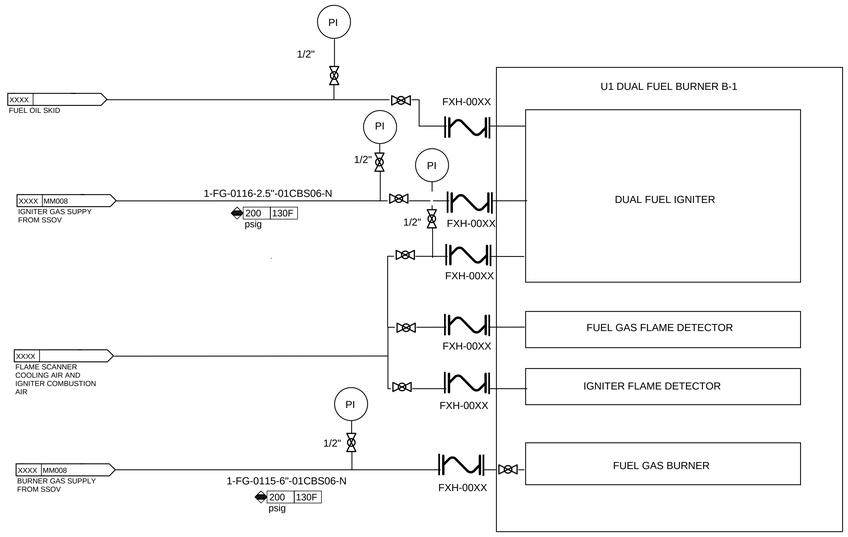
BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO. 43
designed A. BHALCHANDRA
detailed

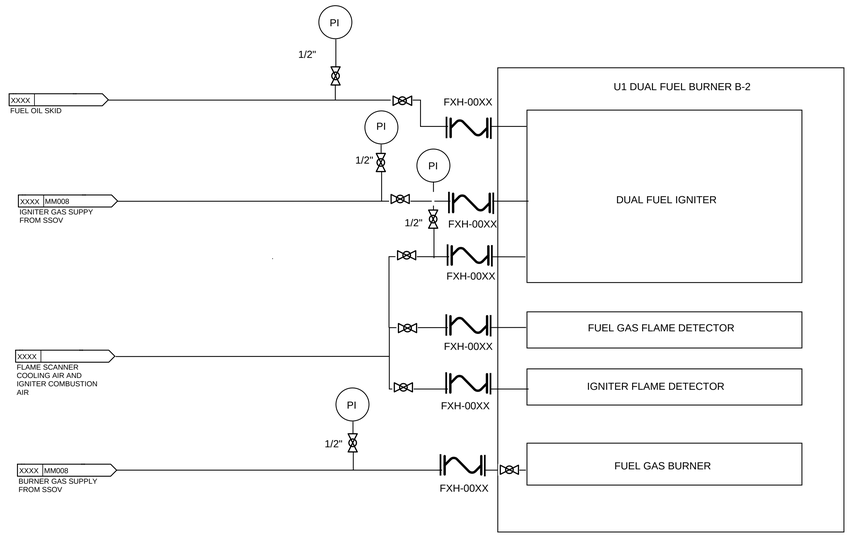
EAST KENTUCKY POWER COOPERATIVE
SPURLOCK CO-FIRE PROJECT
SPURLOCK STATION
MASON COUNTY, KENTUCKY

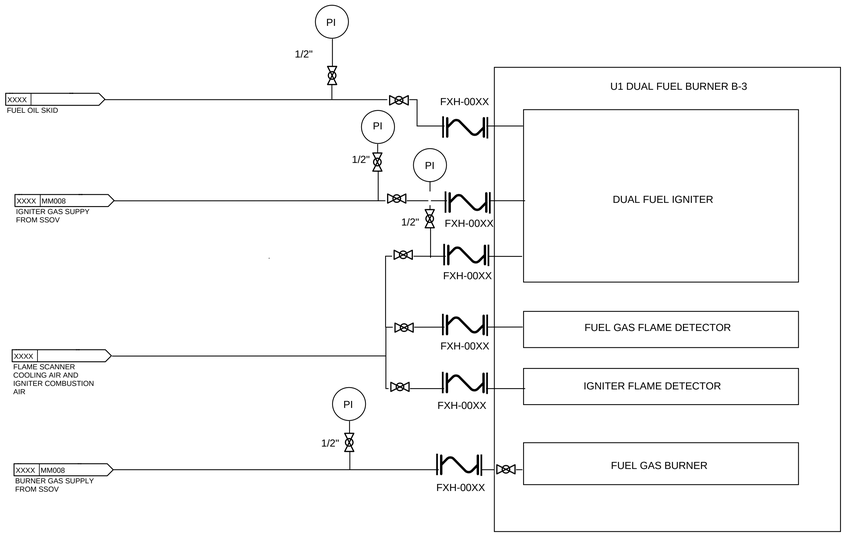
SPURLOCK POWER STATION
FG/IG SAFETY SHUT OFF SKID U1

project 164714 | contract -
drawing MM008 | rev. B
sheet | of | sheets
file

\\bmcd.burnsmcd.com\dfs\Clients\ENR\EKPC\164714_SPURCONVPSR\2_Design\Civil\Dwgs\Sketches\Archive\164714SKC001.dgn







PRELIMINARY - NOT FOR CONSTRUCTION

no.	date	by	ckd	description
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A	02/02/24	AB	MED	ISSUED FOR OWNER REVIEW

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO. 43
designed A. BHALCHANDRA
detailed

EAST KENTUCKY POWER COOPERATIVE
SPURLOCK CO-FIRE PROJECT
SPURLOCK STATION
MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION
U1 DUAL FUEL BURNERS

project 164714 | contract -
drawing MM009 | rev. B
sheet | of | sheets
file

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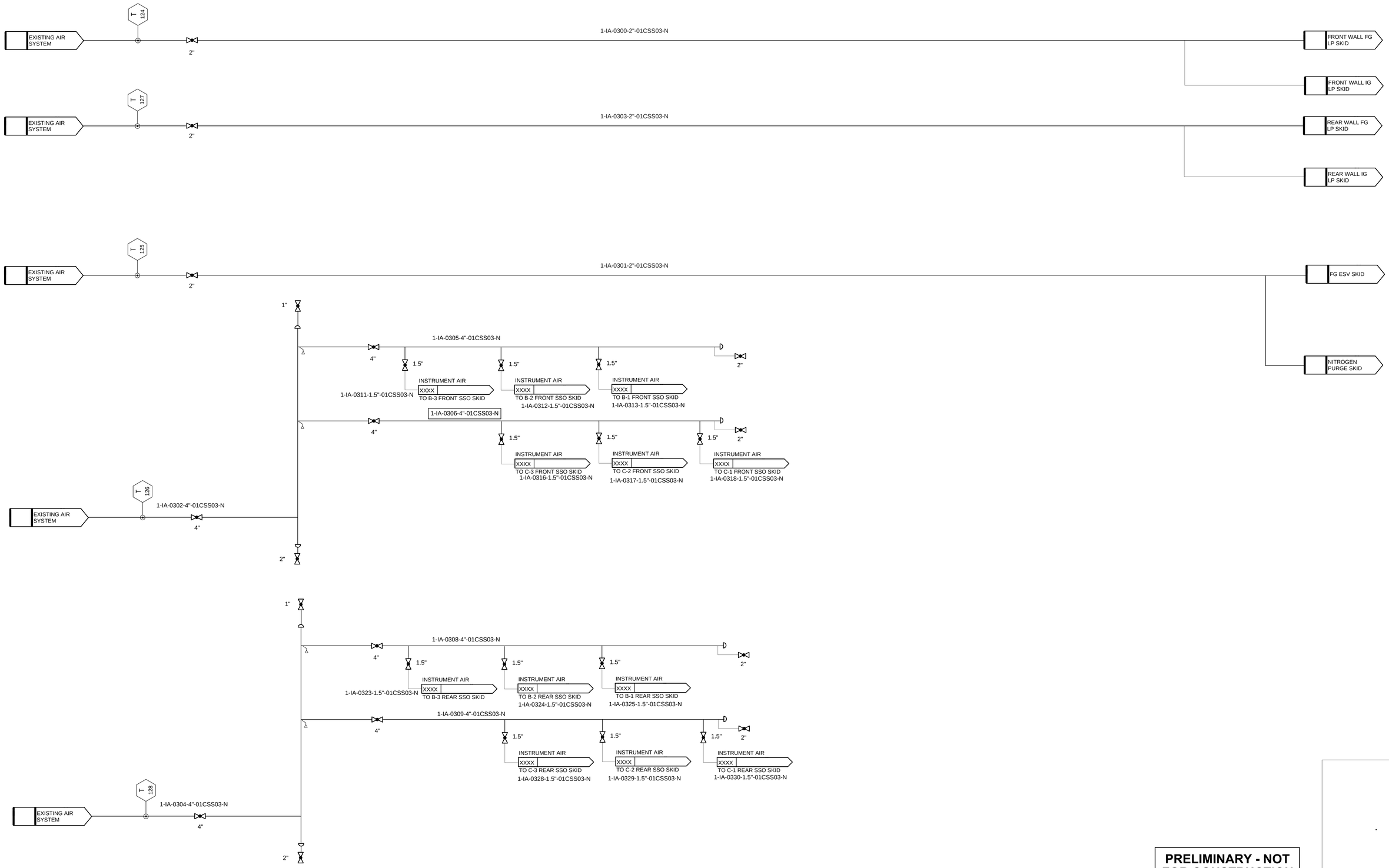

PRELIMINARY - NOT FOR CONSTRUCTION

no.	date	by	ckd	description
B	06/11/24	AB	AB	IFOR - UPDATED FOR 50% GAS
A	02/02/24	AB	MED	ISSUED FOR OWNER REVIEW

no.	date	by	ckd	description

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO. 43
designed A. BHALCHANDRA
detailed

EAST KENTUCKY POWER COOPERATIVE

SPURLOCK CO-FIRE PROJECT
SPURLOCK STATION
MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION
INSTRUMENT AIR SYSTEM P&ID
UNIT 1

project	contract
164714	-
drawing	rev.
MM0028	B
sheet	of sheets
file	

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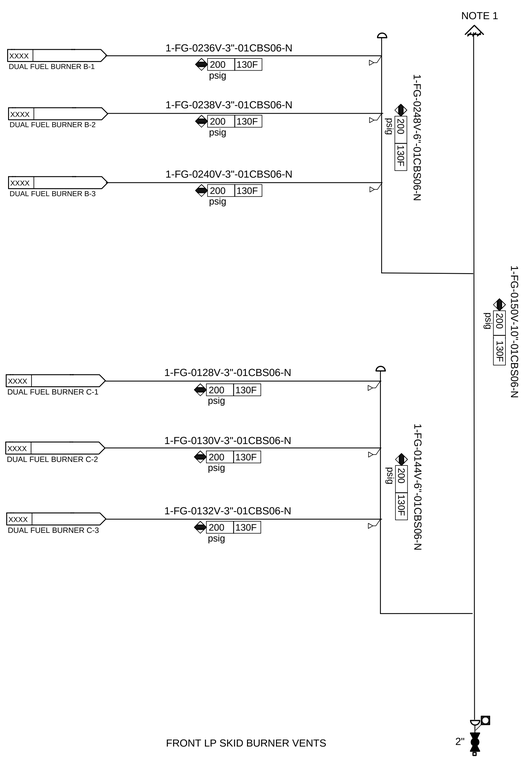
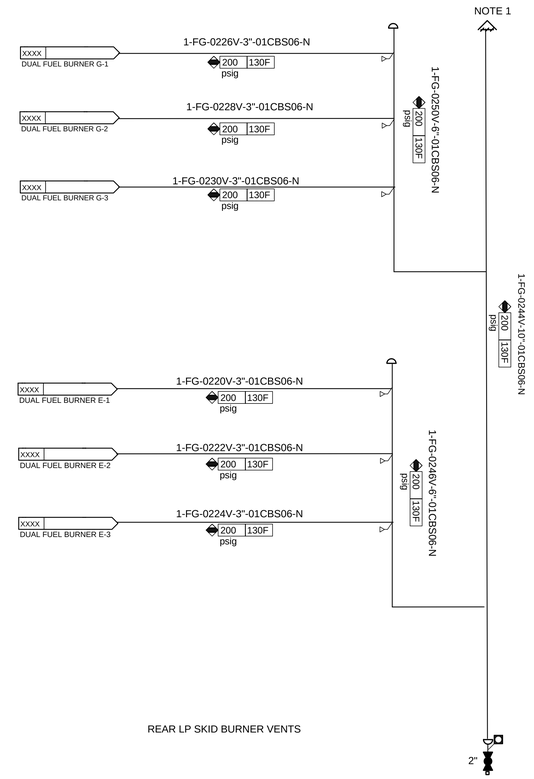
NOTES:

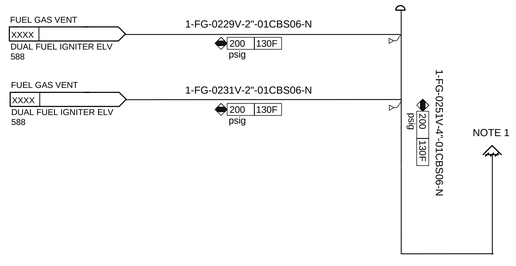
1. VENT TO SAFE LOCATION ON THE ROOF OF UNIT 1. TERMINATE VENT WITH RAM'S HORN AND BIRD SCREEN.



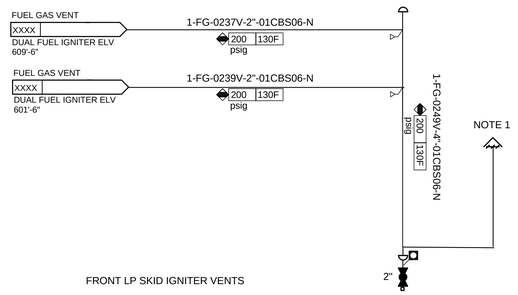
FRONT LP SKID BURNER VENTS



REAR LP SKID BURNER VENTS



REAR LP SKID IGNITER VENTS



FRONT LP SKID IGNITER VENTS

PRELIMINARY - NOT FOR CONSTRUCTION

Millimeters
Scale For Microfilming
Inches

no.	date	by	ckd	description
B	06/11/24	AB	AB	IFOR - UPDATED FOR 50% GAS
A	02/02/24	AB	MED	ISSUED FOR OWNER REVIEW

no.	date	by	ckd	description

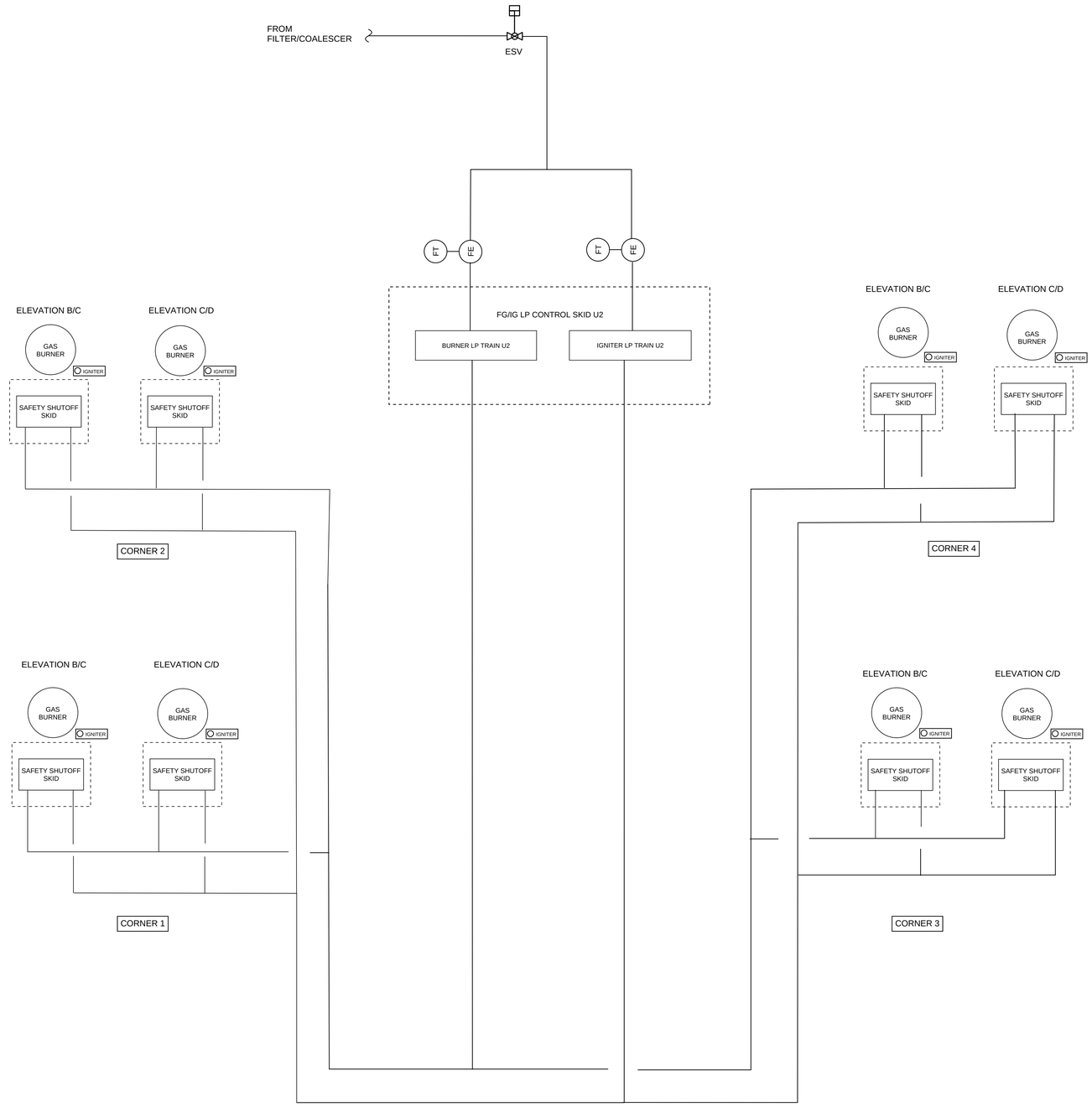
BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO. 43
designed A. BHALCHANDRA
detailed

EAST KENTUCKY POWER COOPERATIVE
SPURLOCK CO-FIRE PROJECT
SPURLOCK STATION
MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION
U1 FUEL GAS VENTS

project 164714 | contract -
drawing MM026 | rev. B
sheet | of | sheets
file

\\bmcd.burnsmcd.com\dfs\Clients\ENR\EKPC\164714_SPURCONVPSR\2_Design\Civil\Dwgs\Sketches\Archive\164714SKC001.dgn



PRELIMINARY - NOT FOR CONSTRUCTION

Millimeters
Scale For Microfilming
Inches

no.	date	by	ckd	description
C	9/20/24	AB	AB	ISSUED WITH PSR
B	06/05/24	AB	AB	IFOR - UPDATED FOR 50% GAS
A	02/02/24	AB	MED	ISSUED FOR OWNER REVIEW

no.	date	by	ckd	description

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO. 43

designed: A. BHALCHANDRA
detailed:

EAST KENTUCKY POWER COOPERATIVE

SPURLOCK CO-FIRE PROJECT
SPURLOCK STATION
MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION
PROCESS FLOW DIAGRAM
UNIT 2

project: 164714
contract: -
drawing: MM013
rev.: C
sheet
of
sheets
file

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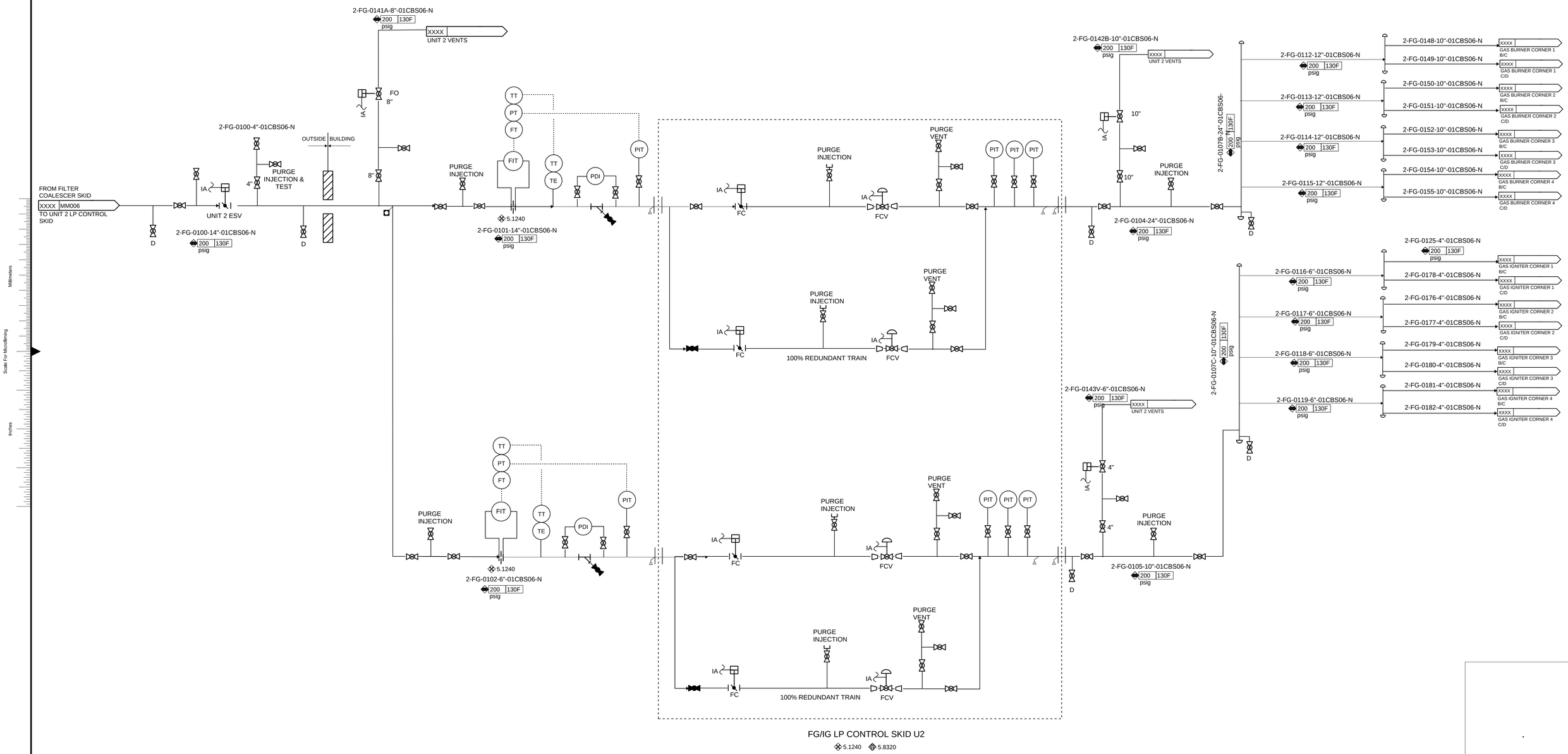
2-FG-0124-10"-01CBS06-N



FG/IG LP CONTROL SKID U2

5.1240 5.8320

PRELIMINARY - NOT FOR CONSTRUCTION

Millimeters Inches Scale For Microfilming

no.	date	by	ckd	description
C	9/20/24	AB	AB	ISSUED WITH PSR
B	06/05/24	AB	AB	UPDATED FOR 50% GAS
A	02/02/24	AB		ISSUED FOR OWNER REVIEW

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO. 43

designed A. BHALCHANDRA | detailed

EAST KENTUCKY POWER COOPERATIVE
SPURLOCK CO-FIRE PROJECT
SPURLOCK STATION
MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION
FG/IG LP CONTROL SKID U2

project 164714 | contract -
drawing MM010 | rev. C
sheet | of | sheets
file

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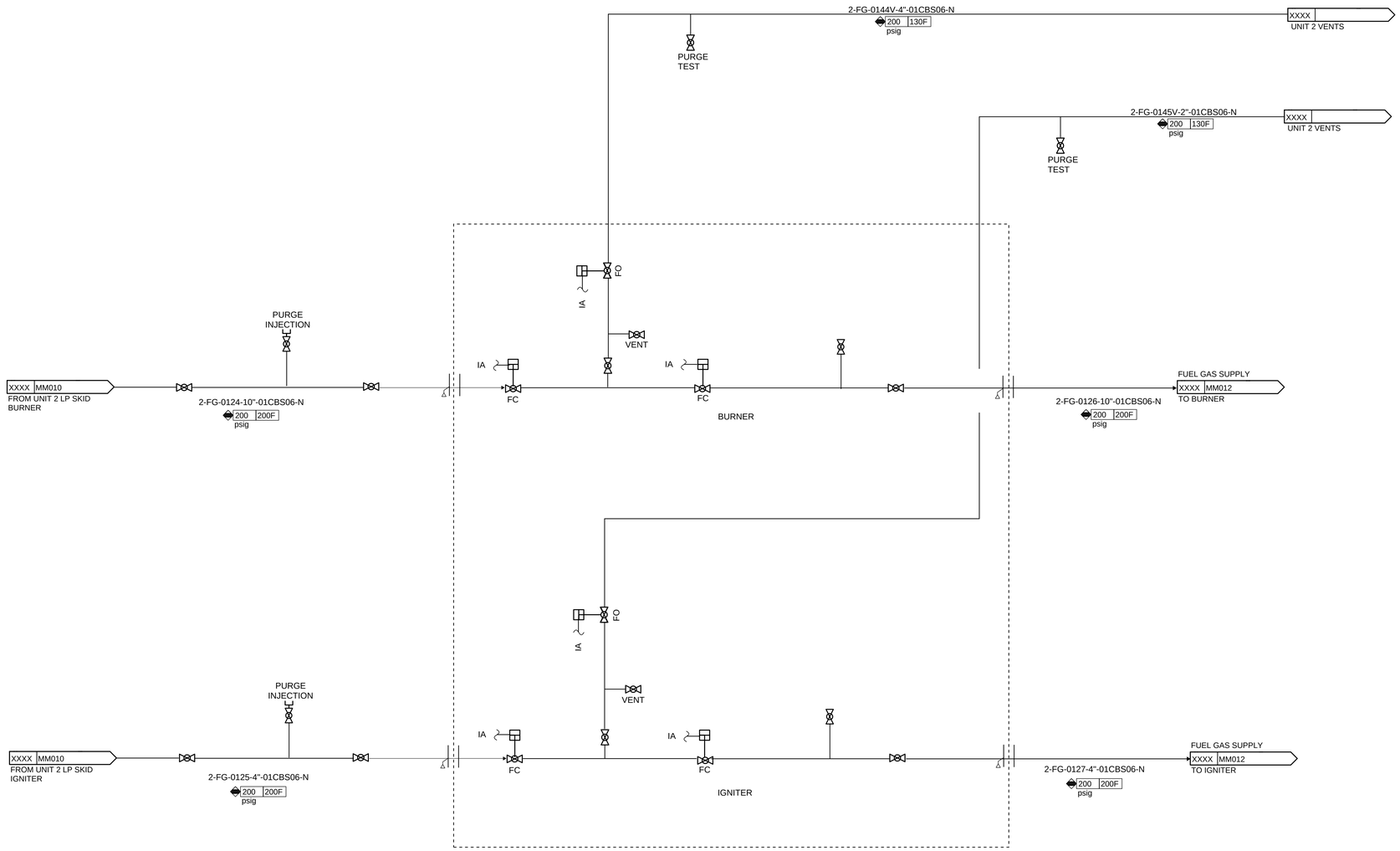

FG/IG SAFETY SHUT OFF SKID U2

5.1240 5.8320

PRELIMINARY - NOT FOR CONSTRUCTION

Millimeters
Inches
Scale For Microfilming

no.	date	by	ckd	description
C	9/20/24	AB	AB	ISSUED WITH PSR
B	06/05/24	AB	AB	UPDATED FOR 50% GAS
A	02/02/24	AB		ISSUED FOR OWNER REVIEW

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FIRM LICENSE NO. 43
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detailed:

EAST KENTUCKY POWER COOPERATIVE
SPURLOCK CO-FIRE PROJECT
SPURLOCK STATION
MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION
FG/IG SAFETY SHUT OFF
SKID U2

project 164714 | contract -
drawing MM011 | rev. C
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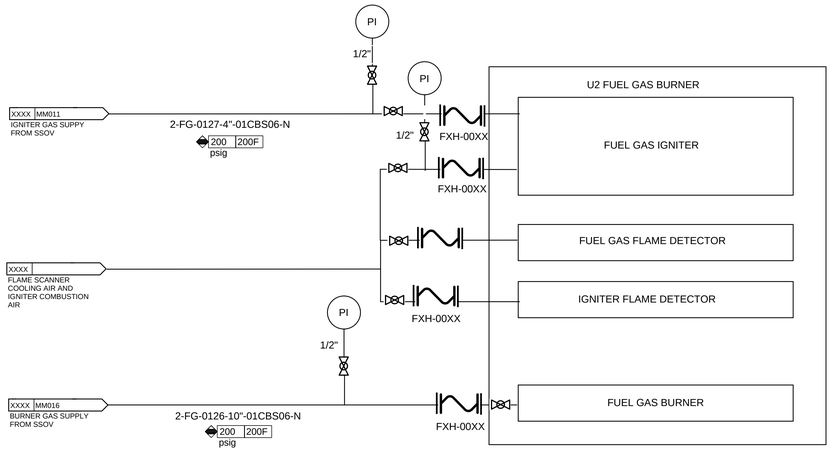

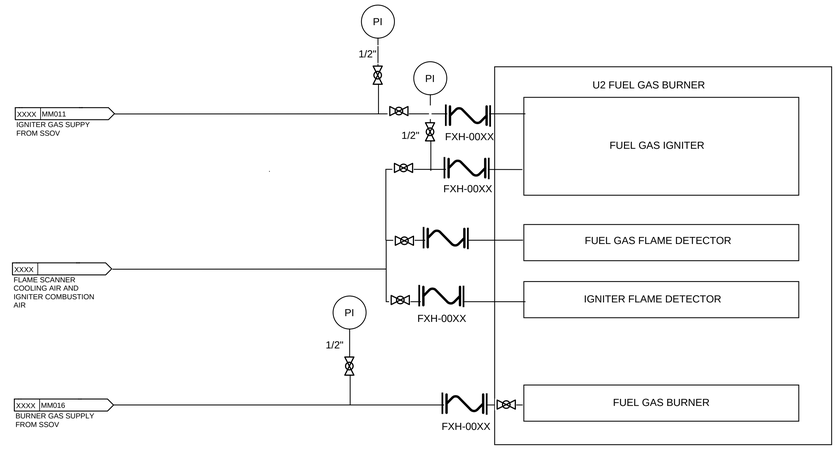

PRELIMINARY - NOT FOR CONSTRUCTION

no.	date	by	ckd	description
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B	06/05/24	AB	AB	UPDATED FOR 50% GAS
A	02/02/24	AB		ISSUED FOR OWNER REVIEW

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EAST KENTUCKY POWER COOPERATIVE

SPURLOCK CO-FIRE PROJECT
SPURLOCK STATION
MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION
U2 GAS BURNERS

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drawing MM012 | rev. C
sheet of sheets
file

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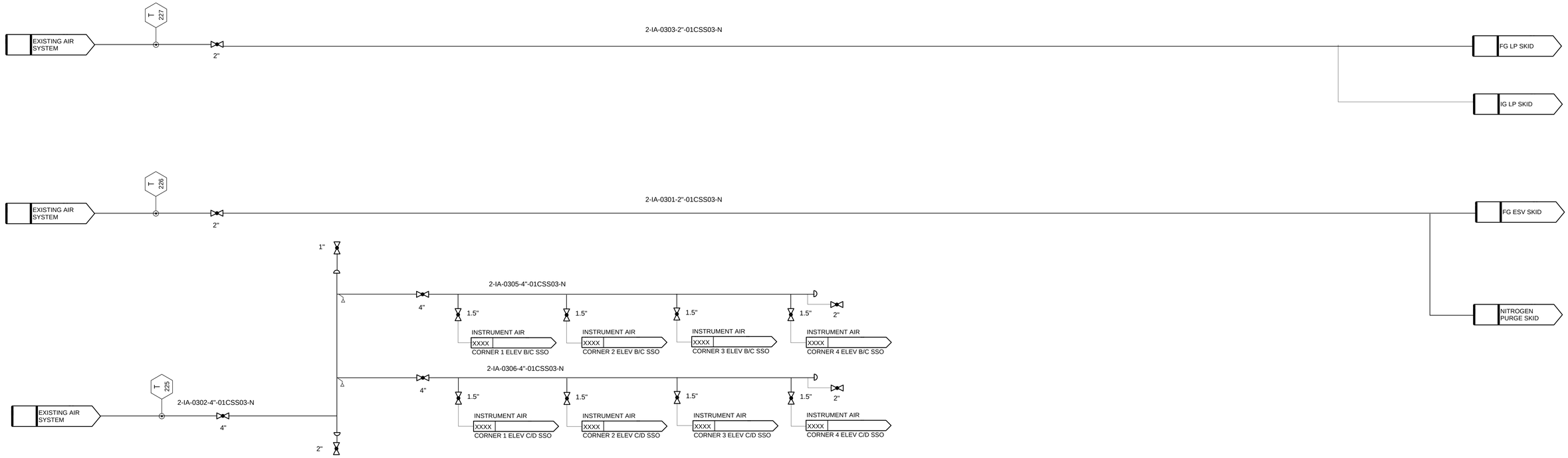
Millimeters
Inches
Scale For Microfilming



Millimeters

Scale For Microfilming

Inches

PRELIMINARY - NOT FOR CONSTRUCTION

no.	date	by	ckd	description
C	9/20/24	AB	AB	ISSUED WITH PSR
B	06/05/24	AB	AB	UPDATED FOR 50% GAS
A	02/02/24	AB	MED	ISSUED FOR OWNER REVIEW

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EAST KENTUCKY POWER COOPERATIVE

SPURLOCK CO-FIRE PROJECT
SPURLOCK STATION
MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION
INSTRUMENT AIR SYSTEM P&ID
UNIT 2

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drawing MM028 | rev. C
sheet | of | sheets
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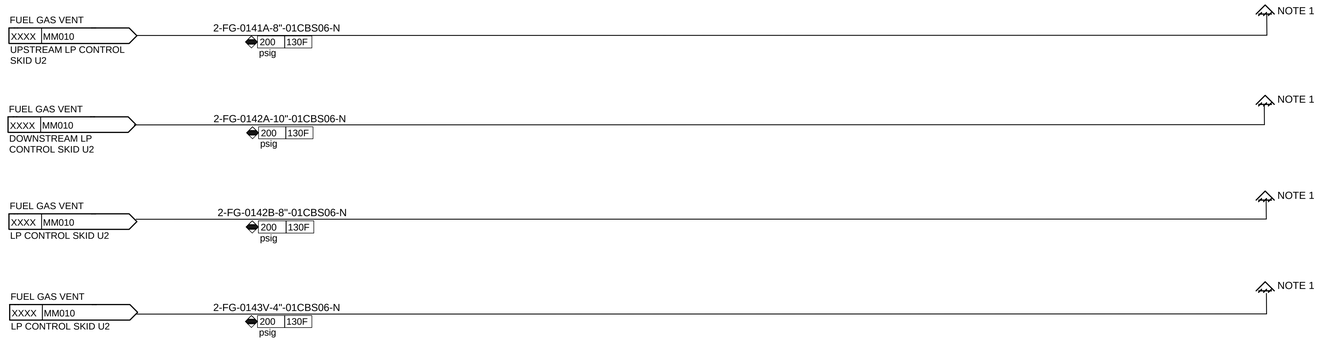
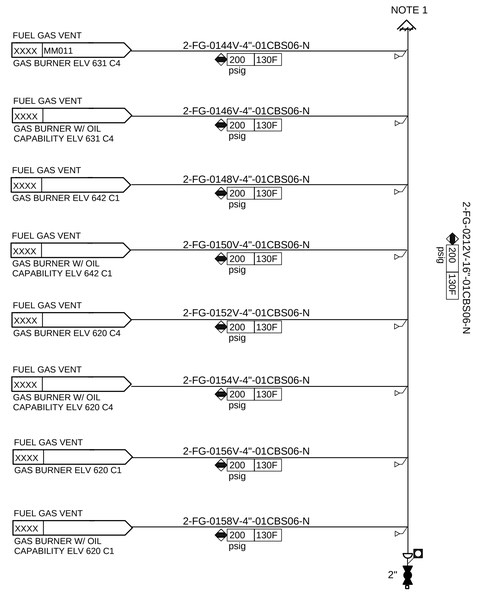
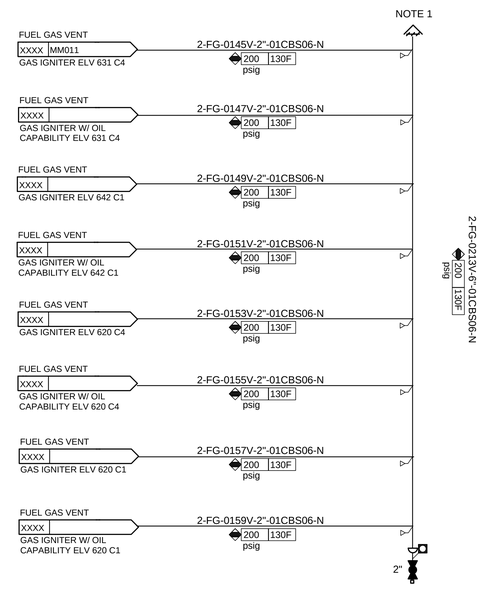
NOTES:

1. VENT TO SAFE LOCATION ON THE ROOF OF UNIT 2. TERMINATE VENT WITH RAM'S HORN AND BIRD SCREEN.







Millimeters
Inches
Scale For Microfilming

PRELIMINARY - NOT FOR CONSTRUCTION

no.	date	by	ckd	description
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B	06/05/24	AB	AB	UPDATED FOR 50% GAS
A	02/02/24	AB	MED	ISSUED FOR OWNER REVIEW

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9400 WARD PARKWAY
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816-333-9400
FIRM LICENSE NO. 43
designed A. BHALCHANDRA
detailed

EAST KENTUCKY POWER COOPERATIVE
SPURLOCK CO-FIRE PROJECT
SPURLOCK STATION
MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION
U2 FUEL GAS BURNER VENTS

project 164714 | contract -
drawing MM027 | rev. C
sheet of sheets
file

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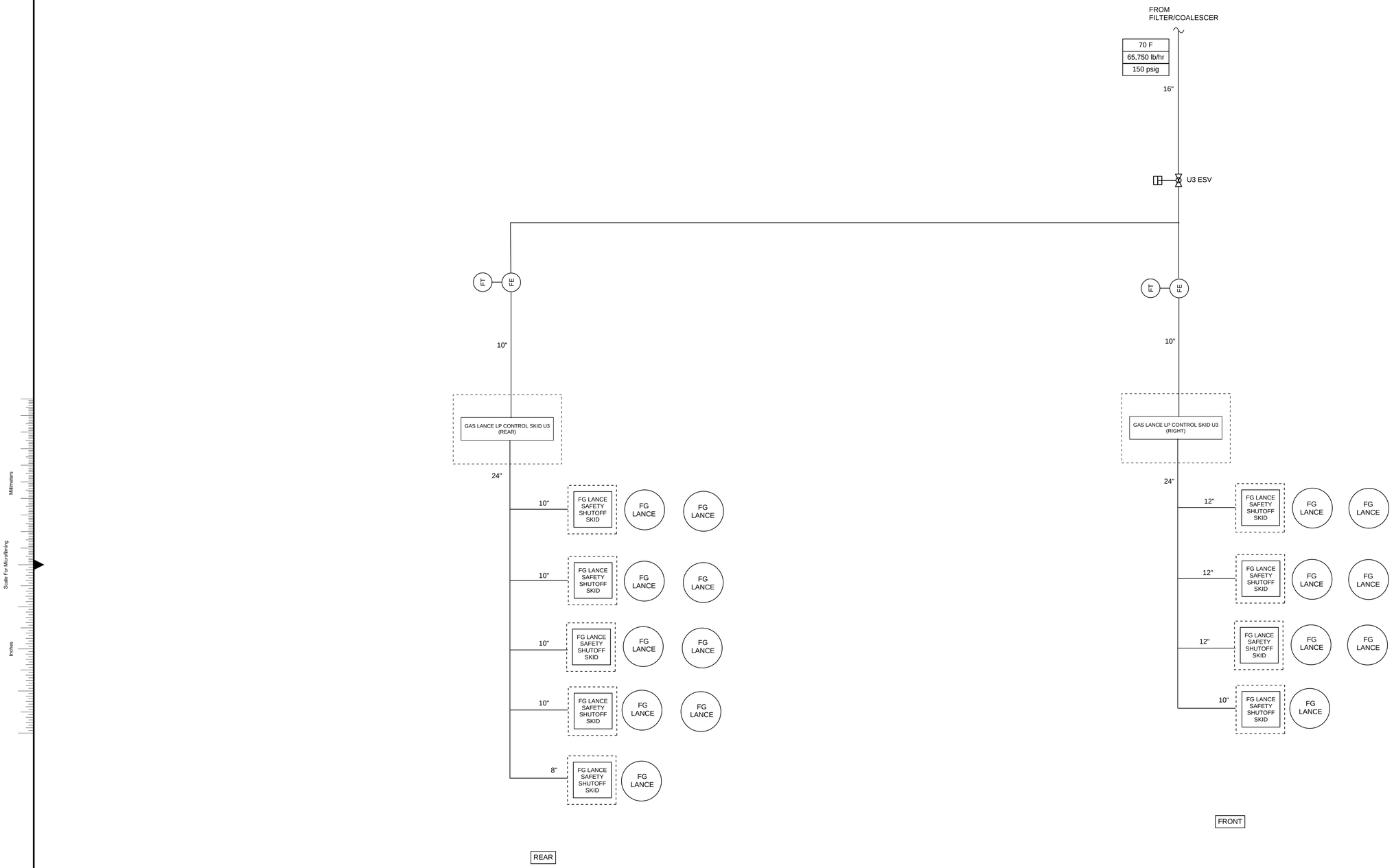

Millimeters
Scale For Microfilming
Inches

PRELIMINARY - NOT FOR CONSTRUCTION

no.	date	by	ckd	description
C	9/20/24	AB	AB	ISSUED WITH PSR
B	06/13/24	AB	AB	IFOR - UPDATED FOR 50% GAS
A	05/06/24	AB	AB	UPDATED BASED ON SITE WALKDOWN
A	02/02/24	AB	MED	ISSUED FOR OWNER REVIEW

no.	date	by	ckd	description

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816-333-9400
FIRM LICENSE NO. 43
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detailed:

EAST KENTUCKY POWER COOPERATIVE
SPURLOCK CO-FIRE PROJECT
SPURLOCK STATION
MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION
PROCESS FLOW DIAGRAM
UNIT 3

project: 164714 | contract: -
drawing: MM012 | rev.: C
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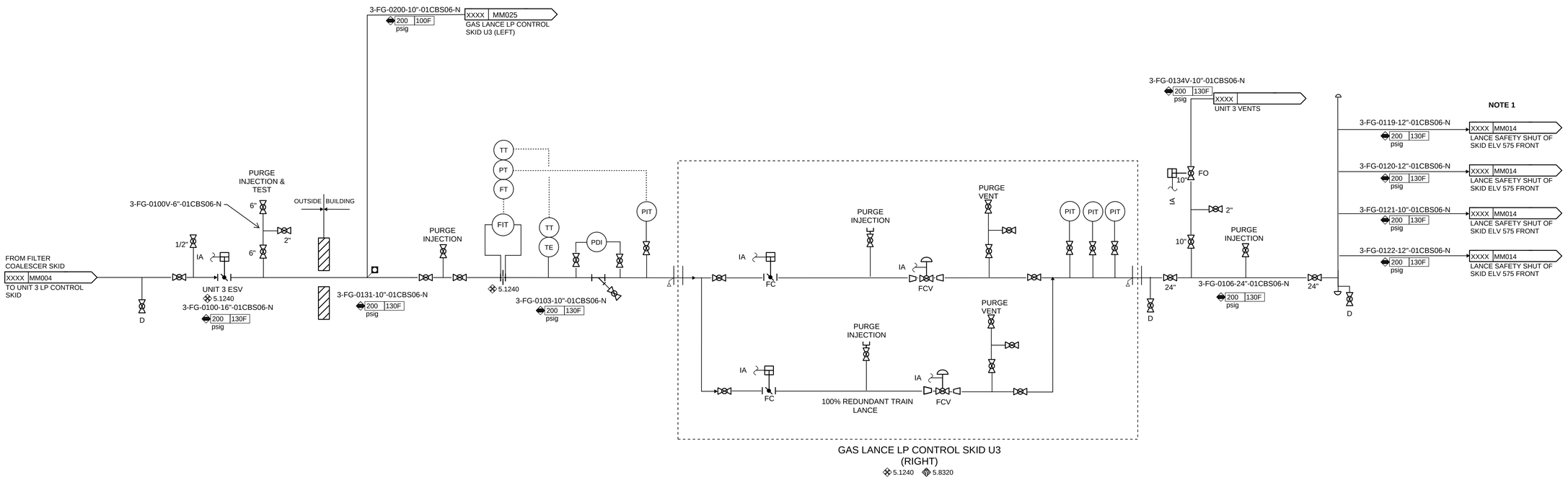

GAS LANCE LP CONTROL SKID U3
(RIGHT)
5.1240 5.8320

NOTE 1:
- ON THE FRONT LANCE LP SKID, FUEL GAS WILL GO TO FOUR (4) LANCE SAFETY SHUT OFF SKIDS WHICH CONTROL SEVEN (7) LANCES. PIPING ON THE REAR FROM THE LP SKID TO THE SSOs CONTROLING 2 LANCES WILL BE 10". PIPING FROM THE LP SKID TO THE SSO CONTROLING 1 LANCE WILL BE 8".
- ON THE REAR LANCE LP SKID, FUEL GAS WILL GO TO FIVE (5) LANCE SAFETY SHUTOFF SKIDS WHICH CONTROL NINE (9) LANCES. PIPING ON THE FRONT AND REAR WILL NOT BE THE SAME SIZE AS THE LANCES ON THE REAR ARE LARGER.

PRELIMINARY - NOT FOR CONSTRUCTION

no.	date	by	ckd	description
C	9/20/24	AB	AB	ISSUED WITH PSR
B	06/13/24	AB	AB	IFOR - UPDATED FOR 50% GAS
A	05/06/24	AB	AB	UPDATED BASED ON SITE WALKDOWN
A	02/02/24	AB	MED	ISSUED FOR OWNER REVIEW

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EAST KENTUCKY POWER COOPERATIVE
SPURLOCK CO-FIRE PROJECT
SPURLOCK STATION
MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION
GAS LANCE LP CONTROL SKID U3 (RIGHT)

project 164714 | contract -
drawing MM013 | rev. C
sheet of sheets
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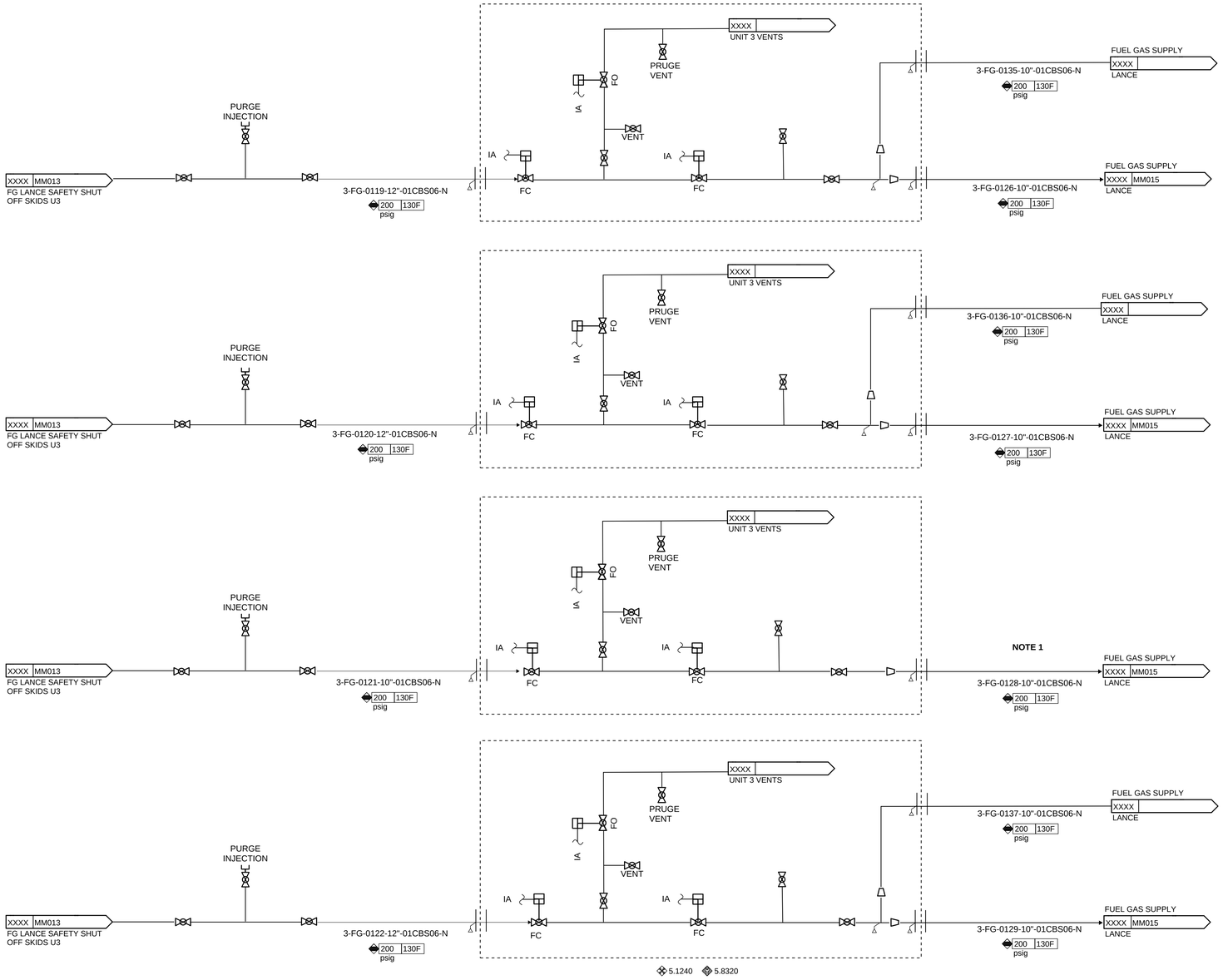

NOTE 1:
- ON THE FRONT LANCE LP SKID, FUEL GAS WILL GO TO FOUR (4) LANCE SAFETY SHUT OFF SKIDS WHICH CONTROL SEVEN (7) LANCES. PIPING ON THE FRONT FROM THE LP SKID TO THE SSOs CONTROLING 2 LANCES WILL BE 12". PIPING FROM THE LP SKID TO THE SSO CONTROLING 1 LANCE WILL BE 10". THE FRONT AND REAR WILL NOT BE THE SAME SIZE AS THE LANCES ON THE REAR ARE LARGE
- ON THE REAR LANCE LP SKID, FUEL GAS WILL GO TO FIVE (5) LANCE SAFETY SHUTOFF SKIDS WHICH CONTROL NINE (9) LANCES. PIPING ON R. PIPING ON THE REAR FROM THE LP SKID TO THE SSOs CONTROLING 2 LANCES WILL BE 10". PIPING FROM THE LP SKID TO THE SSO CONTROLING 1 LANCE WILL BE 8".

PRELIMINARY - NOT FOR CONSTRUCTION

no.	date	by	ckd	description
C	9/20/24	AB	AB	ISSUED WITH PSR
B	06/13/24	AB	AB	IFOR - UPDATED FOR 50% GAS
A	05/06/24	AB	AB	UPDATED BASED ON SITE WALKDOWN
A	02/02/24	AB	MED	ISSUED FOR OWNER REVIEW

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9400 WARD PARKWAY
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816-333-9400
FIRM LICENSE NO. 43
designed A. BHALCHANDRA
detailed

EAST KENTUCKY POWER COOPERATIVE
SPURLOCK CO-FIRE PROJECT
SPURLOCK STATION
MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION
FG LANCE SAFETY SHUT OFF SKIDS U3 (FRONT)

project 164714 | contract -
drawing MM014 | rev. C
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file

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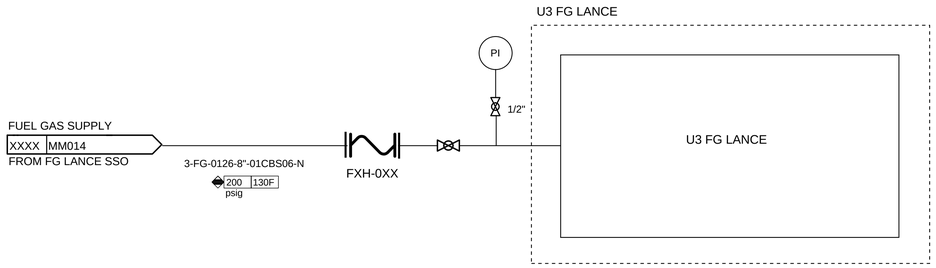

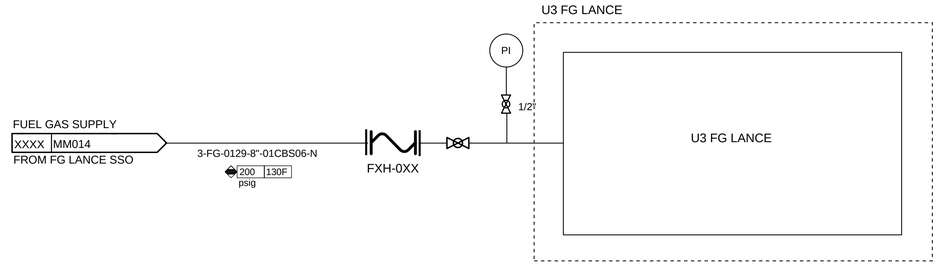

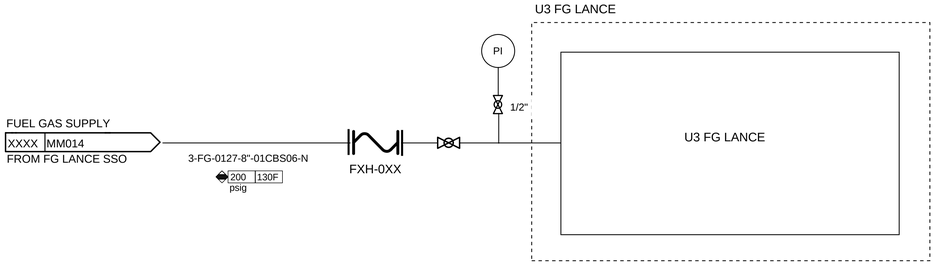

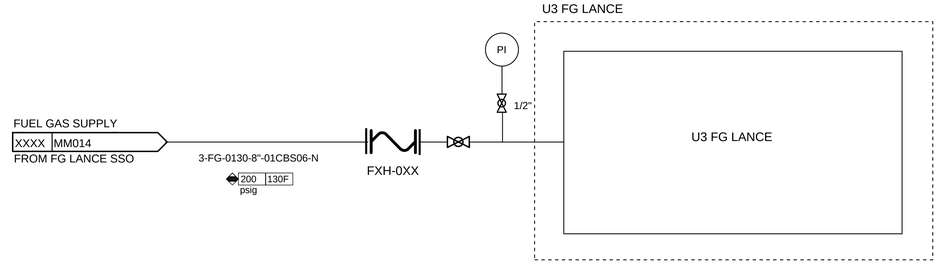

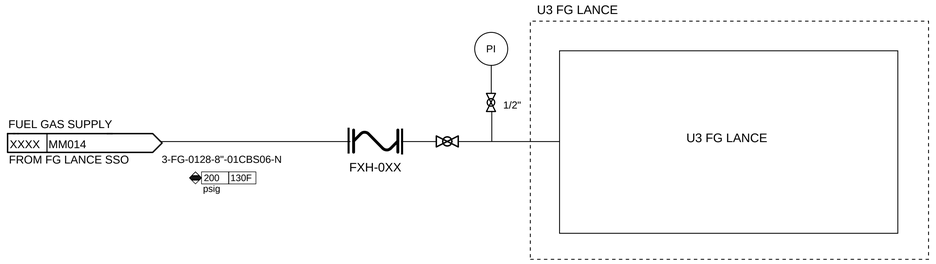

Millimeters
Scale For Microfilming
Inches

PRELIMINARY - NOT FOR CONSTRUCTION

no.	date	by	ckd	description
C	9/20/24	AB	AB	ISSUED WITH PSR
B	06/13/24	AB	AB	IFOR - UPDATED FOR 50% GAS
A	05/06/24	AB	AB	UPDATED BASED ON SITE WALKDOWN
A	02/02/24	AB	MED	ISSUED FOR OWNER REVIEW

no.	date	by	ckd	description

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EAST KENTUCKY POWER COOPERATIVE

SPURLOCK CO-FIRE PROJECT
SPURLOCK STATION
MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION
U3 RIGHT LANCE ROW

project 164714 | contract -
drawing MM015 | rev. C
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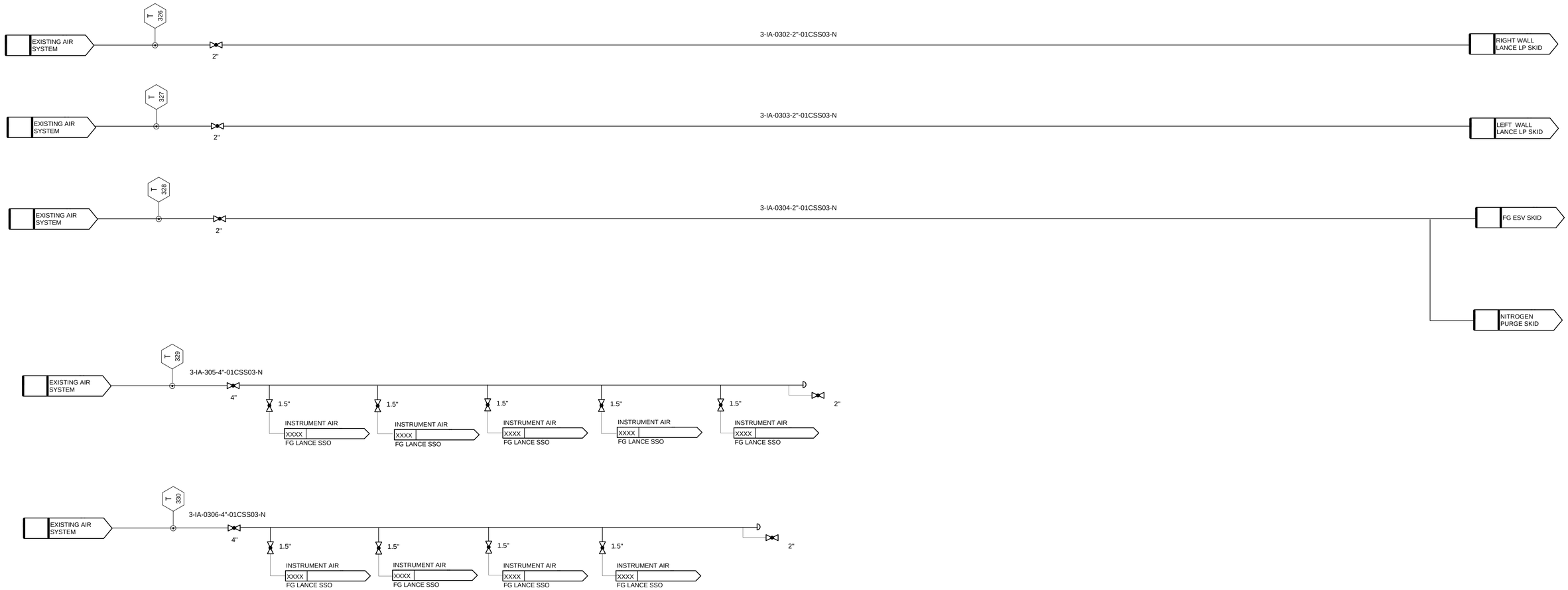

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B	06/13/24	AB	AB	IFOR - UPDATED FOR 50% GAS
A	05/06/24	AB	AB	UPDATED BASED ON SITE WALKDOWN
A	02/02/24	AB	MED	ISSUED FOR OWNER REVIEW

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9400 WARD PARKWAY
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816-333-9400
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designed A. BHALCHANDRA | detailed

EAST KENTUCKY POWER COOPERATIVE

SPURLOCK CO-FIRE PROJECT
SPURLOCK STATION
MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION
INSTRUMENT AIR SYSTEM P&ID
UNIT 3

project 164714 | contract -
drawing MM028 | rev. C
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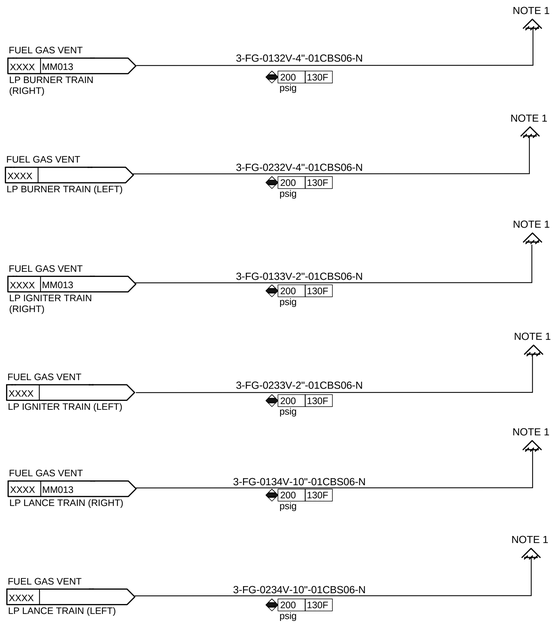
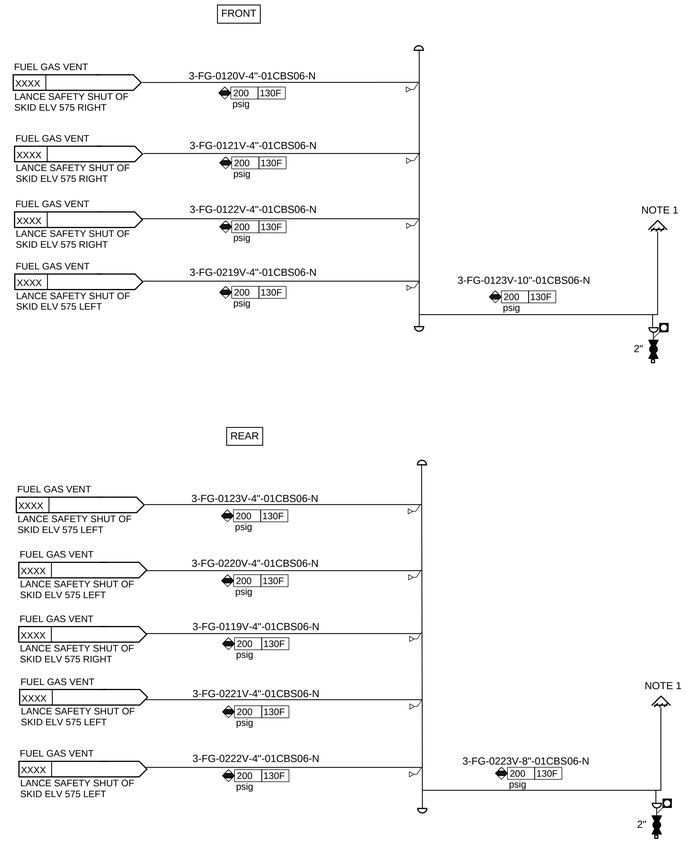
Scale For Microfilming
Millimeters
Inches

NOTES:

1. VENT TO SAFE LOCATION ON THE ROOF OF UNIT 3. TERMINATE VENT WITH RAM'S HORN AND BIRD SCREEN.





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A	05/06/24	AB	AB	UPDATED BASED ON SITE WALKDOWN
A	02/02/24	AB	MED	ISSUED FOR OWNER REVIEW

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9400 WARD PARKWAY
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816-333-9400
FIRM LICENSE NO. 43
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detailed

EAST KENTUCKY POWER COOPERATIVE

SPURLOCK CO-FIRE PROJECT
SPURLOCK STATION
MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION
U3 FUEL GAS VENTS

project 164714 | contract -
drawing MM025 | rev. C
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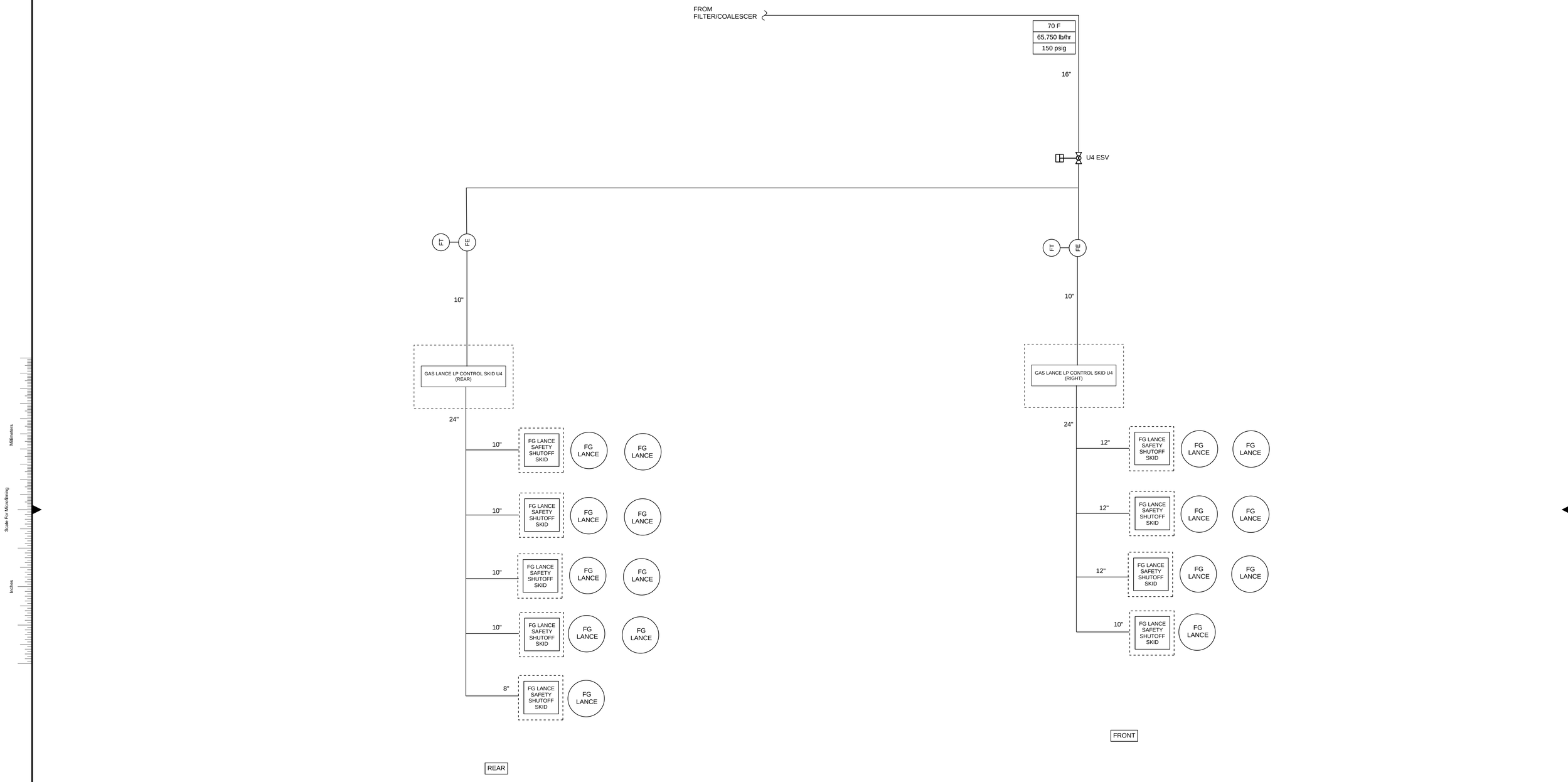
Millimeters
Scale For Microfilming
Inches



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no.	date	by	ckd	description
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B	06/13/24	AB	AB	IFOR - UPDATED FOR 50% GAS
A	05/06/24	AB	AB	UPDATED BASED ON SITE WALKDOWN
A	02/02/24	AB	MED	ISSUED FOR OWNER REVIEW

no.	date	by	ckd	description

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816-333-9400
FIRM LICENSE NO. 43
designed A. BHALCHANDRA
detailed

EAST KENTUCKY POWER COOPERATIVE

SPURLOCK CO-FIRE PROJECT
SPURLOCK STATION
MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION
PROCESS FLOW DIAGRAM
UNIT 4

project 164714 | contract -
drawing MM016 | rev. C
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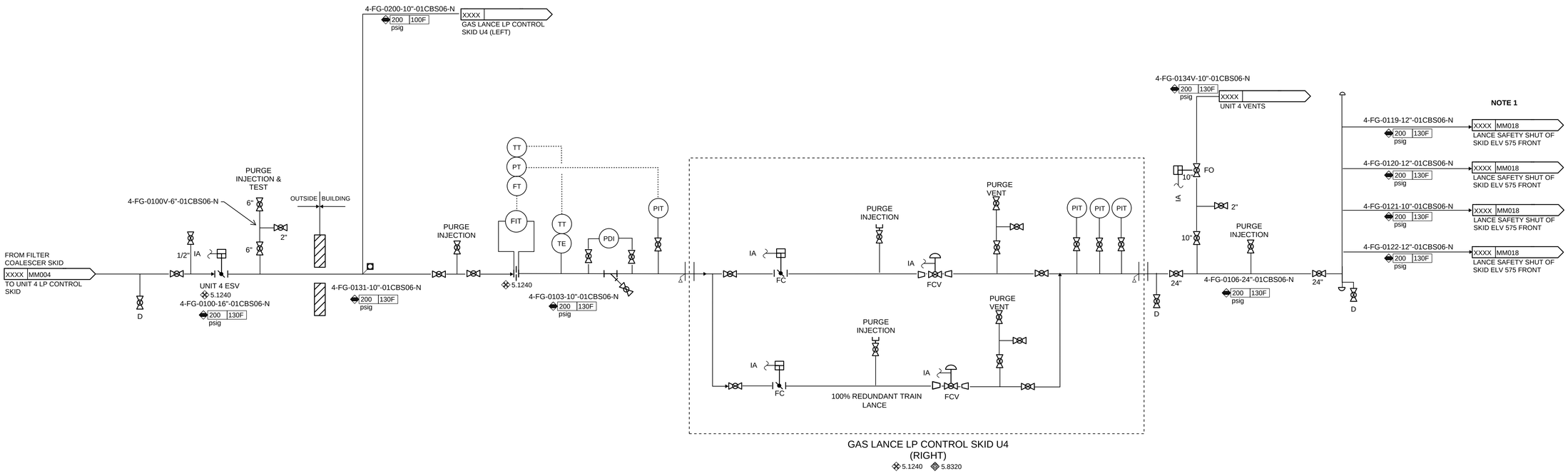
Scale For Microfilming
Millimeters
Inches



GAS LANCE LP CONTROL SKID U4
(RIGHT)

5.1240 5.8320

NOTE 1:
- ON THE FRONT LANCE LP SKID, FUEL GAS WILL GO TO FOUR (4) LANCE SAFETY SHUT OFF SKIDS WHICH CONTROL SEVEN (7) LANCES. PIPING ON THE REAR FROM THE LP SKID TO THE SSOs CONTROLING 2 LANCES WILL BE 10". PIPING FROM THE LP SKID TO THE SSO CONTROLING 1 LANCE WILL BE 8".
- ON THE REAR LANCE LP SKID, FUEL GAS WILL GO TO FIVE (5) LANCE SAFETY SHUTOFF SKIDS WHICH CONTROL NINE (9) LANCES. PIPING ON THE FRONT AND REAR WILL NOT BE THE SAME SIZE AS THE LANCES ON THE REAR ARE LARGER.

PRELIMINARY - NOT FOR CONSTRUCTION

no.	date	by	ckd	description
C	9/20/24	AB	AB	ISSUED WITH PSR
B	06/13/24	AB	AB	IFOR - UPDATED FOR 50% GAS
A	05/06/24	AB	AB	UPDATED BASED ON SITE WALKDOWN
A	02/02/24	AB	MED	ISSUED FOR OWNER REVIEW

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9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO. 43
designed: A. BHALCHANDRA
detailed:

EAST KENTUCKY POWER COOPERATIVE
SPURLOCK CO-FIRE PROJECT
SPURLOCK STATION
MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION
GAS LANCE LP CONTROL SKID U4 (RIGHT)

project	contract
164714	-
drawing	rev.
MM017	C
sheet	of sheets
file	

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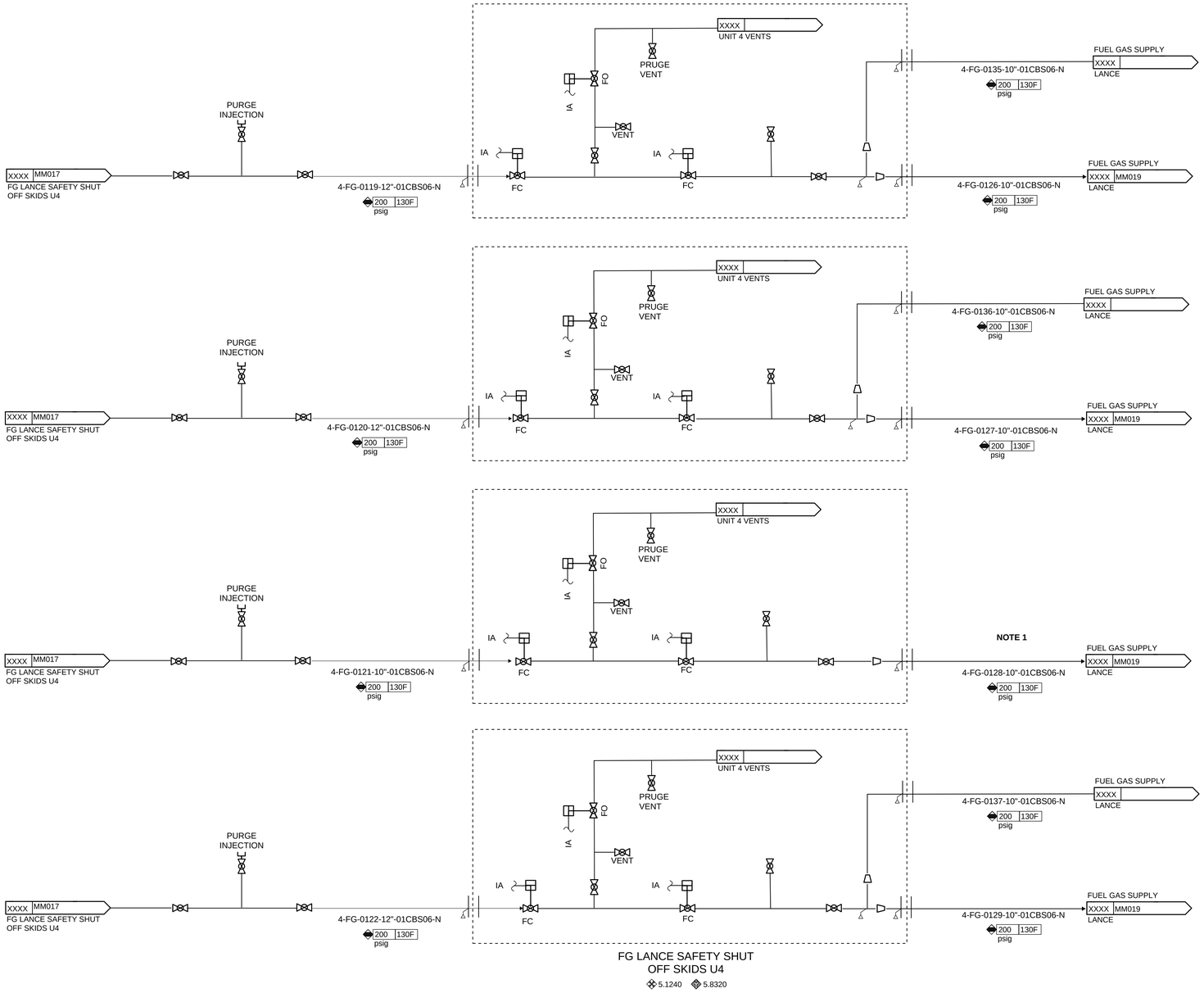

FG LANCE SAFETY SHUT
OFF SKIDS U4

5.1240 5.8320

NOTE 1:
- ON THE FRONT LANCE LP SKID, FUEL GAS WILL GO TO FOUR (4) LANCE SAFETY SHUT OFF SKIDS WHICH CONTROL SEVEN (7) LANCES. PIPING ON THE FRONT FROM THE LP SKID TO THE SSOs CONTROLING 2 LANCES WILL BE 12". PIPING FROM THE LP SKID TO THE SSO CONTROLING 1 LANCE WILL BE 10". THE FRONT AND REAR WILL NOT BE THE SAME SIZE AS THE LANCES ON THE REAR ARE LARGE
- ON THE REAR LANCE LP SKID, FUEL GAS WILL GO TO FIVE (5) LANCE SAFETY SHUTOFF SKIDS WHICH CONTROL NINE (9) LANCES. PIPING ON R. PIPING ON THE REAR FROM THE LP SKID TO THE SSOs CONTROLING 2 LANCES WILL BE 10". PIPING FROM THE LP SKID TO THE SSO CONTROLING 1 LANCE WILL BE 8".

PRELIMINARY - NOT FOR CONSTRUCTION

no.	date	by	ckd	description
C	9/20/24	AB	AB	ISSUED WITH PSR
B	06/13/24	AB	AB	IFOR - UPDATED FOR 50% GAS
A	05/06/24	AB	AB	UPDATED BASED ON SITE WALKDOWN
A	02/02/24	AB	MED	ISSUED FOR OWNER REVIEW

no.	date	by	ckd	description

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO. 43
designed A. BHALCHANDRA
detailed

EAST KENTUCKY POWER COOPERATIVE
SPURLOCK CO-FIRE PROJECT
SPURLOCK STATION
MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION
FG LANCE SAFETY SHUT
OFF SKIDS U4

project 164714 | contract -
drawing MM018 | rev. C
sheet | of | sheets
file

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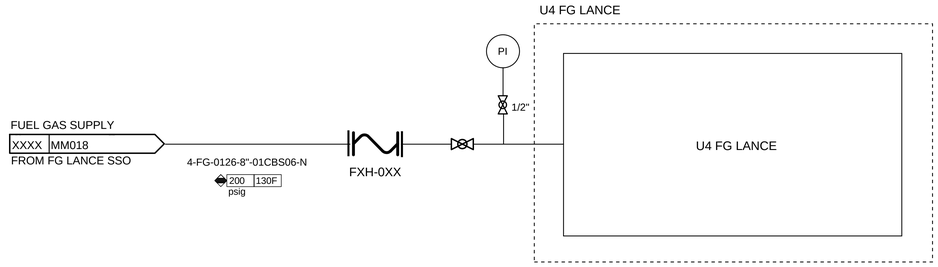

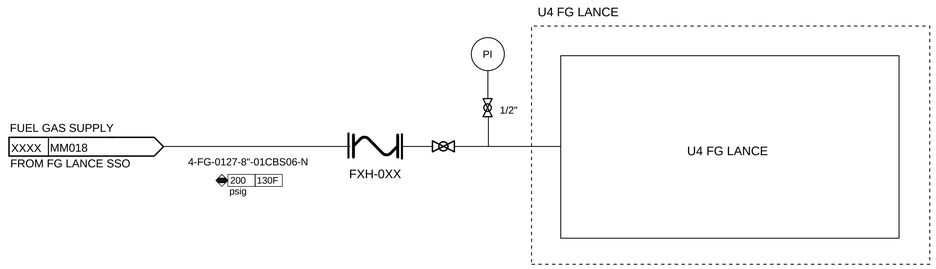

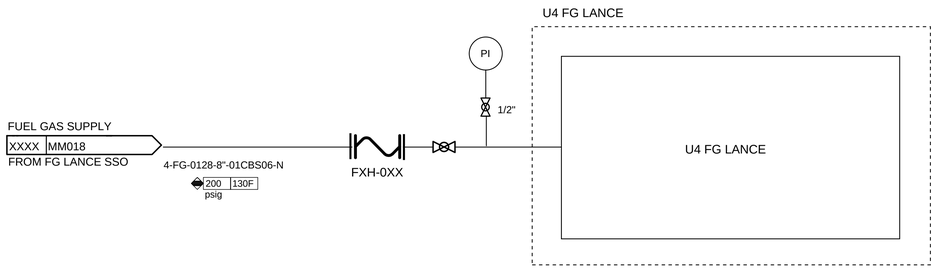

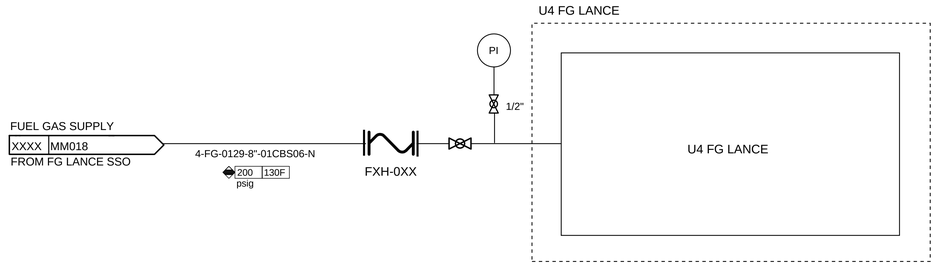

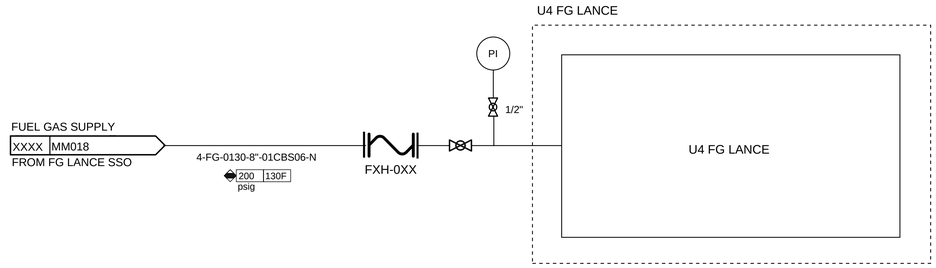

PRELIMINARY - NOT FOR CONSTRUCTION

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A	05/06/24	AB	AB	UPDATED BASED ON SITE WALKDOWN
A	02/02/24	AB	MED	ISSUED FOR OWNER REVIEW

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9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO. 43
designed A. BHALCHANDRA
detailed

EAST KENTUCKY POWER COOPERATIVE
SPURLOCK CO-FIRE PROJECT
SPURLOCK STATION
MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION
U4 RIGHT LANCE ROW

project	contract
164714	-
drawing	rev.
MM019	B
sheet	of sheets
file	

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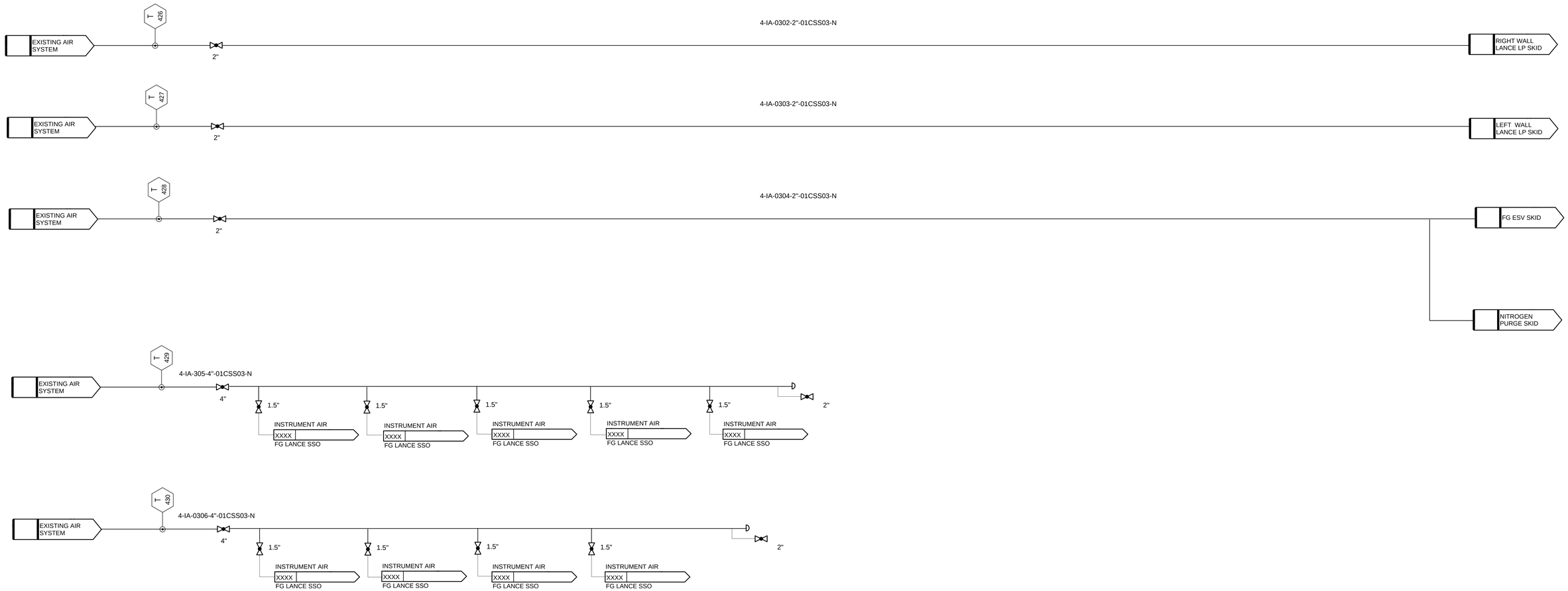
Scale For Microfilming
Millimeters
Inches



PRELIMINARY - NOT FOR CONSTRUCTION

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A	05/06/24	AB	AB	UPDATED BASED ON SITE WALKDOWN
A	02/02/24	AB	MED	ISSUED FOR OWNER REVIEW

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9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO. 43
designed A. BHALCHANDRA
detailed

EAST KENTUCKY POWER COOPERATIVE
SPURLOCK CO-FIRE PROJECT
SPURLOCK STATION
MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION
INSTRUMENT AIR SYSTEM P&ID
UNIT 4

project 164714 | contract -
drawing MM028 | rev. B
sheet | of | sheets
file

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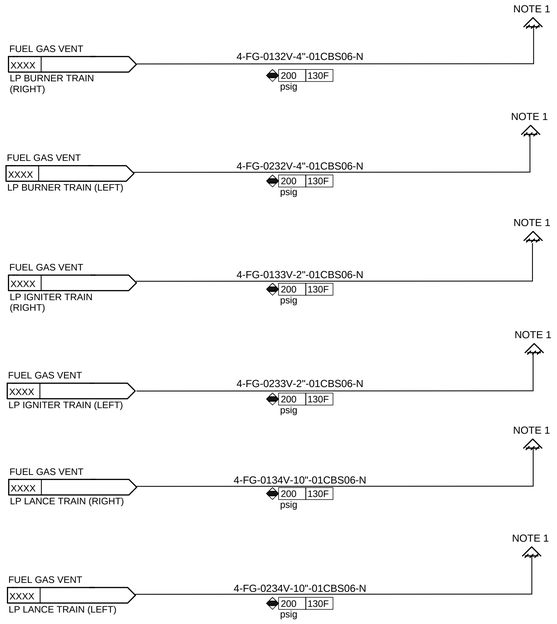
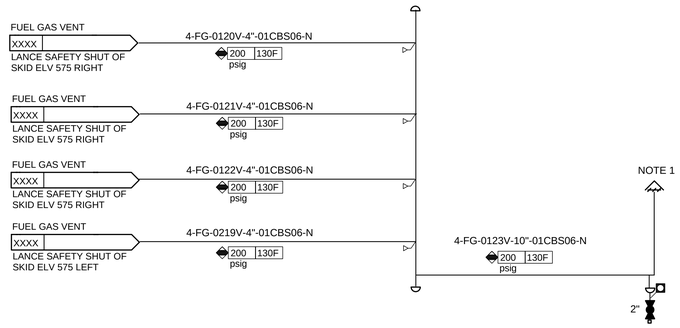
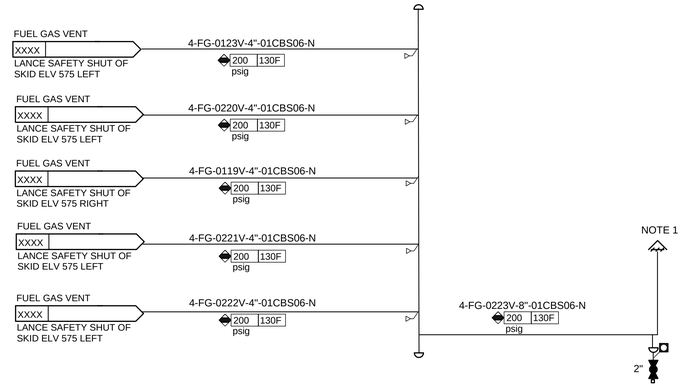
NOTES:

1. VENT TO SAFE LOCATION ON THE ROOF OF UNIT 3. TERMINATE VENT WITH RAM'S HORN AND BIRD SCREEN.







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A	05/06/24	AB	AB	UPDATED BASED ON SITE WALKDOWN
A	02/02/24	AB	MED	ISSUED FOR OWNER REVIEW

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO. 43
designed: A. BHALCHANDRA
detailed:

EAST KENTUCKY POWER COOPERATIVE

SPURLOCK CO-FIRE PROJECT
SPURLOCK STATION
MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION
U4 FUEL GAS VENTS

project: 164714 | contract: -
drawing: MM026 | rev.: C
sheet: | of: | sheets:
file:

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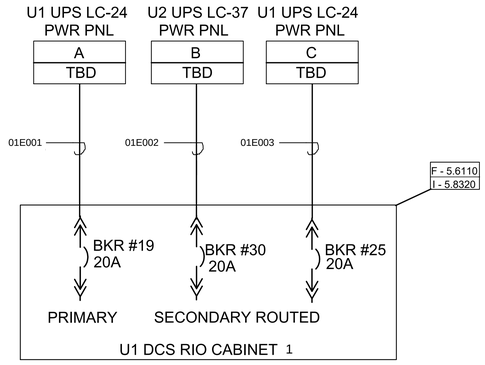
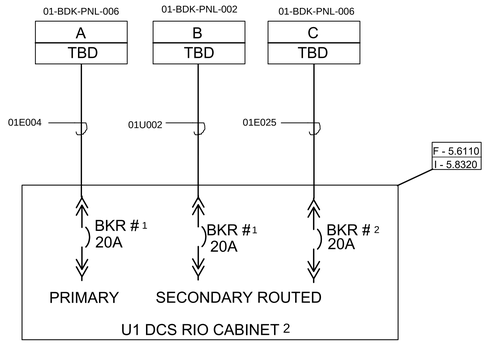
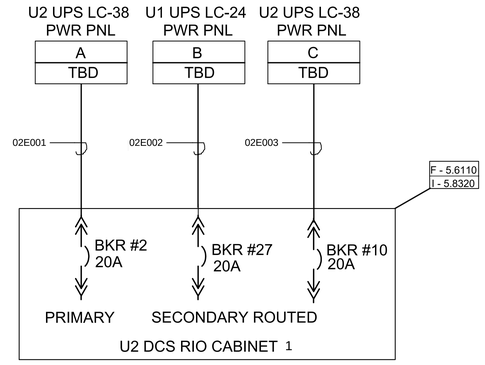
Millimeters
Inches
Scale For Microfilming

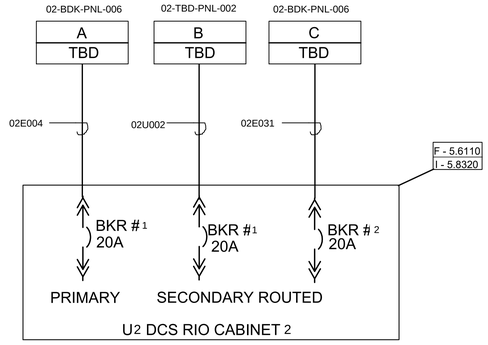


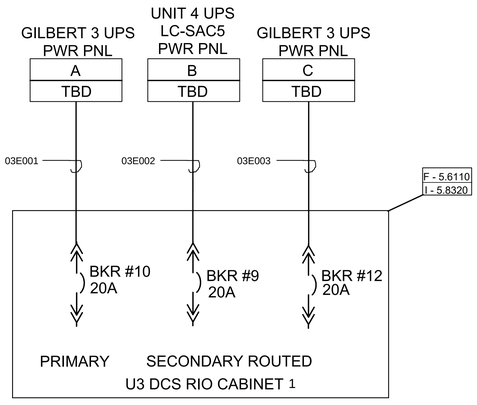
A - U1 120V UPS: PRIMARY
B - U2 120V UPS: SECONDARY
C - U1 120V UPS: RO



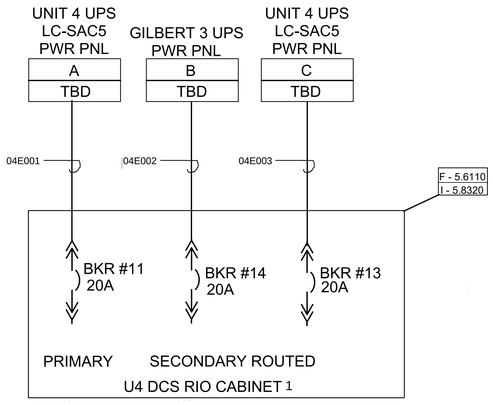


A - U2 120V UPS: PRIMARY
B - U1 120V UPS: SECONDARY
C - U2 120V UPS: RO

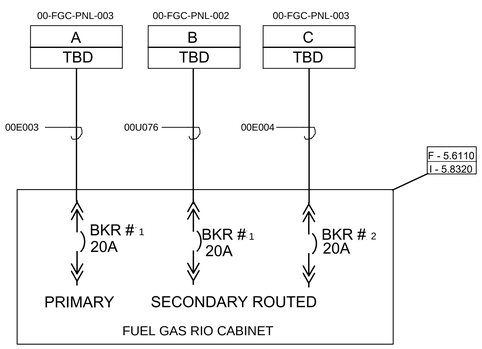


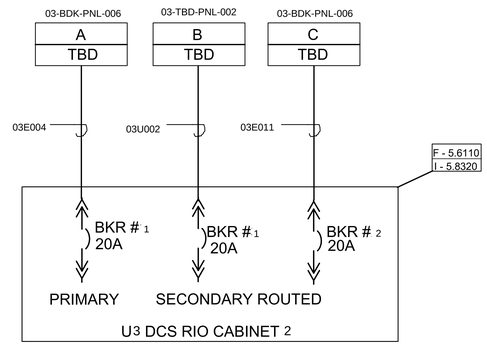


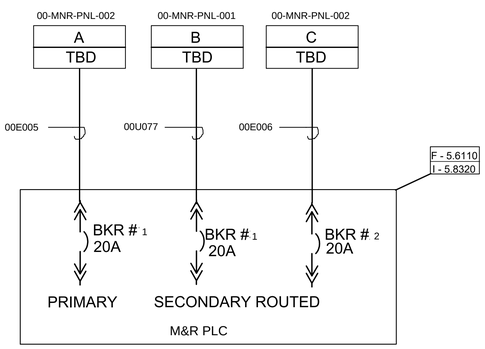
A - U3 120V UPS: PRIMARY
B - U4 120V UPS: SECONDARY
C - U3 120V UPS: RO

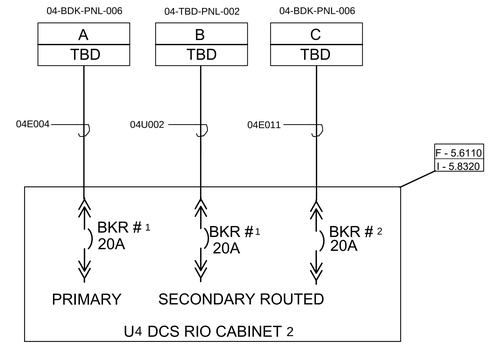


A - U4 120V UPS: PRIMARY
B - U3 120V UPS: SECONDARY
C - U4 120V UPS: RO









no.	date	by	ckd	description
B	9/20/24	LDV	CDM	ISSUED WITH PSR
A	1/31/24	LDV	CDM	ISSUED FOR ESTIMATING

no.	date	by	ckd	description

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO. 43
designed L. D. VO
detailed L. D. VO

EAST KENTUCKY POWER COOPERATIVE
SPURLOCK CO-FIRE PROJECT
SPURLOCK STATION
MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION
ELECTRICAL SKETCH
COFIRE DCS CABINET POWER

project 164714 | contract –
drawing SK-EE001 | rev. — B
sheet 1 of 1 sheets
file 164714 SK-EE001

LEGEND:
- 345kV
- 161kV
- 138kV
- 69kV
- 22kV -18kV
- 13.8kV
- 4160V
- 480V
- 240V-208V

A
THIS DRAWING

D
SK-EE012

00S023
00S034
00S024
00S035

F - 8410
I - 8410
00-FGC-ATS-001

00S026

F - 8410
I - 8410
00-FGC-PNL-001

00S002

480V
208/120V
30KVA

00U003

F - 8410
I - 8410
00-FGC-PNL-002

00U004

F - 8410
I - 8410
00-FGC-PNL-003

A

FROM COOLING TOWER SWITCHGEAR 3A1 (52-3A1F1)
DWG. SP0-PWR-300-KA2019-0021

4160V
480Y/277V
XFMR-3A11
2000KVA
VTC WEST
CAST COIL
5.75%Z

GE
WAVEPRO WPS-32
MVT-PM
3200A FRAME / 3200A SENSOR
1B

COOLING TOWER UNIT SUB SUS-3A11
480V
GE/PEDERSON POWER PRODUCTS
(UNIT 3 COOLING TOWER BUILDING)

GE
WAVEPRO WPX-08
MVT-PM
800A FRAME / 800A PLUG
2A

GE
WAVEPRO WPX-08
MVT-PM
800A FRAME / 800A PLUG
2B

GE
WAVEPRO WPX-08
MVT-PM
800A FRAME / 800A PLUG
2C

GE
WAVEPRO WPX-08
MVT-PM
800A FRAME / 800A PLUG
2D

N.O.
GE
WAVEPRO WPX-08
MVT-PM
800A FRAME / 800A PLUG
3C

GE
WAVEPRO WPX-08
MVT-PM
800A FRAME / 800A PLUG
3D

COOLING TOWER FAN 3A STARTER
480V
CUTLER-HAMMER
(UNIT 3 COOLING TOWER BUILDING)

COOLING TOWER FAN 3B STARTER
480V
CUTLER-HAMMER
(UNIT 3 COOLING TOWER BUILDING)

COOLING TOWER FAN 3C STARTER
480V
CUTLER-HAMMER
(UNIT 3 COOLING TOWER BUILDING)

COOLING TOWER FAN 3D STARTER
480V
CUTLER-HAMMER
(UNIT 3 COOLING TOWER BUILDING)

250/
62.5

COOLING TOWER FAN 3A
(UNIT 3 COOLING TOWER)

COOLING TOWER FAN 3B
(UNIT 3 COOLING TOWER)

COOLING TOWER FAN 3C
(UNIT 3 COOLING TOWER)

COOLING TOWER FAN 3D
(UNIT 3 COOLING TOWER)

FROM COOLING TOWER SWITCHGEAR 3B1 (52-3B1F1)
DWG. SP0-PWR-300-KA2019-0021

4160V
480Y/277V
XFMR-3B11
2000KVA
VTC WEST
CAST COIL
5.75%Z

GE
WAVEPRO WPS-32
MVT-PM
3200A FRAME / 3200A SENSOR
1B

MCC-3A11A
480V
EATON
(UNIT 3 COOLING TOWER BUILDING)

400A
200A

A
THIS DRAWING

B
SK-EE012

FGC FEED A
M&R FEED B

COOLING TOWER UNIT SUB SUS-3B11
480V
GE/PEDERSON POWER PRODUCTS
(UNIT 3 COOLING TOWER BUILDING)

GE
WAVEPRO WPX-08
MVT-PM
800A FRAME / 800A PLUG
2A

GE
WAVEPRO WPX-08
MVT-PM
800A FRAME / 800A PLUG
2B

GE
WAVEPRO WPX-08
MVT-PM
800A FRAME / 800A PLUG
2C

GE
WAVEPRO WPX-08
MVT-PM
800A FRAME / 800A PLUG
2D

N.O.
GE
WAVEPRO WPX-08
MVT-PM
800A FRAME / 800A PLUG
3C

GE
WAVEPRO WPX-08
MVT-PM
800A FRAME / 800A PLUG
3D

COOLING TOWER FAN 3E STARTER
480V
CUTLER-HAMMER
(UNIT 3 COOLING TOWER BUILDING)

COOLING TOWER FAN 3F STARTER
480V
CUTLER-HAMMER
(UNIT 3 COOLING TOWER BUILDING)

COOLING TOWER FAN 3G STARTER
480V
CUTLER-HAMMER
(UNIT 3 COOLING TOWER BUILDING)

COOLING TOWER FAN 3H STARTER
480V
CUTLER-HAMMER
(UNIT 3 COOLING TOWER BUILDING)

250/
62.5

COOLING TOWER FAN 3E
(UNIT 3 COOLING TOWER)

COOLING TOWER FAN 3F
(UNIT 3 COOLING TOWER)

COOLING TOWER FAN 3G
(UNIT 3 COOLING TOWER)

COOLING TOWER FAN 3H
(UNIT 3 COOLING TOWER)

MCC-3B11A
480V
EATON
(UNIT 3 WATER TREATMENT BUILDING)

PRELIMINARY - NOT FOR CONSTRUCTION

no.	date	by	ckd	description
B	9/20/24	LDV	CDM	ISSUED WITH PSR
A	02/27/24	LDV	CDM	ISSUED FOR ESTIMATING

BURNS McDONNELL
Burns & McDonnell Engineering Company, Inc.
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO. 43

designed L. VO | detailed L. VO

EAST KENTUCKY POWER COOPERATIVE
SPURLOCK PSR FUEL CONVERSION
MASON COUNTY, KENTUCKY

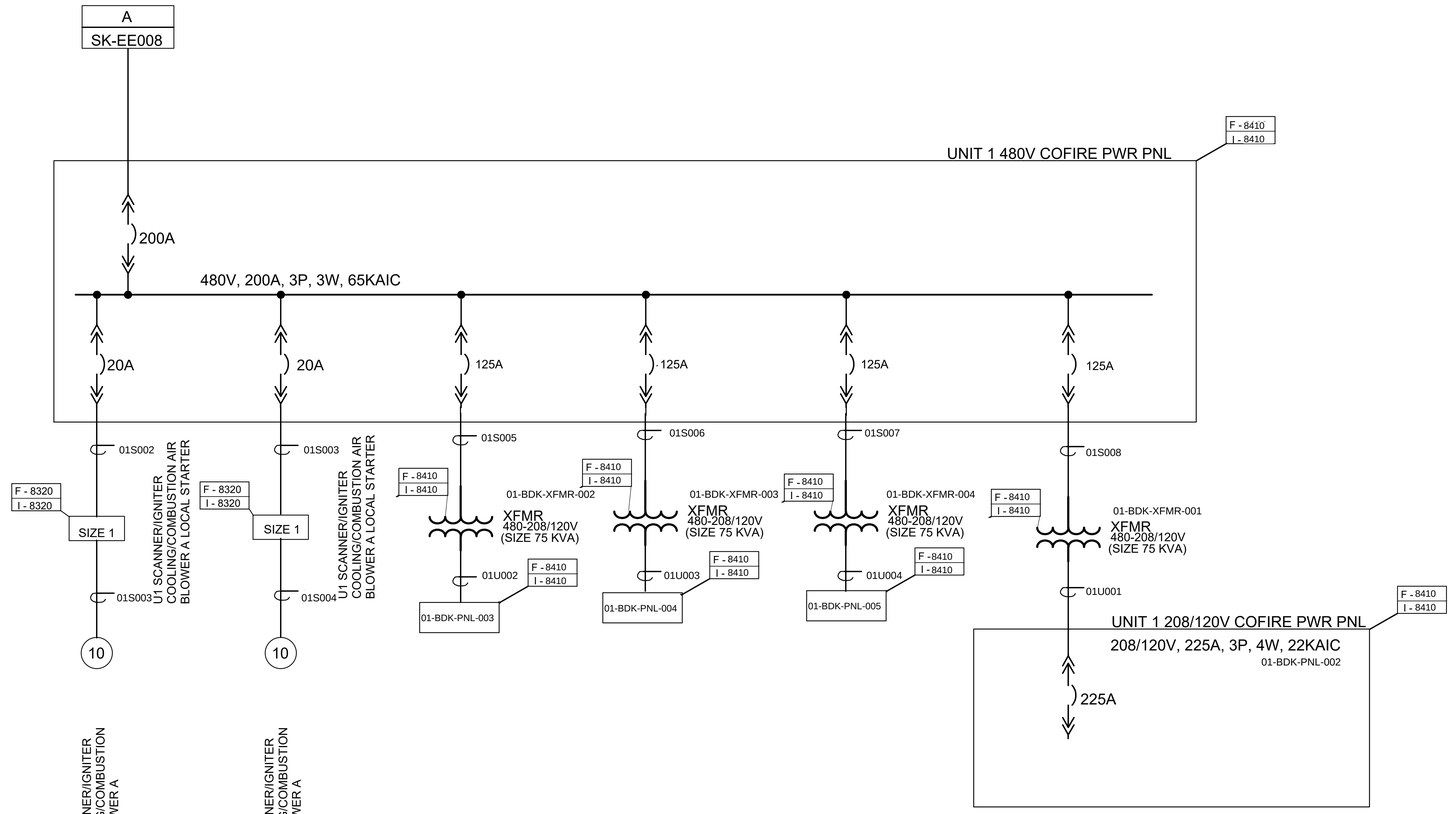
SPURLOCK POWER STATION
ELECTRICAL SKETCH U3 COOLING TOWER SWITCHGEAR AND FGC ONE-LINE

project 164714 | contract

drawing SK-EE002 – | rev. B

sheet 1 of 1 sheets

file 164714 SK-EE002



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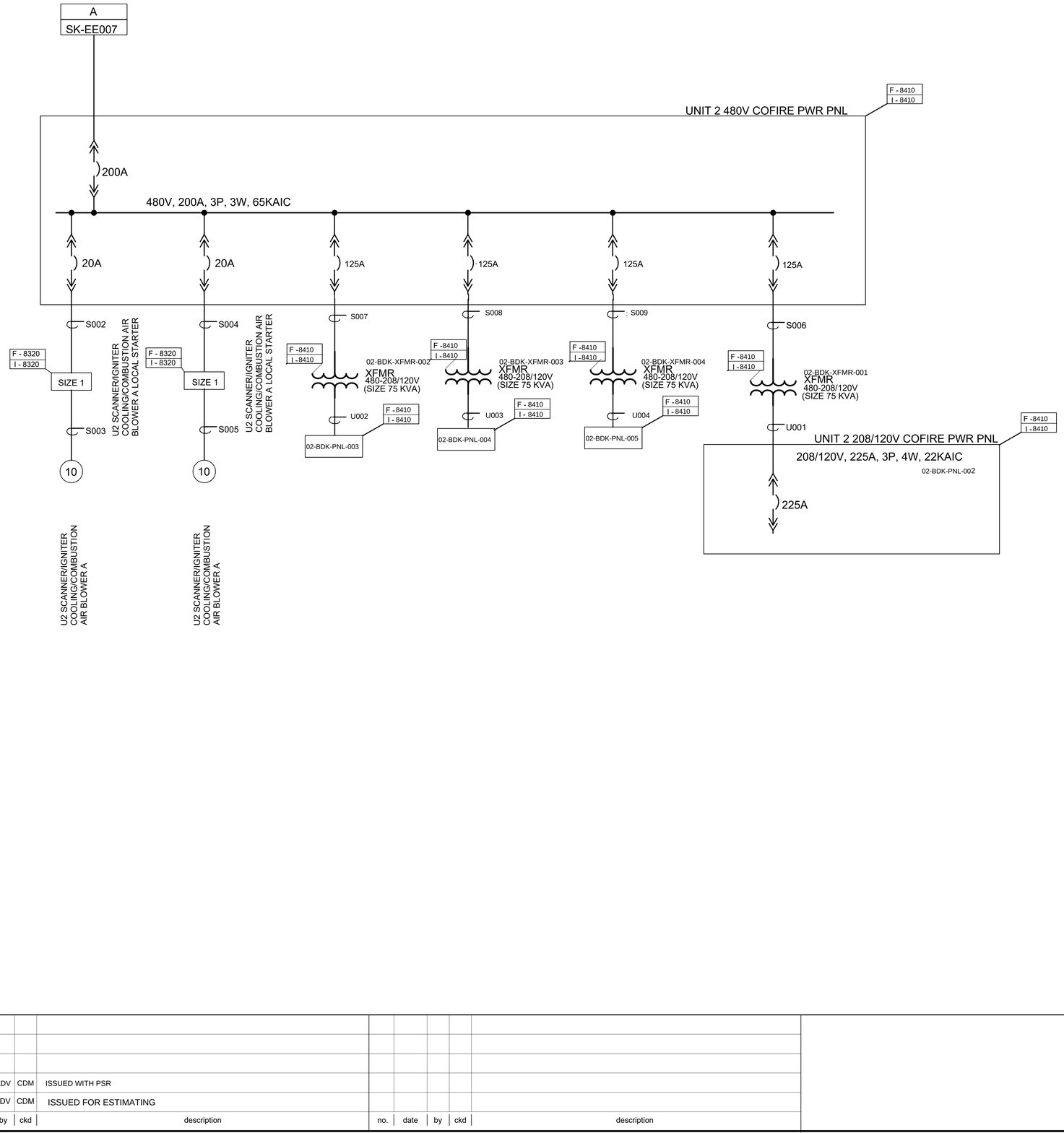
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO. 43
designed L. D. VO
detailed L. D. VO

EAST KENTUCKY POWER COOPERATIVE

SPURLOCK PSR FUEL CONVERSION
SPURLOCK STATION
MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION
ELECTRICAL SKETCH UNIT 1
COFIRE POWER PANELS
ONE-LINE

project 164714 | contract –
drawing SK-EE003 | rev. — B
sheet 1 of 1 sheets
file 164714 SK-EE003



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no.	date	by	ckd	description

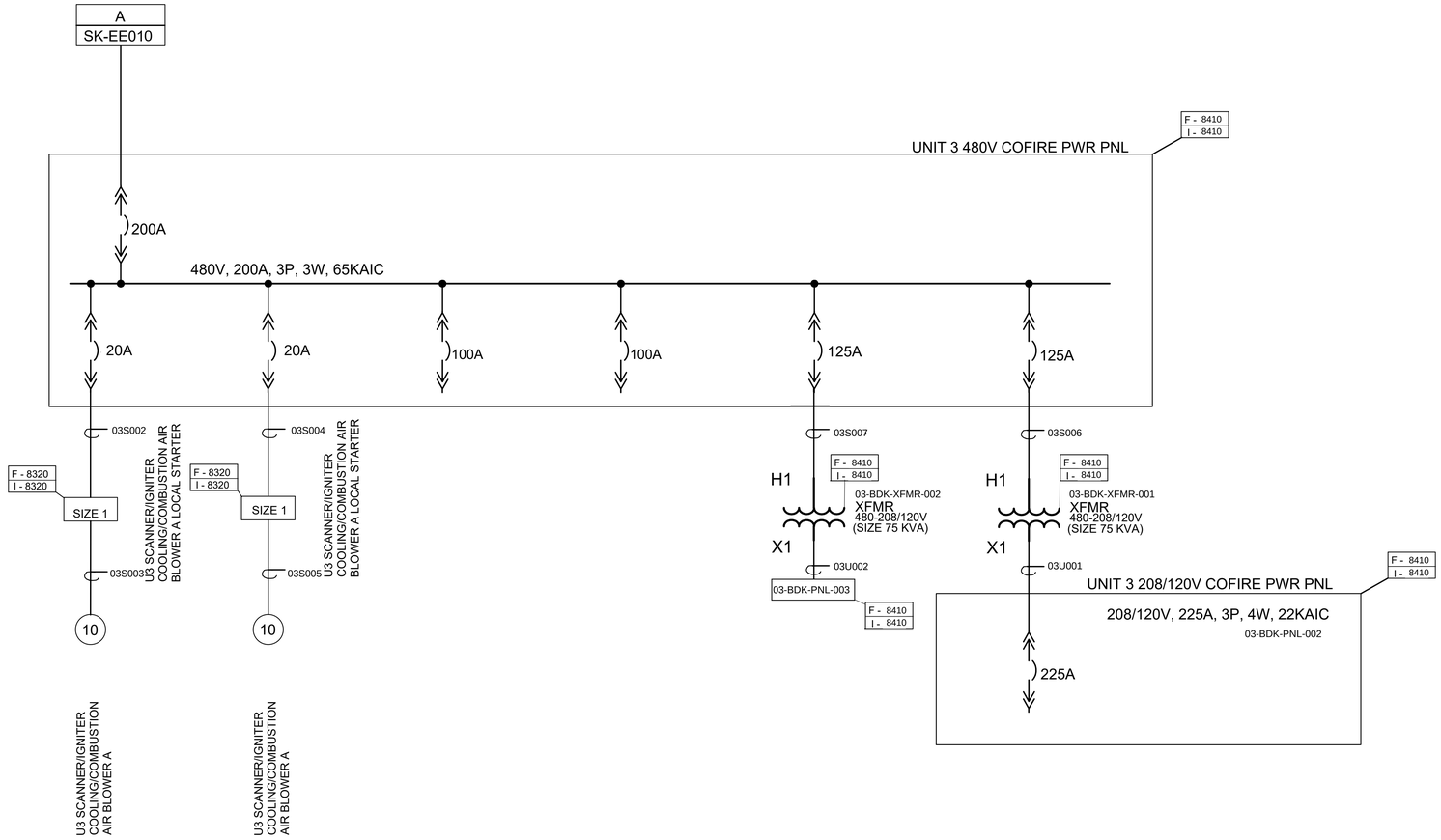
BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO. 43
designed L. D. VO
detailed L. D. VO

EAST KENTUCKY POWER COOPERATIVE

SPURLOCK PSR FUEL CONVERSION
SPURLOCK STATION
MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION
ELECTRICAL SKETCH UNIT 2
COFIRE POWER PANELS
ONE-LINE

project 164714 | contract –
drawing SK-EE004 | rev. — B
sheet 1 of 1 sheets
file 164714 SK-EE004



Millimeters
Inches
Scale For Microfilming

no.	date	by	ckd	description
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A	1/31/24	LDV	CDM	ISSUED FOR ESTIMATING

no.	date	by	ckd	description

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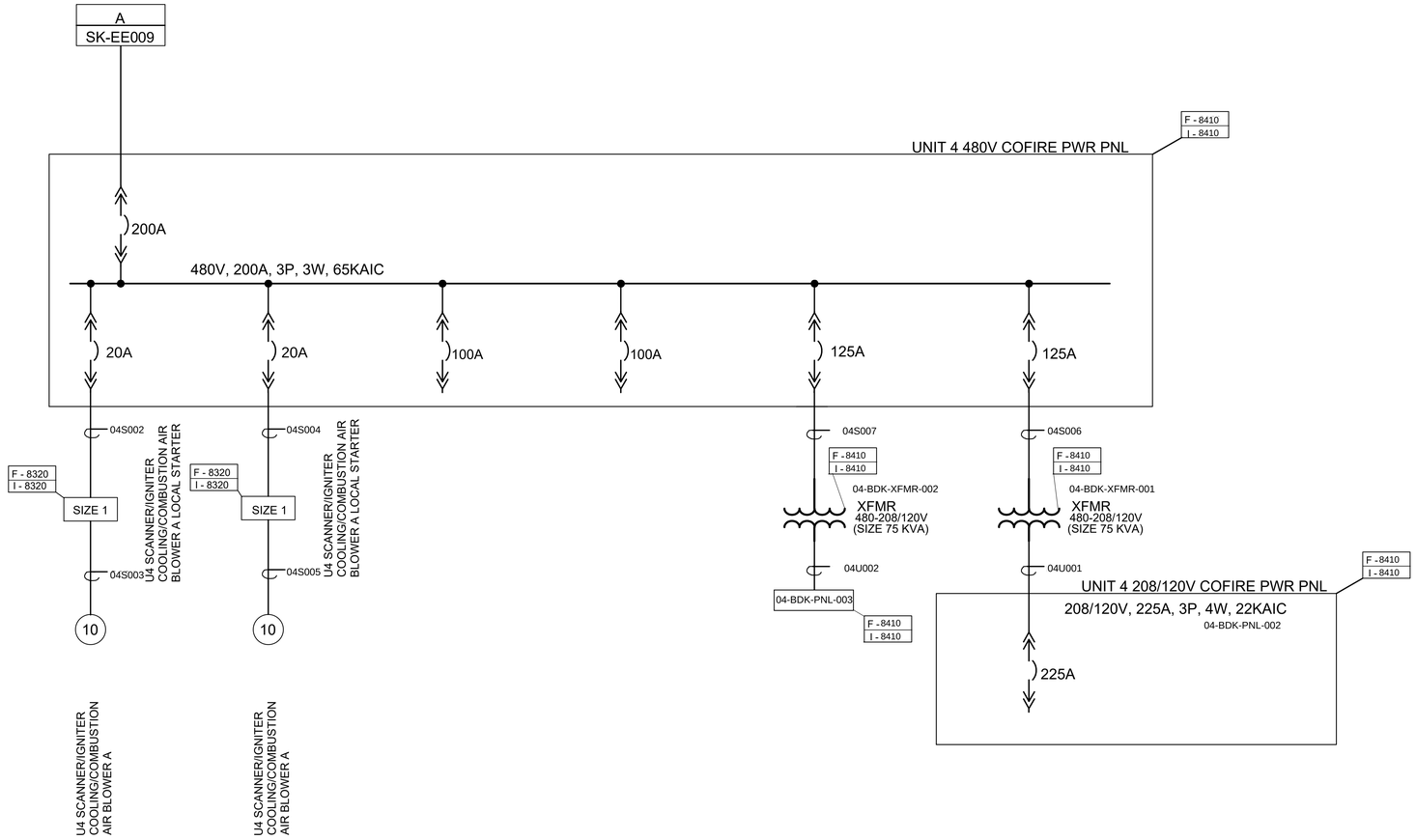
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO. 43
designed L. D. VO
detailed L. D. VO

EAST KENTUCKY POWER COOPERATIVE
SPURLOCK PSR FUEL CONVERSION
SPURLOCK STATION
MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION
ELECTRICAL SKETCH UNIT 3
COFIRE POWER PANELS
ONE-LINE

project 164714 | contract –
drawing SK-EE005 | rev. — B
sheet 1 of 1 sheets
file 164714 SK-EE005



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KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO. 43

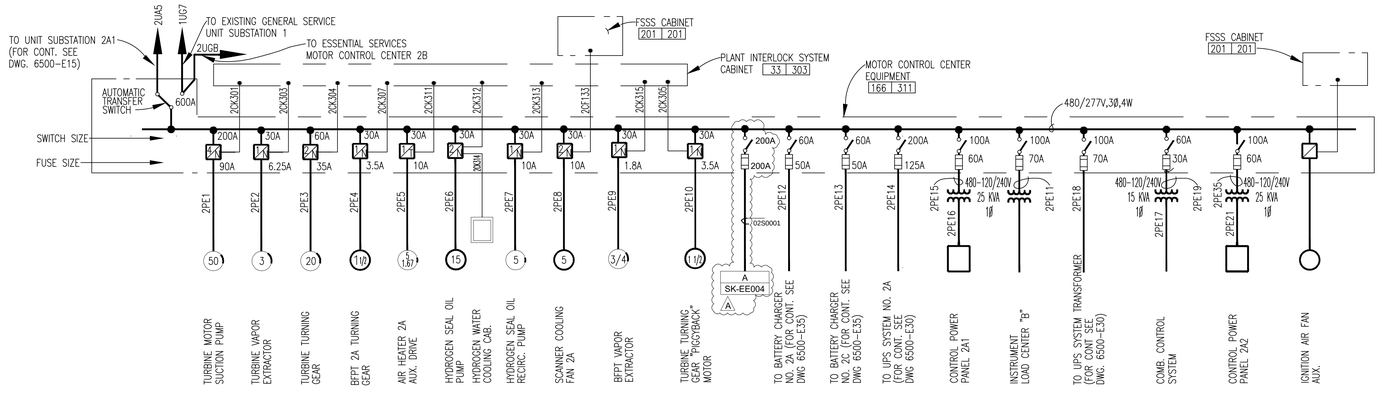
designed L. D. VO
detailed L. D. VO

EAST KENTUCKY POWER COOPERATIVE

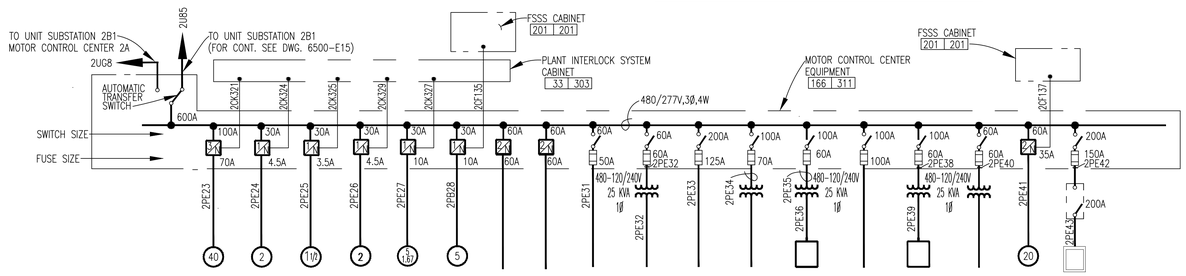
SPURLOCK PSR FUEL CONVERSION
SPURLOCK STATION
MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION
ELECTRICAL SKETCH UNIT 4
COFIRE POWER PANELS
ONE-LINE

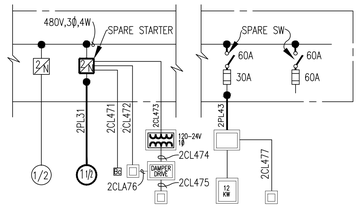
project 164714 | contract –
drawing SK-EE006 | rev. — B
sheet 1 of 1 sheets
file 164714 SK-EE006



ESSENTIAL SERVICES MOTOR CONTROL CENTER 2A



ESSENTIAL SERVICES MOTOR CONTROL CENTER 2B

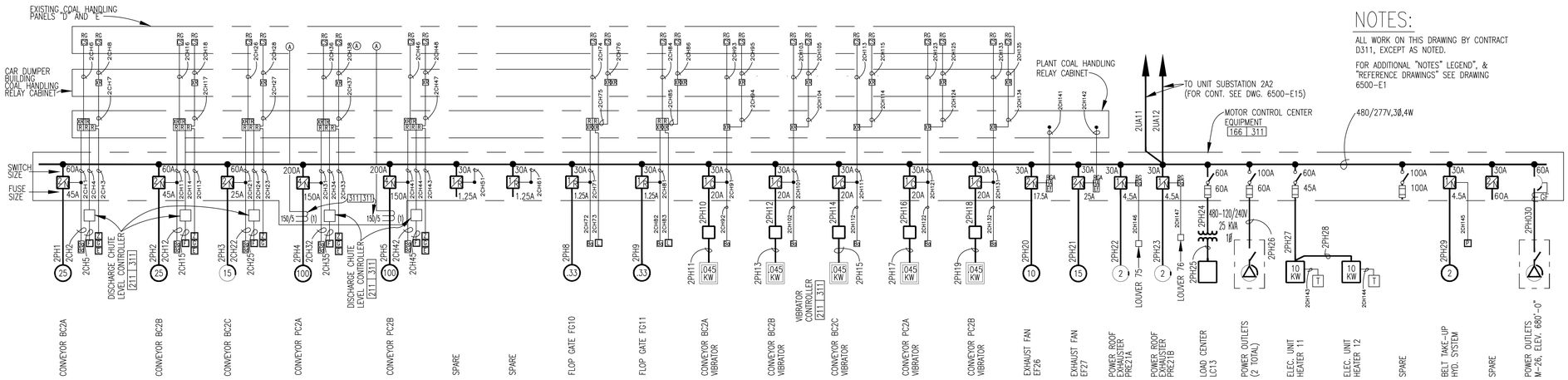


EXISTING CRUSHER HOUSE MOTOR CONTROL CENTER NO. 2A

NOTES:

ALL WORK ON THIS DRAWING BY CONTRACT D311, EXCEPT AS NOTED.

FOR ADDITIONAL "NOTES" LEGEND", & "REFERENCE DRAWINGS" SEE DRAWING 6500-E1



PLANT COAL HANDLING MOTOR CONTROL CENTER

ELECTRICAL SKETCH UNIT 3
COFIRE POWER PANELS
ONE-LINE

no.	date	by	ckd	description
B	9/20/24	LDV	CDM	ISSUED WITH PSR
A	1/31/24	LDV	CDM	ISSUED FOR ESTIMATING

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO. 43

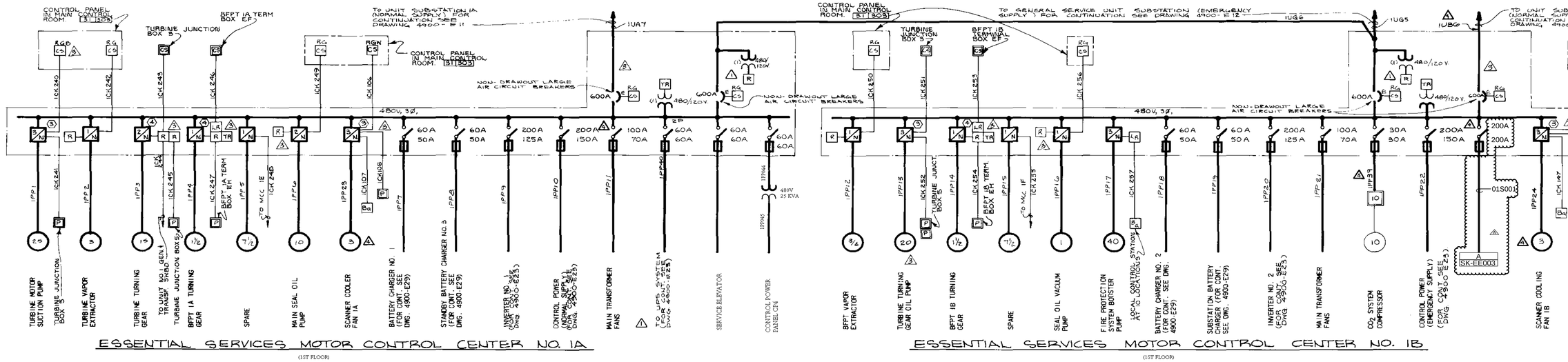
designed L. D. VO | detailed L. D. VO

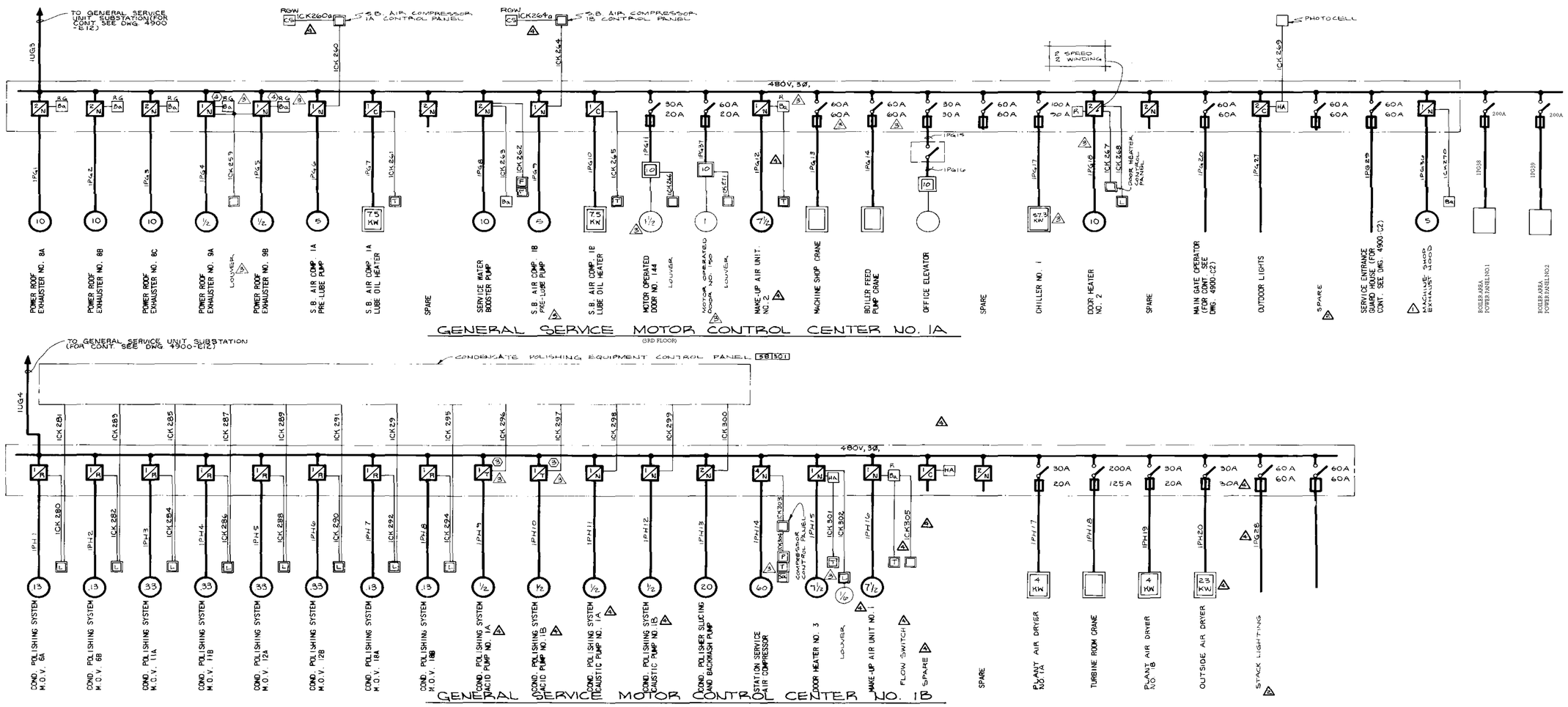
EAST KENTUCKY POWER COOPERATIVE
SPURLOCK PSR FUEL CONVERSION
SPURLOCK STATION
MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION
ELECTRICAL SKETCH UNIT 2
ESSENTIAL MCC 480V SYSTEM
ONE-LINE

project 164714 | contract –
drawing SK-EE007 | rev. B
sheet 1 of 1 sheets
file 164714 SK-EE007

Scale For Microfilming: Millimeters / Inches





no.	date	by	ckd	description
B	9/20/24	LDV	CDM	ISSUED WITH PSR
A	1/31/24	LDV	CDM	ISSUED FOR ESTIMATING

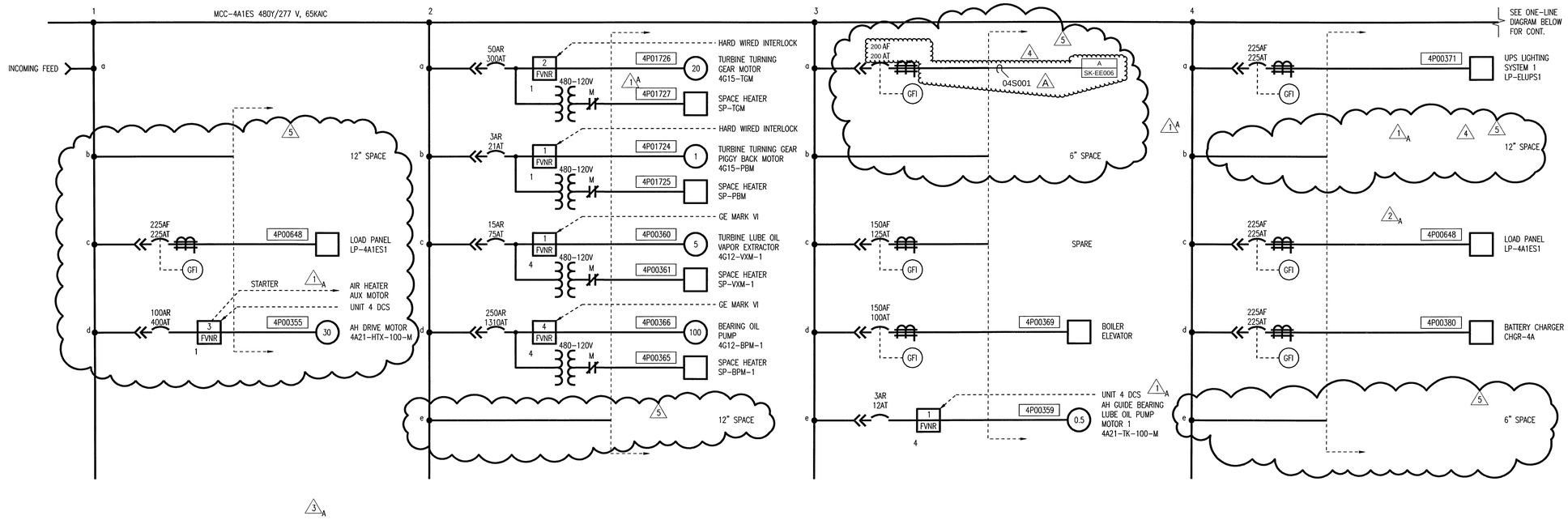
BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO. 43
designed L. D. VO
detailed L. D. VO

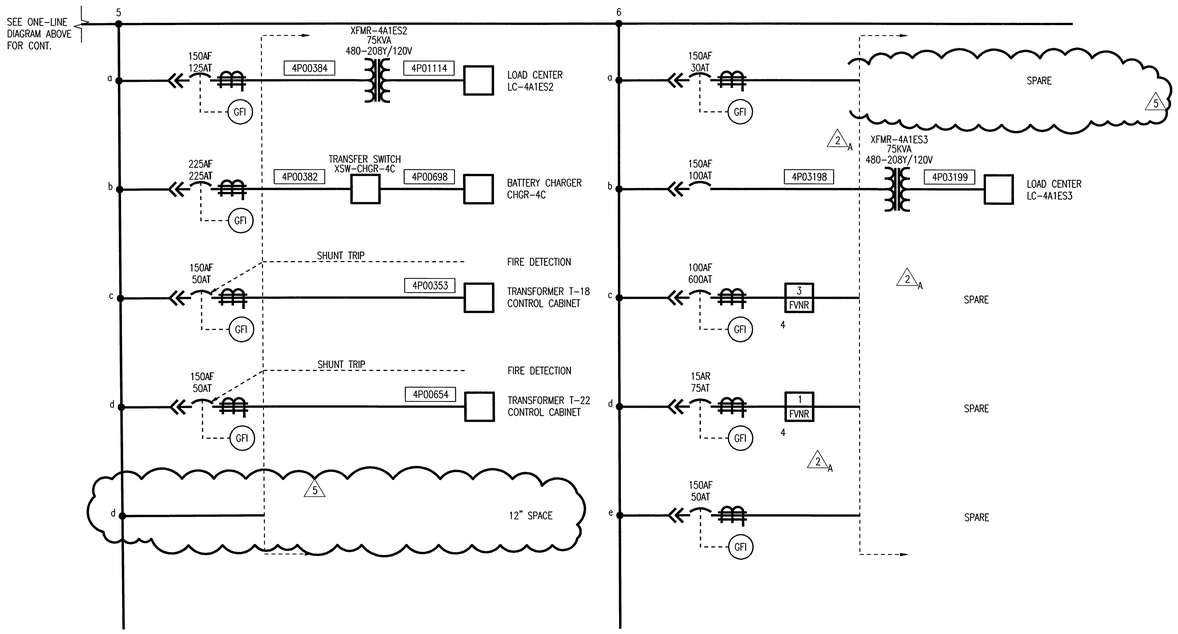
EAST KENTUCKY POWER COOPERATIVE
SPURLOCK PSR FUEL CONVERSION
SPURLOCK STATION
MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION
ELECTRICAL SKETCH UNIT 1
ESSENTIAL MCC
480V SYSTEM
ONE-LINE

project 164714 | contract –
drawing SK-EE008 | rev. — B
sheet 1 of 1 sheets
file 164714 SK-EE008

Scale For Microfilming: Millimeters / Inches





LEGEND:

3 A — 1 FVNR (#)

— WIRING DIAGRAM TYPE DESIGNATION. SEE E145 AND E146 FOR DETAILS

NOTES:

1. ALL WORK ON THIS DRAWING BY F281 F281 UNLESS NOTED OTHERWISE.
2. EQUIPMENT TAGS BEGINNING WITH "4AXX" OR "4KXX" F201 F201 .
3. EQUIPMENT TAGS BEGINNING WITH "4GXX", F1 F1 .

Scale For Microfilming: Millimeters / Inches

no.	date	by	ckd	description
B	9/20/24	LDV	CDM	ISSUED WITH PSR
A	1/31/24	LDV	CDM	ISSUED FOR ESTIMATING

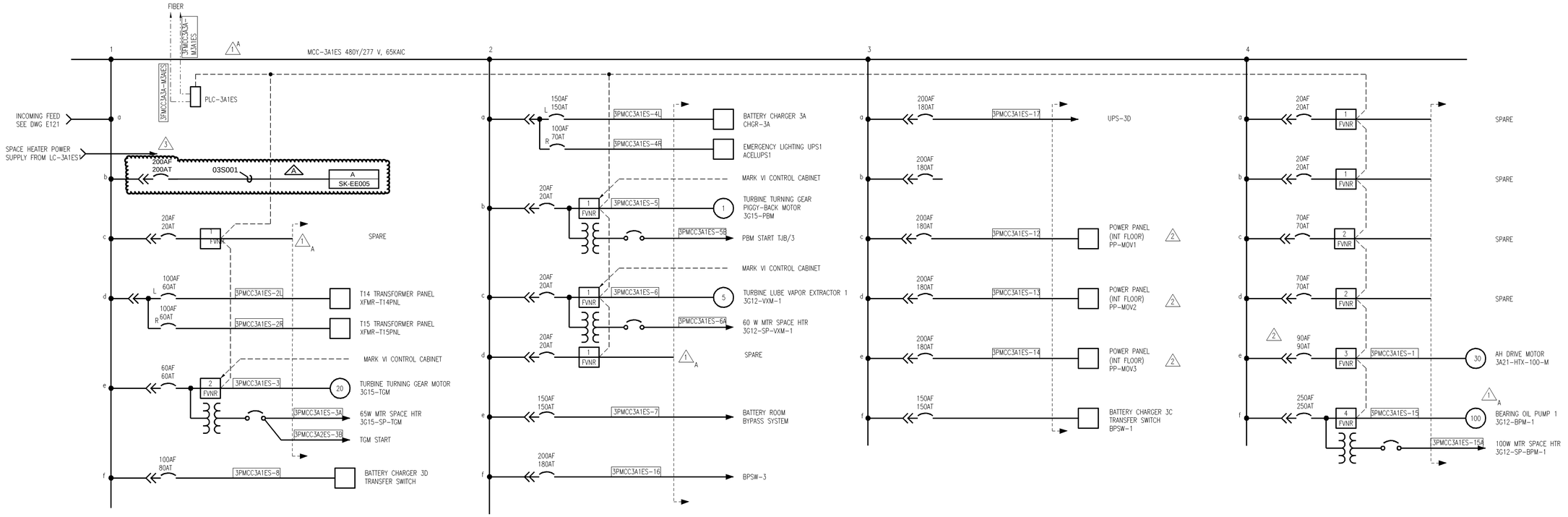
BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO. 43

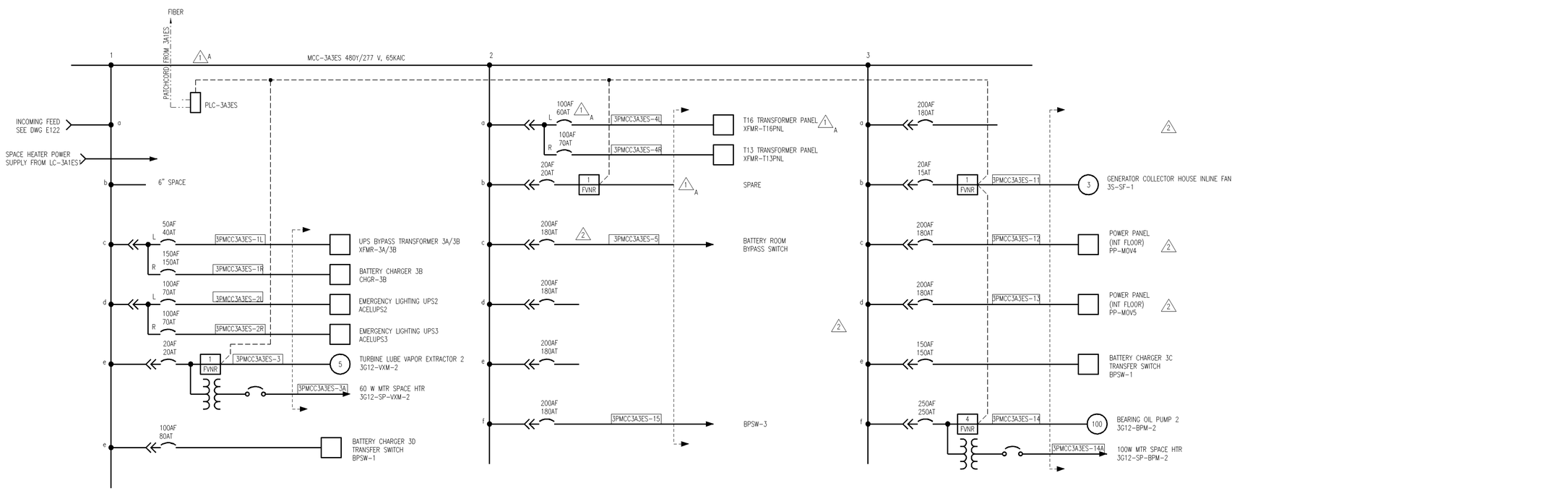
designed L. D. VO | detailed L. D. VO

EAST KENTUCKY POWER COOPERATIVE
SPURLOCK PSR FUEL CONVERSION
SPURLOCK STATION
MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION
ELECTRICAL SKETCH
UNIT 4 MCC 4A1ES
ONE-LINE

project 164714 | contract –
drawing SK-EE009 | rev. — B
sheet 1 of 1 sheets
file 164714 SK-EE009





Scale For Microfilming
Millimeters
Inches

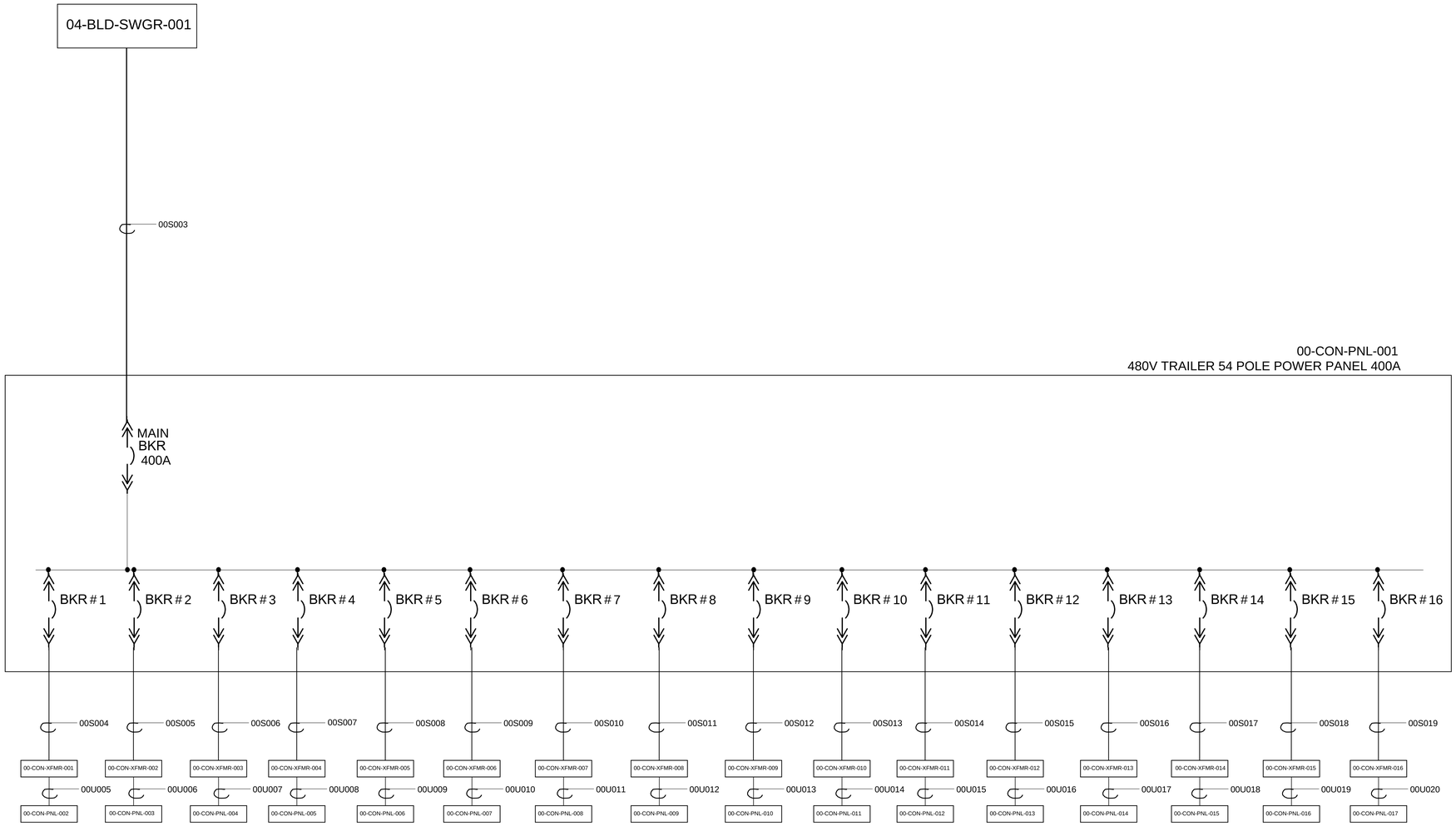
no.	date	by	ckd	description
B	9/20/24	LDV	CDM	ISSUED WITH PSR
A	1/31/24	LDV	CDM	ISSUED FOR ESTIMATING

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO. 43
designed L. D. VO
detailed L. D. VO

EAST KENTUCKY POWER COOPERATIVE
SPURLOCK PSR FUEL CONVERSION
SPURLOCK STATION
MASON COUNTY, KENTUCKY

SPURLOCK POWER STATION
ELECTRICAL SKETCH
UNIT 3 MCC 3A1ES AND 3A3ES ONE-LINE

project 164714 | contract –
drawing SK-EE010 | rev. — B
sheet 1 of 1 sheets
file 164714 SK-EE010



no.	date	by	ckd	description
B	9/20/24	LDV	CDM	ISSUED WITH PSR
A		LDV	CDM	ISSUED FOR ESTIMATING

no.	date	by	ckd	description

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO. 43

designed L. D. VO | detailed L. D. VO

EAST KENTUCKY POWER COOPERATIVE

SPURLOCK PSR FUEL CONVERSION
SPURLOCK STATION
MASON COUNTY, KENTUCKY

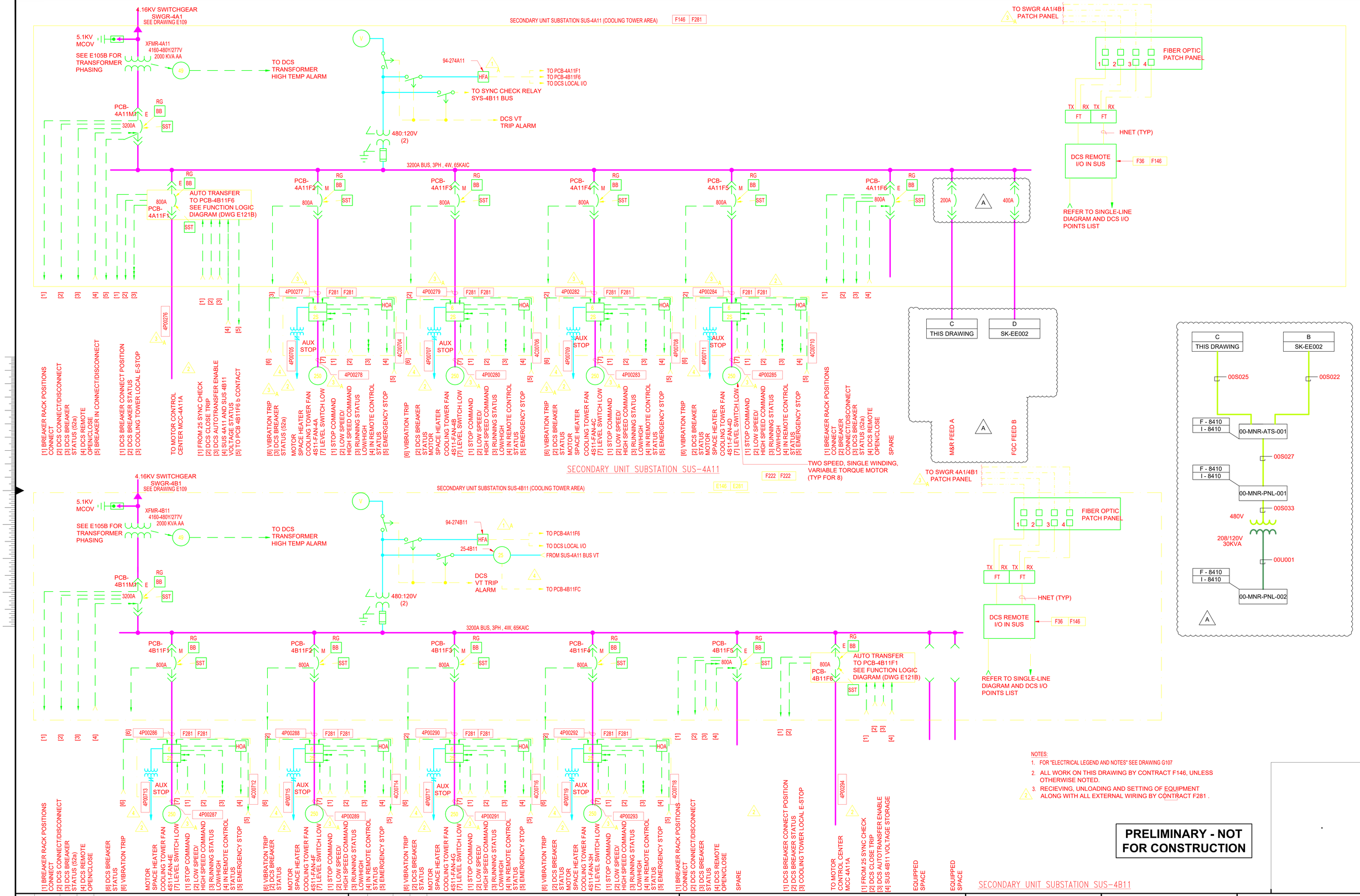
SPURLOCK POWER STATION
ELECTRICAL SKETCH
CONSTRUCTION TRAILER
POWER

project 164714 | contract –

drawing SK-EE011 | rev. — B

sheet 1 of 1 sheets

file 164714 SK-EE011



no.	date	by	ckd	description
B	9/20/24	LDV	CDM	ISSUED WITH PSR
A	02/27/24	LDV	CDM	ISSUED FOR ESTIMATING

BURNS McDONNELL
Burns & McDonnell Engineering Company, Inc.
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO. 43
designed L. VO
detailed L. VO

EAST KENTUCKY POWER COOPERATIVE

SPURLOCK PSR FUEL CONVERSION
MASON COUNTY, KENTUCKY

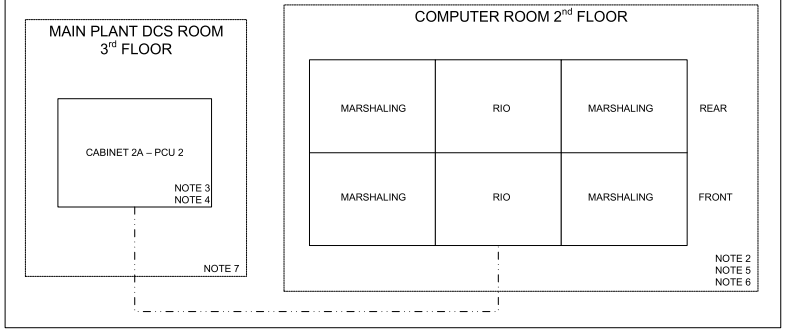
SPURLOCK POWER STATION
ELECTRICAL SKETCH U4 COOLING TOWER SWITCHGEAR AND M&R ONE-LINE

project 164714 | contract
drawing **SK-EE012** | rev. **B**
sheet 1 of 1 sheets
file 164714 SK-EE012

\\BMCD.BURNSMCD.COM\DFS\CLIENTS\ENR\EKPC\164714_SPURCONVPSR\2_DESIGN\ELEC\ONE-LINE_DWGS\WORKING\164714 SK-EE012.DWG 2/29/2024 TDVO

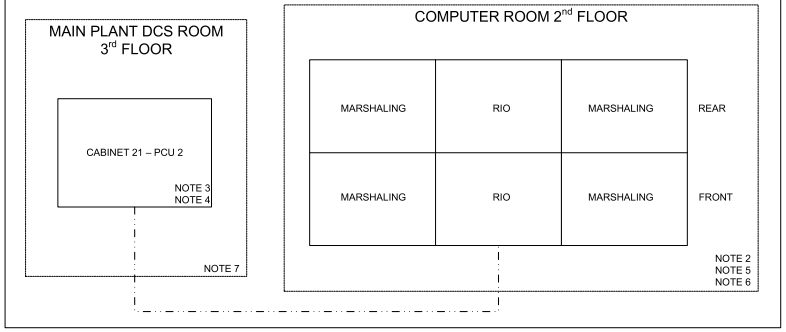
UNIT 1

System	DI	RO	AI	AO	TC	RTD	TOTAL
BMS	480	228	0	0	0	1	709
CCS	10	4	76	8	4		102



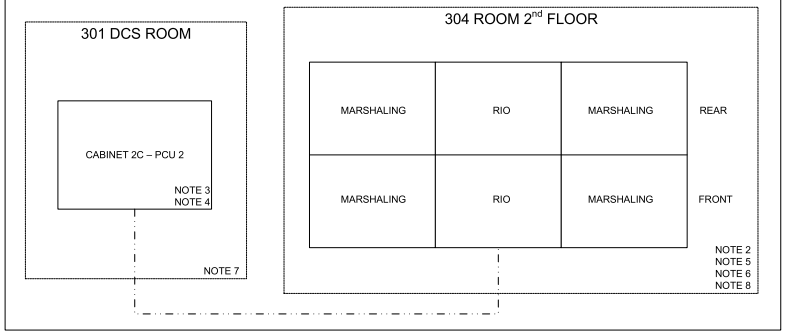
UNIT 2

System	DI	RO	AI	AO	TC	RTD	TOTAL
BMS	576	270	0	0	0	1	847
CCS	8	4	86	4	2		104



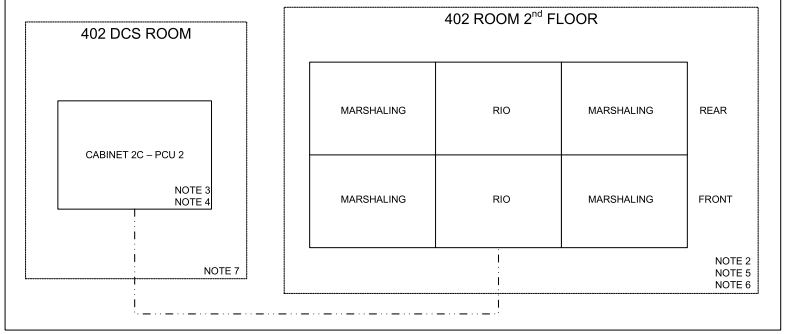
UNIT 3

System	DI	RO	AI	AO	TC	RTD	TOTAL
BMS	248	120	0	0	0	1	369
CCS	6	4	34	30	3		77



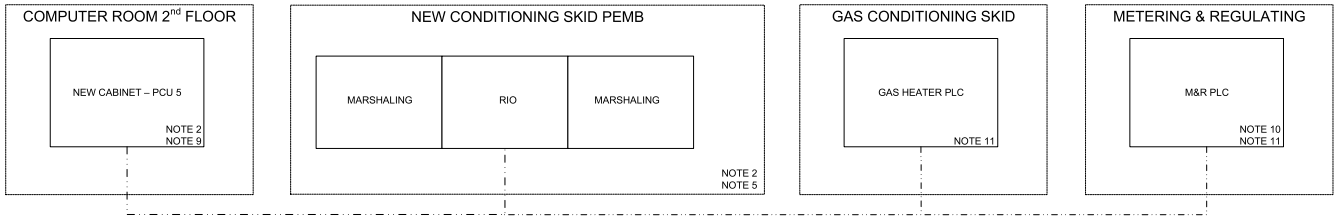
UNIT 4

System	DI	RO	AI	AO	TC	RTD	TOTAL
BMS	248	120	0	0	0	1	369
CCS	6	4	34	30	3		77



COMMON

Unit	DI	RO	AI	AO	TC	RTD	TOTAL
Common	10	2	42	12	2	2	70



no.	date	by	ckd	description
0	02/09/24	CC	TD	ISSUED FOR
1	9/20/24	CC	TD	ISSUED WITH PSR

NOTES:

1. INTERNAL CONNECTIONS NOT SHOWN.
2. NEW EQUIPMENT.
3. EXISTING EQUIPMENT.
4. NEW MMU WITH REDUNDANT BRC-410's AND RIO MODULES.
5. S800 I/O.
6. INCLUDE MULTIPLING MFT RELAYS DRIVEN FROM EXISTING MFT CABINET.
7. UTILIZE EXISTING SPARE FOR CCS I/O
8. ROOM WILL BE EXTENDING TO HOUSE NEW CABINETS.
9. NEW PCU WITH REDUNDANT POWER SUPPLIES , BRC-410's, AND RIO MODULES. TIE INTO EXISTING COMMON LOOP.
10. PLC BY OTHERS.
11. DATALINK.

LEGEND:

REDUNDANT FIBEROPTIC CABLE: – · · – · · –

BURNS McDONNELL

date	detailed
02/09/2024	C. COONTS
designed	checked
C. COONTS	T. DORSNER

EAST KENTUCKY POWER COOPERATIVE
A Touchstone Energy Cooperative

EKCP SPURLOCK GAS CONVERION
PRELIMINARY
CONTROL SYSTEM ARCHITECTURE

project no.	contract no.
164714	5.6110

drawing no. SK-CSA-01 rev. 1

sheet 1 of 1 sheets

Millimeters
Inches
Scale For Microfilming

APPENDIX F – HEAT BALANCE DIAGRAMS (NOT USED)

APPENDIX G – WATER BALANCE DIAGRAMS (NOT USED)

APPENDIX H – PRELIMINARY SUBSURFACE INVESTIGATION (NOT USED)

APPENDIX I – PRELIMINARY NOISE ASSESSMENT (NOT USED)

APPENDIX J – PERMITTING MATRIX

East Kentucky Power Cooperative (EKPC) Spurlock Generating Station
Coal to Gas Conversion Permit Matrix
10/15/24

No.	Permit/Clearance	Regulatory Agency	Details	When Required	Comments
Federal					
1	Notice of Proposed Construction or Alteration	Federal Aviation Administration (FAA)	Must notify the FAA if structures will exceed 200 feet in height or if the structures (stacks & cranes) are located within the 100:1 (distance to height) ratio from the nearest point of the nearest FAA designated airport runway. Notifying the FAA includes completing Form 7460-1 for all required structures and providing a site layout map depicting structure locations.	Prior to construction	
2	Endangered Species Act (ESA) Section 7 Threatened and Endangered (T&E) Species Consultation and Clearance	U.S. Fish & Wildlife Service (USFWS), Ecological Services	If the project will potentially impact protected species or their respective habitat, or if a Section 404 and/or NPDES permit is required, then the FWS must be contacted. The FWS will determine the level of effort needed for the project to proceed (e.g., habitat assessment, species surveys, avian impact studies, etc.).	Prior to construction	Because the facility site is previously disturbed, a habitat assessment may only be required, if routed through undisturbed areas. USFWS IPaC indicates that 15 Special Status species have potential to occur within Project Area. Habitat assessments and/or species surveys may be required to determine presence/absence of protected plant and wildlife species, including bats. Seasonal tree clearing restrictions may be imposed to avoid bat roosting periods.
3	Migratory Bird Treaty Act (MBTA) / Bald and Golden Eagle Protection Act (BGEPA)Compliance	U.S. Fish & Wildlife Service (USFWS), Ecological Services	Required when construction or operation of a proposed facility could impact migratory birds, their nests, and especially threatened or endangered species	Prior to construction	Because the facility site is previously disturbed, a habitat assessment may only be required, if routed through undisturbed areas. Nesting period for Migratory Birds within the Project Area is indicated by USFWS to be March 15 - August 31. If tree clearing must occur inside that window it is recommended that avian nest surveys be conducted no more than 5 days prior to clearing a given area.
4	Spill Prevention, Control, and Countermeasures (SPCC) Plan	U.S. Environmental Protection Agency (EPA)	Required if the facility will have 1,320 gallons or more of aboveground petroleum storage capacity in 55-gallon-sized or larger containers (or 42,000 gallons in underground storage not regulated by underground storage tank rules)	Prior to storage of petroleum products onsite in excess of SPCC thresholds	
5	Permits under Section 404 of the Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act	U.S. Army Corps of Engineers (USACE) – Louisville District	Nationwide Permit: Less than or equal to 0.5 acre of wetland impacts Individual Permit: Greater than 0.5 acre of wetland or stream impacts Section 10 Authorization for any structures within or over any navigable waters of the U.S.	Prior to construction start and activities within wetland areas. Section 404 authorization required to dredge or place fill in a jurisdictional water, including wetlands. Section 10 authorization required for crossings/activities within any navigable waterways.	A wetland delineation will be required to determine the extent of wetland and stream impacts associated with the Project. If permanent impacts to wetlands and streams are less than 0.5-acre, Project should qualify for a Nationwide Permit. Mitigation credits would be required for cumulative permanent impacts of 0.10 acre or greater of wetlands and waterbodies. A pre-construction notification (PCN) will likely be required.
6	Consultations regarding erosion and sedimentation controls and seed mixes, Farmland Protection Policy Act (FPPA), and Conservation Reserve Program and Wetland Reserve Program Consultation	U.S. Department of Agriculture- Farm Service Agency and Natural Resources Conservation Service (NRCS)	FPPA consultation form AD-1006; coordination on erosion and sedimentation controls (ESC) and seed mixes; potential NRCS consultation for Conservation and/or Wetland Reserve Programs	Prior to construction	Contractor will fill out form AD-1006 and submit to NRCS for review and scoring (NRCS has 45 days to make determination and return the form). For project sites where the total points equal or exceed 160, consider alternative actions, as appropriate, that could reduce adverse impacts (e.g. Alternative Sites, Modifications or Mitigation).
State - Kentucky					
7	National Environmental Policy Act (NEPA) Review	Lead Federal agency (USDA-RUS)	Required pursuant to NEPA for public disclosure of environmental impacts resulting from Federal actions. Process can be a phased approach. The applicant typically prepares a preliminary Environmental Assessment (EA). The agency reviews the document and can either attach a Finding of No Significant Impact or require the preparation of an Environmental Impact Statement (EIS).	Prior to construction	Verify potential cooperating agencies with RUS during pre-planning activities.
8	Certificate of Public Convenience and Necessity	Kentucky Public Service Commission	Required for the construction of electric generating facilities	Prior to construction	A Notice of Intent must be submitted at least 30 days prior to submitting an application for a certificate.
9	Site Compatibility Certificate	Kentucky Public Service Commission	Required for the construction of electric generating facilities 10 MW or greater	Prior to construction	The site compatibility certificate application will include a site assessment report. Documentation of compliance with NEPA may be submitted in lieu of a site assessment report.
10	Air Quality Construction / Operating Permit (PSD and Title V permit Update)	Kentucky Department of Environmental Protection Division for Air Quality	New Source Review construction permit is required for new major stationary sources of air emissions, and Title V operating permit is required if more than 100 TPY of any non-hazardous regulated air pollutant is emitted	Prior to construction	Replacement of burner can only likely be accomplished with a State permit (Prevention of Significant Deterioration [PSD] minor). The addition of a new combined-cycle unit will likely trigger PSD major source permitting for at least one pollutant, although several pollutants should be able to "net out" of PSD. The existing Title V operating permit will need to be updated.
11	Noise Compliance	Kentucky Public Service Commission (PSC; as a part of a larger certificate application).	Required to demonstrate that facility operation will comply with State, county, and city noise regulations. The PSC may require/request additional noise mitigation measures.	Prior to construction	City of Maysville has local regulations based on time of day and receiving land use that will need to be analyzed for the surrounding area and modeled to determine compliance. Review of County ordinances did not find any numerical noise limits. Any compressors along the pipeline and booster stations will be required to meet the FERC limit of an Ldn of 55 dBA.

East Kentucky Power Cooperative (EKPC) Spurlock Generating Station
Coal to Gas Conversion Permit Matrix
10/15/24

No.	Permit/Clearance	Regulatory Agency	Details	When Required	Comments
12	Section 401 Water Quality Certification (WQC)	Kentucky Energy and Environment Cabinet Department of Environmental Protection Division of Water	Authorizes work and placement of dredged or fill material within watesr of the State. General 401 Certification with approved USACE Nationwide Permit assuming project meets conditions listed in the Kentucky Energy and Environment Cabinet DEP *General Certification--Nationwide Permit (NWP)* document. Individual 401 Certification required if Project is unable to meet conditions listed in the *General Certification--Nationwide Permit (NWP)* document.	Prior to construction	This permit provides Section 401 WQC and floodplain construction approval. The purpose of the WQC is to confirm that the discharge of fill materials will be in compliance with the State's applicable water quality standards. Assumes automatic Water Quality Certification authorization through a USACE Nationwide Permit. The permit application must be reviewed and signed by the local county floodplain coordinator(s) prior to submitting the application to the State.
13	Floodplain Development Permit **(NOT REQUIRED)**	Kentucky Energy and Environment Cabinet Department of Environmental Protection Division of Water	Authorizes construction and development activities along, or adjacent to a stream, or within a floodway. General Permit KY FPGP if Project meets eligibility requirements listed in Section 2.2 of KY FPGP and does not increase the Base Flood Elevation. Individual Permit (IP) if Project is unable to meet eligibility requirements in Section 2.2 of KY FPGP or has potential to increase the Base Flood Elevation.	Prior to construction	
14	Groundwater Protection Plan	Kentucky Energy and Environment Cabinet Department of Environmental Protection Division of Water	Required for activities that have the potential to pollute groundwater. The Groundwater Protection Plan must define best management practices for groundwater protection.	Prior to operation	The Groundwater Protection Plan is not submitted for review unless requested by the State.
15	One-Time/Temporary Discharge Request for Off-Permit Authorization (hydrostatic testing)	Kentucky Energy and Environment Cabinet Department of Environmental Protection Division of Water	Required prior to discharging waters used for hydrostatic testing pipelines and/or tanks.	Prior to testing	
16	Water Withdrawal Permit **(NOT REQUIRED**)	Kentucky Energy and Environment Cabinet Department of Environmental Protection Division of Water	According to the Kentucky Department of Environmental Protection, withdrawals of water greater than 10,000 gallons per day from any surface, spring, or groundwater source, with the exception of water required for steam-powered electrical generating plants whose retail rates are regulated by the Kentucky Public Service Commission or for which facilities a certificate of environmental compatibility from such commission is required by law, require a Water Withdrawal Permit.		
17	General Permit for Stormwater Discharges Associated with Construction Activities	Kentucky Energy and Environment Cabinet Department of Environmental Protection Division of Water	Required for all stormwater discharges from construction activities which will disturb of one or more total acres of land. The General Permit requires the development of a Stormwater Pollution Prevention Plan (SWPPP) prior to submitting a Notice of Intent for permit coverage.	Prior to construction	The permit also authorizes the discharge of construction dewatering waters if managed through the use of appropriate best management practices.
18	KPDES Operational Discharge Permit (Modification to KY0022250)	Kentucky Energy and Environment Cabinet Department of Environmental Protection Division of Water	A modification to KPDES Permit No. KY0022250 will be required if the quantity or quality of wastewater discharged from the plant site to the Ohio River and unnamed tributary to Lawrence Creek will change as a result of project activities. Changes to existing outfalls or the need for additional outfalls would also require a permit modification.	Prior to operation	Project changes will also require a modification to the site's operational SWPPP.
19	National Historic Preservation Act – Section 106 Clearance	Kentucky Heritage Council - State Historic Preservation Office	Under Section 106 of the National Historic Preservation Act, Federal agencies must work with the State Historic Preservation Office to address historic preservation issues when planning projects or issuing funds or permits that may affect historic properties and archaeological resources listed in or determined eligible for the National Register of Historic Places (NHRP).	Prior to construction	Because the facility site is previously disturbed, a Section 106 occurrence may only be required, if routed through undisturbed areas.
20	Threatened & Endangered Species Clearance (State)	Kentucky Department of Fish and Wildlife Resources, Office of Kentucky State Nature Preserves, Kentucky Energy and Environment Cabinet	Recommended for Projects with potential to impact state threatened and/or endangered species.	Prior to construction	Because the facility site is previously disturbed, a habitat assessment may only be required, if routed through undisturbed areas. Desktop review conducted; three (3) special status species have been historically observed within the Project footprint. Three (3) special status species have been observed within 1-mile of the Project footprint.
21	Right-of-Way Certification	Kentucky Transportation Cabinet	Required if any part of the facility (including pipelines) will be constructed within State road rights-of-way.	Prior to construction	
County					
22	Building Permit	City of Maysville	Required prior to builing commercial/industrial/utilities infrastructure	Prior to construction	
23	Zoning Permit	City of Maysville	The site is zoned Heavy Industrial (I-2B), so the Project is a permitted use. Just a zoning permit is needed, no special use needed.	Prior to construction	
Tribal Permits					
24	Section 106 of the National Historic Preservation Act	Tribal Consultations	Coordination with local tribes required as part of Section 106 consultation	Prior to approval of expenditure of federal funds or prior to issuance of a license	

APPENDIX K – TIE-IN LIST

BURNS McDONNELL

Tie-In List

EKPC Spurlock Unit 1

Project 164714

Tie-In Number	Description	Service	Grade Status	Connection Method	Valve(s) Required	Existing Line Size	Tie-in Line Size / Valve Size	P&ID	Pipe Spec
T-0001	From M&R yard to plant pipeline	Fuel Gas	AG	RFFE	Yes	16"	16"	MM002	06CBS09
T-124	U1 Front LP Skid Instrument Air	Instrument Air	AG	SWE tee	Yes	2"	2"	MM028	01CSS03
T-127	U1 Rear LP Skid Instrument Air	Instrument Air	AG	SWE tee	Yes	2"	2"	MM028	01CSS03
T-125	ESV and Nitrogren	Instrument Air	AG	SWE tee	Yes	2"	2"	MM028	01CSS03
T-126	U1 Front SSOs	Instrument Air	AG	SWE tee	Yes	4"	4"	MM028	01CSS03
T-128	U1 Rear SSOs	Instrument Air	AG	SWE tee	Yes	4"	4"	MM028	01CSS03
T-011	U1 Front Level 597'-2" Fuel Oil IGN C-3	Fuel Oil	AG	SWE tee	Yes	1"	1"	N/A	01CBS06
T-012	U1 Front Level 597'-2" Fuel Oil IGN C-2	Fuel Oil	AG	SWE tee	Yes	1"	1"	N/A	01CBS06
T-013	U1 Front Level 597'-2" Fuel Oil IGN C-1	Fuel Oil	AG	SWE tee	Yes	1"	1"	N/A	01CBS06
T-015	U1 Rear Level 597'-2" Fuel Oil IGN C-3	Fuel Oil	AG	SWE tee	Yes	1"	1"	N/A	01CBS06
T-016	U1 Rear Level 597'-2" Fuel Oil IGN C-2	Fuel Oil	AG	SWE tee	Yes	1"	1"	N/A	01CBS06
T-017	U1 Rear Level 597'-2" Fuel Oil IGN C-1	Fuel Oil	AG	SWE tee	Yes	1"	1"	N/A	01CBS06
T-018	U1 Front Level 606'-6" Fuel Oil IGN B-3	Fuel Oil	AG	SWE tee	Yes	1"	1"	N/A	01CBS06
T-019	U1 Front Level 606'-6" Fuel Oil IGN B-2	Fuel Oil	AG	SWE tee	Yes	1"	1"	N/A	01CBS06
T-020	U1 Front Level 606'-6" Fuel Oil IGN B-1	Fuel Oil	AG	SWE tee	Yes	1"	1"	N/A	01CBS06
T-022	U1 Rear Level 606'-6" Fuel Oil IGN B-3	Fuel Oil	AG	SWE tee	Yes	1"	1"	N/A	01CBS06
T-023	U1 Rear Level 606'-6" Fuel Oil IGN B-2	Fuel Oil	AG	SWE tee	Yes	1"	1"	N/A	01CBS06
T-024	U1 Rear Level 606'-6" Fuel Oil IGN B-1	Fuel Oil	AG	SWE tee	Yes	1"	1"	N/A	01CBS06
T-026	U1 Front Level 588'-6" Coal BNR A-1	Coal	AG	RFFE	No	14"	14"	N/A	N/A
T-027	U1 Front Level 588'-6" Coal BNR D-2	Coal	AG	RFFE	No	14"	14"	N/A	N/A
T-028	U1 Front Level 588'-6" Coal BNR A-3	Coal	AG	RFFE	No	14"	14"	N/A	N/A
T-029	U1 Front Level 588'-6" Coal BNR A-2	Coal	AG	RFFE	No	14"	14"	N/A	N/A
T-030	U1 Rear Level 588'-6" Coal BNR A-1	Coal	AG	RFFE	No	14"	14"	N/A	N/A
T-031	U1 Rear Level 588'-6" Coal BNR D-2	Coal	AG	RFFE	No	14"	14"	N/A	N/A
T-032	U1 Rear Level 588'-6" Coal BNR A-3	Coal	AG	RFFE	No	14"	14"	N/A	N/A
T-033	U1 Rear Level 588'-6" Coal BNR A-2	Coal	AG	RFFE	No	14"	14"	N/A	N/A
T-034	U1 Front Level 597'-2" Coal BNR D-1	Coal	AG	RFFE	No	14"	14"	N/A	N/A
T-038	U1 Rear Level 597'-2" Coal BNR D-1	Coal	AG	RFFE	No	14"	14"	N/A	N/A
T-045	U1 Front Level 606'-6" Coal BNR D-3	Coal	AG	RFFE	No	14"	14"	N/A	N/A
T-049	U1 Rear Level 606'-6" Coal BNR D-3	Coal	AG	RFFE	No	14"	14"	N/A	N/A

Legend

Connection Method	
BE	Beveled End
RFFE	Raised-Face Flanged End
SWE	Socket Weld End

BURNS McDONNELL

Tie-In List

EKPC Spurlock Unit 2

Project 164714

Tie-In Number	Description	Grade Status	Service	Connection Method	Valve(s) Required	Existing Line Size	Tie-in Line Size / Valve Size	P&ID	Pipe Spec
T-227	U2 LP Skid Instrument Air	AG	Instrument Air	SWE tee	Yes	4"	2"	MM029	01CSS03
T-126	ESV and Nitrogren	AG	Instrument Air	SWE tee	Yes	2"	2"	MM029	01CSS03
T-126	U2 Left SSOs	AG	Instrument Air	SWE tee	Yes	4"	4"	MM029	01CSS03
T-128	U2 Right SSOs	AG	Instrument Air	SWE tee	Yes	4"	4"	MM029	01CSS03
T-050	Potable Water for Safety Shower	BG	PW	RFFE	No	2"	2"	N/A	N/A

Legend

Connection Method	
BE	Beveled End
RFFE	Raised-Face Flanged End
SWE	Socket Weld End

BURNS McDONNELL

Tie-In List

EKPC Spurlock Unit 3

Project 164714

Tie-In Number	Description	Grade Status	Service	Connection Method	Valve(s) Required	Existing Line Size	Tie-in Line Size / Valve Size	P&ID	Pipe Spec
T-326	U3 Right Lance LP Skid Instrument Air	AG	Instrument Air	SWE tee	Yes	2"	2"	MM015	01CSS03
T-327	U3 Left Lance LP Skid Instrument Air	AG	Instrument Air	SWE tee	Yes	2"	2"	MM015	01CSS03
T-328	ESV and Nitrogren	AG	Instrument Air	SWE tee	Yes	2"	2"	MM015	01CSS03
T-329	U3 Right Lance SSOs	AG	Instrument Air	SWE tee	Yes	4"	4"	MM016	01CSS03
T-330	U3 Left Lance SSOs	AG	Instrument Air	SWE tee	Yes	4"	4"	MM016	01CSS03

Legend

Connection Method	
BE	Beveled End
RFFE	Raised-Face Flanged End
SWE	Socket Weld End

BURNS McDONNELL

Tie-In List

EKPC Spurlock Unit 4

Project 164714

Tie-In Number	Description	Grade Status	Service	Connection Method	Valve(s) Required	Existing Line Size	Tie-in Line Size / Valve Size	P&ID
T-426	U4 Right Lance LP Skid Instrument Air	AG	Instrument Air	SWE tee	Yes	2"	2"	MM021
T-427	U4 Left Lance LP Skid Instrument Air	AG	Instrument Air	SWE tee	Yes	2"	2"	MM021
T-428	ESV and Nitrogren	AG	Instrument Air	SWE tee	Yes	2"	2"	MM021
T-429	U4 Right Lance SSOs	AG	Instrument Air	SWE tee	Yes	4"	4"	MM022
T-430	U4 Left Lance SSOs	AG	Instrument Air	SWE tee	Yes	4"	4"	MM023

Legend

Connection Method	
BE	Beveled End
RFFE	Raised-Face Flanged End
SWE	Socket Weld End

APPENDIX L – DESIGN FUEL BASIS

Spurlock Design Fuels - Coal

Spurlock Fuels																		
Lab ID		Original Design Fuels				SGS	SGS	SGS	SGS	SGS	MLI	MLI	SGS	MLI	MLI	Average	Average	TDF
Sample ID		Unit 1	Unit 2	Unit 3	Unit 4	550-2310688-001	550-2310688-002	550-2310688-004	550-2310688-005	550-2310688-006	12028379	12028380	550-2310688-003	12028378	12028381	All Coals	All Coals	
Date				04/01/03	03/04/05	No Date	No Date	No Date	No Date	No Date	No Date	No Date	No Date	No Date	No Date	for	for	for
To be Fired in Which Unit(s):		n/a	n/a	n/a	n/a	1&2	1&2	1&2	1&2	1&2	1&2	1&2	3 & 4	3 & 4	3 & 4	1 & 2	3 & 4	3 & 4
Proximate Analysis																		
Moisture	(%)			9.51	9.51	9.76	6.88	6.83	6.64	9.94	8.94	6.62	5.65	6.79	16.78	7.94	9.74	4.71
Ash	(%)			20.00	20.00	8.42	14.52	9.33	14.89	8.23	12.73	9.56	17.17	22.92	8.19	11.10	16.09	2.99
Volatile	(%)					35.44	32.08	36.20	35.04	32.66	34.22	36.59	35.59	31.76	33.19	34.60	33.51	
Fixed Carbon	(%)					46.38	46.52	47.64	43.43	49.17	44.11	47.24	41.59	38.53	41.85	46.36	40.66	
Total (Data Check)	(%)	0.00	0.00	29.51	29.51	100.00	100.00	100.00	100.00	100.00	100.00	100.01	100.00	100.00	100.01	100.00	100.00	7.70
Ultimate Analysis																		
Moisture	(%)	0.00	0.00	9.51	9.51	9.76	6.88	6.83	6.64	9.94	8.94	6.62	5.65	6.79	16.78	7.94	9.74	4.71
Ash	(%)	0.00	0.00	20.00	20.00	8.42	14.52	9.33	14.89	8.23	12.73	9.56	17.17	22.92	8.19	11.10	16.09	2.99
Carbon	(%)			53.48	53.48	65.70	63.40	68.84	62.06	66.66	63.75	69.59	61.11	55.08	59.13	65.71	58.44	
Hydrogen	(%)			4.40	4.40	4.56	4.30	4.87	4.39	4.44	4.13	4.47	4.52	3.80	4.19	4.45	4.17	
Nitrogen	(%)			0.90	0.90	1.32	1.12	1.17	1.10	1.64	1.28	1.40	1.00	0.94	1.12	1.29	1.02	
Sulfur	(%)			4.50	4.50	2.77	2.40	3.19	4.06	1.73	3.30	3.51	4.45	4.61	3.36	2.99	4.14	
Oxygen (By diff)	(%)			7.21	7.21	7.47	7.38	5.77	6.86	7.36	5.87	4.85	6.10	5.86	7.23	6.51	6.40	
Total (Data Check)	(%)	0.00	0.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	7.70
Ash Fusion Temperatures, Reducing																		
Initial Deformation	(°F)					2213	2308	2114	2062	2150	2185	2050	2119	2180	2600	2155	2300	
Softening	(°F)					2410	2499	2307	2251	2347	2380	2230	2316	2320	2700	2346	2445	
Hemispherical	(°F)					2506	2596	2403	2347	2445	2430	2300	2412	2400	2700	2432	2504	
Fluid	(°F)					2593	2677	2474	2404	2524	2485	2340	2487	2460	2700	2500	2549	
Misc Properties																		
HHV	(Btu/lb)			10,400	10,400	11,839	11,309	12,462	11,275	11,760	11,562	12,434	11,110	9,925	10,596	11,806	10,544	14,484
FC/VM Ratio	n/a	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.31	1.45	1.32	1.24	1.51	1.29	1.29	1.17	1.21	1.26	1.34	1.21	
Base/Acid Ratio	(%)					0.32	0.25	0.40	0.44	0.37	0.45	0.46	0.39	0.33	0.41	0.38	0.38	
T250 Temp	(°F)					2514	2620	2413	2361	2456	2450	2330	2424	2470	2370	2449	2421	
Fouling Index	(%)					0.37	0.09	0.24	0.14	0.39	0.09	0.14	0.10	0.08	0.49	0.21	0.22	
Slagging Index	(%)					0.99	0.66	1.36	1.93	0.70	1.62	1.73	1.84	1.63	1.66	1.28	1.71	
Ash Mineral Analysis:																		
SiO_2	(%)					52.46	51.52	45.66	44.63	49.29	45.03	43.92	47.32	49.69	46.20	47.50	47.74	
Al_2O_3	(%)					20.56	25.36	22.52	21.25	20.30	20.90	22.18	22.30	23.27	20.49	21.87	22.02	
TiO_2	(%)					1.08	1.34	0.97	0.93	1.06	1.05	1.07	0.97	1.04	1.04	1.07	1.02	
Fe_2O_3	(%)					16.98	14.63	20.86	23.18	16.20	23.24	26.06	22.70	19.29	19.29	20.16	20.43	
CaO	(%)					2.59	1.52	3.39	3.01	5.27	3.05	2.01	1.31	1.25	4.25	2.98	2.27	
MgO	(%)					0.83	0.87	0.83	1.15	1.00	1.44	0.71	0.94	1.14	1.09	0.98	1.06	
K_2O	(%)					2.22	2.49	1.85	2.03	2.28	1.94	1.84	2.29	2.45	1.96	2.09	2.23	
Na_2O	(%)					1.15	0.35	0.61	0.32	1.06	0.21	0.31	0.25	0.23	1.20	0.57	0.56	
SO_3	(%)					1.90	1.64	2.90	2.95	3.27	2.44	1.46	1.44	1.07	3.51	2.37	2.01	
P_2O_5	(%)					0.12	0.16	0.20	0.35	0.12	0.28	0.12	0.25	0.18	0.22	0.19	0.22	
SrO	(%)					0.03	0.06	0.10	0.09	0.04	0.06	0.05	0.06	0.04	0.03	0.06	0.04	
BaO	(%)					0.04	0.01	0.07	0.07	0.05	0.05	0.04	0.13	0.16	0.08	0.05	0.12	
MnO_2	(%)					0.04	0.05	0.04	0.04	0.06	0.04	0.02	0.04	0.03	0.04	0.04	0.04	
Undetermined	(%)					0.00	0.00	0.00	0.00	0.00	0.27	0.21	0.00	0.16	0.60	0.07	0.25	
Total (Data Check)	(%)	0.00	0.00	0.00	0.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	0.00

DESIGN FUEL BASIS

NATURAL GAS BASIS:

Constituent	Basis Value	Unit
CH4	89.633%	Mol %
C2H6	8.289%	Mol %
C3H8	0.348%	Mol %
i-C4H10	0.006%	Mol %
n-C4H10	0.011%	Mol %
i-C5H12	0.001%	Mol %
n-C5H12	0.001%	Mol %
n-C6H14	0.000%	Mol %
N2	1.323%	Mol %
CO2	0.388%	Mol %
Total Sulfur (Maximum)	<2.0	grain/100 SCF
Fuel LHV (Btu/lb)	20,680	Btu/lbm

BACKUP FUEL OIL BASIS:

Ultra Low Sulfur Fuel Oil

Fuel LHV: 18,400 Btu/lb

PRODUCT SPECIFICATIONS

3.23.1 **SPECIFICATIONS FOR FUNGIBLE 15 ppm SULFUR DIESEL FUEL GRADE 62**

EPA Designation: MVNRLM, Motor vehicle diesel fuel, 15 ppm sulfur

Cancels Previous Issues of Grade 62

PRODUCT PROPERTY	ASTM Test Method	Test Results Minimum	Maximum		Note
Gravity API	D4052	30			
Flash Point, °F					
Pensky-Martin	D93	130			
Physical Distillation, °C(°F)	D86				[W]54
50%			Report		
90%		282(540)	338(640)		
End Point			366(690)		
or Simulated Distillation, °C(°F)	D2887				[W]54
50% recovered			Report		
90% recovered		300(572)	356(673)		
End Point			421(790)		
Color ASTM	D6045		2.5		
Color Visual		Undyed			
Viscosity, cSt @ 40°C (104°F)	D445	1.9	4.1		
Pour Point	D97				2
Cloud Point	D2500				2
Corrosion, 3 hrs. @ 50°C (122°F)	D130		1		
Total Sulfur, ppmwt	D5453		11	Origin	3
			14	Delivery	
Cetane Number	D613	40			[C]4
Aromatics (Volume %)	D1319		31.7		
or Aromatics by Cetane Index	D976	40			
Ash, wt.%	D482		0.01		
Carbon Residue: Ramsbottom					
on 10% Bottom	D524		0.35		
BS&W, vol.%	D2709				
	or equivalent		< 0.05		
Thermal stability, 90 minutes					
150°CPad rating,					
DuPont scale			7		
OR					
Thermal stability	D6468				
Y/Green		73%			
W Unit		65%			
OR					
Oxidation stability, mg/100 ml	D2274		2.5		
Haze rating @ 25°C (77°F)	D4176				
	Procedure 2		2		
Nace Corrosion	TM0172	B+ (Origin)			
Electrical					
Conductivity, pS/m @ 21°C(70°F)	D2624		250		

APPENDIX M – WATER QUALITY BASIS (NOT USED)

APPENDIX N – PRELIMINARY FIRE PROTECTION DESIGN BASIS (NOT USED)

APPENDIX O – LIFE SAFETY CODE AND CRITERIA (NOT USED)

APPENDIX P – RISK MATRIX

Spurlock Co-Fire - PROJECT RISK REGISTER - LEVEL 1 IDENTIFICATION

East Kentucky Power Cooperative

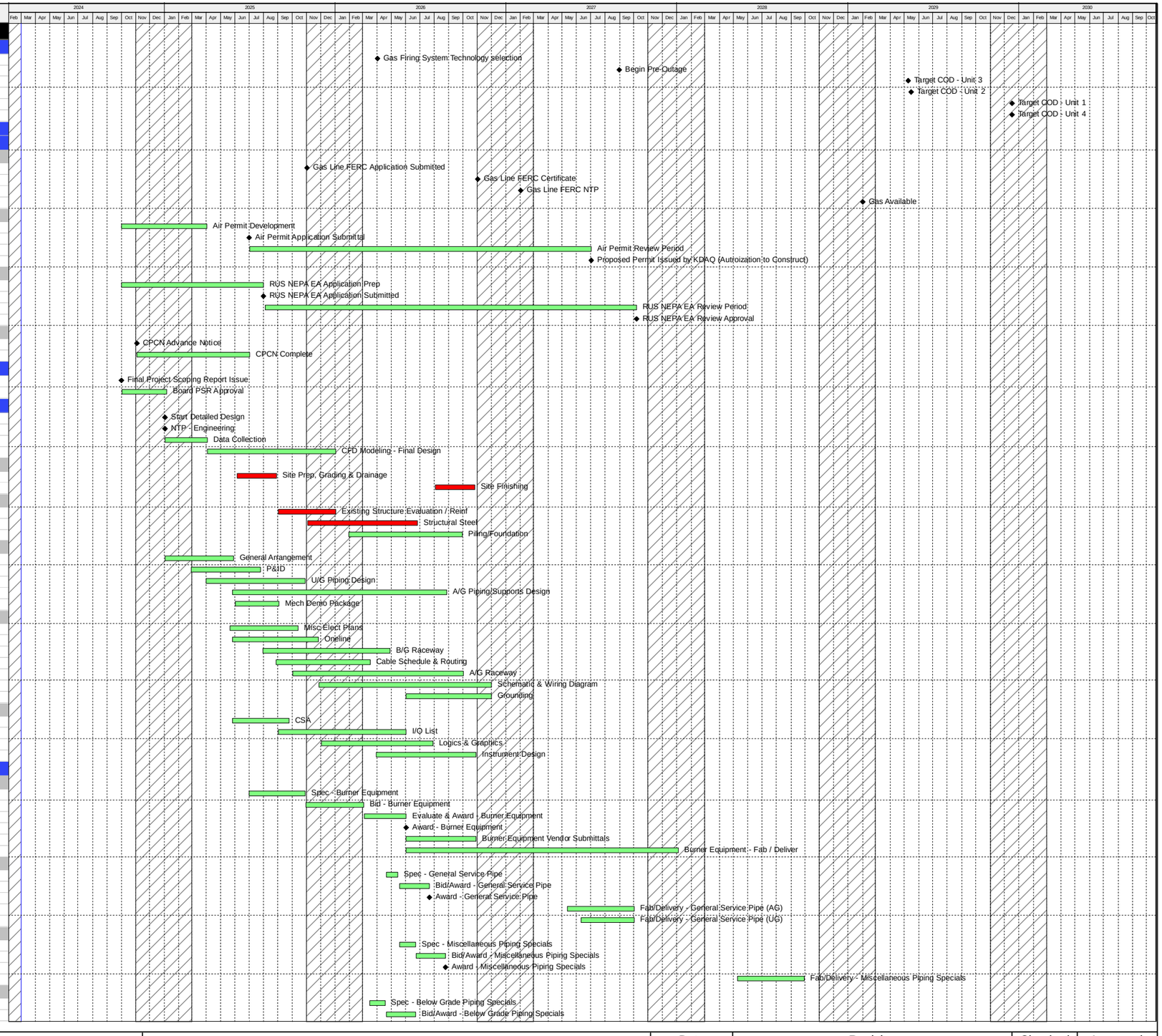
Risk ID No. (NNN)	Key Project Risk Factors (Circumstances) ("because of")	Is Risk Controlled or Uncontrolled?	Party in Control of Risk Event	What Category of Risk Event?	Likely Risk Events due to Risk Factors	Risk Event Details ("What Can Go Wrong?)	Anticipated Impacts of Risk Event ("Enter Y for YES Enter N for No Impact")								Impact Details ("Consequences")	Planned Mitigation Activities
							Health / Safety	Environmental	Quality	Performance	Claims / Litigation	Reputation	Schedule / Time	Cost / Finances ($		
001	Late Delivery of Gas Firing / FGC Equipment	Controlled	_3rd Party_Client	SCHEDULE RELATED	Change start/completion date	Due to logistic and manufacturing reasons, equipment delivered late pushing the schedule potentially 4 to 6 months.	N	N	N	N	Y	Y	Y	Y	Miss the COD date. Results in costs and due to not being able to provide power to grid.	Select supplier who can meet schedule. Involve Expediter throughout project timeline of manufacturing. Add time for shop inspections of all Equipment and Materials. Award contracts as early as possible, after RUS approval. Include contract clause for late delivery.
002	Late Delivery of Electrical / DCS Equipment	Controlled	_3rd Party_Client	SCHEDULE RELATED	Change start/completion date	Due to logistics reasons, equipment delivered late pushing the schedule potentially up to 4 months to complete electrical construction	N	N	N	N	Y	Y	Y	Y	Miss the COD date. Results in costs due to not being able to provide power to grid.	Select supplier who can meet schedule. Involve Expediter throughout project timeline of manufacturing. Add time for shop inspections of all Equipment and Materials. Award contracts as early as possible, after RUS approval.
003	Acoustic/Sound results exceed expected values	Controlled	_3rd Party_Client	PERFORMANCE RELATED	Design misjudgment, miscalculation, misinterpretation or oversight	Sound levels exceed predicted values	N	Y	N	N	Y	Y	Y	Y	Additional sound mitigation activities are required to be purchased and installed	Understand existing sound margin. Purchase low noise options when available.
004	Labor shortages due to other more attractive projects	Controlled	Client	SCHEDULE RELATED	Underestimate time required to perform work	Other Projects In The Area Make Labor Harder to Attract	Y	N	Y	Y	Y	Y	Y	Y	Falling Behind Schedule. Increased Cost.	Planned Per Diem Incentive. Perform a Labor Study in the area.
005	RUS approval delayed	Uncontrolled	Regulatory Authority	SCHEDULE RELATED	Suspend/stop work	RUS approval takes longer than anticipated	N	N	N	Y	Y	Y	Y	Y	Failure to meet COD date. Results in cost due to not being able to produce power. Delay to detailed design, award of equipment contracts (may require increased cost or different payment terms to makeup schedule)	Current project schedule assumes 24 months to approval after submitting application Oct. 2025, which should be conservative for an EA.
006	PSC delays or intervieners	Uncontrolled	Regulatory Authority	SCHEDULE RELATED	Suspend/stop work	Approval process takes longer than anticipated or separate party intervenes	N	N	N	Y	Y	Y	Y	Y	Failure to meet COD date due to delayed start date. Results in cost due to not being able to produce power.	PSC process planned to support submittal in October. Typical turnaround timeframe is 8 months based on past project experience. There are several months of margin between approval and project expenditures.
007	Executing A Project In An Enviornment of Inflation / Supply Chain Challenges	Uncontrolled	Uncontrolled	PRICING/FINANCIALS	Commodity/goods price increase	Due to supply chain issues, vendors might increase prices outside normal increase schedule	N	N	N	N	N	N	N	Y	Project goes over budget	Buy out as much as possible early in project. Continue managing procurements as conditions change. Look at other suppliers/methods to purchase equipment/commodities early. Break potential long lead items out into separate contracts. Include allowances for Field Service Time or perceived scope changes to mitigate costs.
008	Scope item not captured in PSR scope	Controlled	BMCD	PRICING/FINANCIALS	Underbid project	Scope change or additional scope required	N	N	Y	Y	Y	Y	Y	Y	Cost increase to project and potential schedule delays.	Define as much scope as possible in PSR and carry adequate contingency to cover realistic future scope changes/misses.
009	Shortages or delivery delays for wire, conduit, and products.	Controlled	BMCD	SCHEDULE RELATED	Change project sequence	Award materials too late	Y	N	Y	Y	Y	Y	Y	Y	Electrical Construction Falls Behind Schedule. Additonal Manpower Required LDs or additional TFA cost Miss the COD date. Results in costs due to not being able to provide power to grid.	Identify the long lead time materials during the design phase and buy them out prior to the award of the electrical consturction contract.
010	Can't staff site / recurring site shutdowns due to Force Majeure event	Controlled	BMCD	ENVIRONMENTAL EVENTS	Force Majeure	Direct or Indirect COVID exposure or other pandemic type event.	Y	N	Y	Y	Y	Y	Y	Y	Reduced resources throughout schedule	
011	Engineering is late due to submittal delays from suppliers	Controlled	_3rd Party_Client	SCHEDULE RELATED	Change project sequence	Engineering is late due to submittal delays from suppliers	N	N	N	N	Y	N	Y	N	compressed engineering schedule, missed IFC firewall dates	LDs on critical submittals, weekly coordination meetings with OEMs, visits to OEMs office (as required).
012	Housing Availibilty	Uncontrolled	BMCD	PERFORMANCE RELATED	Interfere with activities of others	No availibility of housing for staff and craft	N	N	N	N	N	N	Y	Y		Perform study of local housing availability during project execution. Per Diem included in cost estimate to help attract labor and cover costs for further travel distances.
013	Gas line and M&R station delayed	Controlled	_3rd Party_Client	SCHEDULE RELATED	Change project sequence	Gas line and M&R yard installed later than anticipated	N	N	N	Y	Y	N	Y	Y	Delays startup resulting in failure to meet COD date and/or impacts productivity of project contractors based on site access availability.	Coordinate with gas line supplier.
014	Geotech investigation finds karst or other challenges	Controlled	BMCD	PRICING/FINANCIALS	Underbid project	Piling and / or flow fill required, requires additional cost and schedule to install, potentially holding up downstream activities	N	N	N	Y	Y	Y	Y	Y	Must add piles which could also impact foundation dimensions	Release geotech investigation early in project. Conservative foundation quantities if dimensions need to increase.

015	OEM scope gap	Controlled	BMCD	PRICING/FINANCIALS	Underbid project	Required Equipment Is Not Delivered For Construction	Y	N	Y	N	Y	Y	Y	Y	Schedule Pushes Project Cost Impacts Miss the COD date. Results in costs due to not being able to provide power to grid	Align scopes between OEM scope and BOP scope. Collaboration in OEM Contract Negotiations and Developing the Division of Responsibility Matrix.
016	Delayed owner approval of engineering deliverables	Controlled	Client	SCHEDULE RELATED	Decide/deliver decision after due date	Rework after approvals/release	N	N	Y	Y	Y	Y	Y	Y	Schedule pushes	Provide adequate time for owner review, setup meetings to drive faster review/discussion
017	Value engineering / estimate reduction studies in parallel with detail design	Controlled	Client	SCHEDULE RELATED	Decide/deliver decision after due date	Need to evaluate many items for cost reduction opportunities	N	N	N	N	N	N	Y	Y	Engineering is delayed/late due to increased scope	PSR process has worked through a lot of options already. Manage cost reduction expectations.
018	Delayed air permit finalization	Uncontrolled	Regulatory Authority	SCHEDULE RELATED	Suspend/stop work	Permit process and approval takes longer than anticipated	N	N	N	Y	Y	Y	Y	Y	Cannot set emissions producing equipment without air permit.	Permit anticipated to be complete 2+ years prior to construction. EKPC will get extension from state to allow for construction after 18 months.
019	FM Global involvement / requirements not well defined	Controlled	Client	SCHEDULE RELATED	Change project scope	additional technical requirements and FM Global involvement	Y	N	N	Y	Y	Y	Y	Y	additional design & review requirements that could impact engineering schedule, and material/const costs	Proactive request to clarify FM Global requirements prior to detailed engineering.
020	Environmental impact due to release of chemical/waste	Controlled	Client	ENVIRONMENTAL EVENTS	Unplanned discharge of hazardous materials	Unexpected discharge of hazardous material	Y	Y	N	Y	Y	Y	Y	Y	Potential delay to schedule and hold on construction, increased costs for cleanup/remediation and for adjusted schedule	Develop detailed plan for handling of hazardous material and minimize interaction with existing materials/plant from new project.
021	Escalation for equipment, materials, and labor	Uncontrolled	Uncontrolled	PRICING/FINANCIALS	Price escalation	Costs for labor, equipment, and material escalates more than projected/anticipated based on current indices.	N	N	N	N	Y	Y	Y	Y	Cost increase due to higher costs for labor, material, and/or equipment.	Recommend carrying reasonable allowance in cost estimate for escalation. Communicate changes in escalation as they are discovered. PSR cost estimate does not include escalation. However, estimated values of escalation have been communicated which include 4 to 5% escalation per annum for labor, equipment and materials through execution, assuming project starts today as well as per the execution schedule.
022	Damage to Existing Property	Controlled	_3rd Party_Client	PRICING/FINANCIALS	Don't properly pay/withhold invoice	Contractor damages existing property	Y	N	N	Y	Y	Y	Y	Y	Existing property insurance deductible subcap coverage (TBD $$), Existing facility repairs likely to impact project schedule and costs.	Utilization of proper barricades, spotters, and other preventative measures to protect existing property in the vicinity of work areas. Coordinate work with Owner operations to avoid potential issues and interruptions. Develop plan for contractors' access and transportation around site.
023	Design changes for major equipment after award	Controlled	_3rd Party_Client	PERFORMANCE RELATED	Interfere with activities of others	OEM changes design or scope of supply after award.	N	N	Y	Y	Y	Y	Y	Y	Adjust project schedule which may impact COD date. May also result in increased cost for Equipment contract and contractor contracts.	Coordinate with OEMs prior to and shortly after award that scope and design are well understood by all parties.
024	Replacement / repair of equipment required after installation	Controlled	_3rd Party_Client	SCHEDULE RELATED	Deliver goods/work product after due date	Equipment requires repairs or replacement after installation	N	N	N	Y	Y	Y	Y	Y	Potential delay to schedule to wait on repair/replacement, if critical equipment, which could result in missing COD date. Cost increase for prolonged contractor onsite if issue not caused by OEM	Include adequate coverage in equipment contracts to cover expenses and delays caused by equipment issues.
025	Increased duration for flushes, chem cleaning, etc.	Uncontrolled	Uncontrolled	SCHEDULE RELATED	Underestimate time required to perform work	Duration to complete startup activities takes longer than anticipated such as air blows, line pigging, flushes, and chemical cleaning	N	Y	Y	N	Y	Y	Y	Y	Delays startup resulting in failure to meet Client's COD date and/or increases costs for startup activities.	Schedule includes 3 months of float for guarantee COD. Control work environmment and access during flushes, air blow, chem cleaning to reduce opportunity for interference.
026	Controls Integration	Controlled	BMCD	PERFORMANCE RELATED	Execute less efficiently than planned (poor productivity)	Delay in programming efforts, FATs, and/or startup and commissioning	N	N	Y	Y	Y	Y	Y	Y	Delays completion of construction and startup/commissioning resulting in failure to meet COD date and/or increases costs.	Hold regular design reviews with major suppliers to coordinate key interfaces. Require "readiness submittals" to facilitate productive FATs and confirm key documentation is available. Include field services / technician support from major suppliers during checkout, startup, and commissioning. Allow for sufficient float / margin in project schedule
027	Care, Custody, Control - Handoff of Materials delivered in boxes but not being opened until later date for Client provided Equipment	Controlled	Client	PRICING/FINANCIALS	Don't properly pay/withhold invoice	Material is not delivered as expected but is not discovered until shipments are opened upon needing to be used, not upon delivery	N	N	Y	Y	Y	Y	Y	Y	Increased cost to procure/expedite missing material and to cover cost of extended time onsite for contractors/staff	Open and inventory OEM Equipment under OEM supervision. Open boxes early enough that if materials aren't delivered that we can react accordingly to maintain schedule
028	Additional underground utilities require demolition or work-around	Controlled	Client	PERFORMANCE RELATED	Interfere with activities of others	Unanticipated utilities exist that need to be demo'd or avoided	Y	Y	Y	Y	Y	Y	Y	Y	Delay in schedule to complete additional work and increased cost for unanticipated work	Review all available underground utility drawings to confirm all have been accounted for in detailed design. Complete potholing as needed.
029	Existing equipment and systems that are re-used have failure	Uncontrolled	Client	SCHEDULE RELATED	Change project scope	Existing equipment that is used for new project has unexpected failure which needs to be resolved/replaced	Y	Y	Y	Y	Y	Y	Y	Y	Delay in schedule to repair/replace existing equipment and increased cost for work	Consider all existing equipment/systems being used and assess condition prior to project and consider contingency plans in case of failure
030	Shop Inspections	Controlled	BMCD	PERFORMANCE RELATED	Interfere with activities of others	Make suppliers be prepared for inspections to determine Equipment at shops and quality prior to shipment.	N	N	Y	Y	Y	Y	Y	Y	Cost and schedule impact to release of material later than planned. Additional and / or extended travel to facilities due to supplier not being ready for inspection	Defined plan for shop inspections and visits along with expected progress. Video inspection to verify proper progress prior to travel. Factor in rework for inspection findings.
031	Force Majeure weather delay	Uncontrolled	Uncontrolled	ENVIRONMENTAL EVENTS	Inclement Weather	Weather event interrupts work progress or damages equipment/material	Y	Y	Y	Y	Y	Y	Y	Y	Schedule delay that could result in misisng the COD date. Results in costs due to not being able to provide power to grid.	Include schedule margin (PSR includes 3 months of schedule margin)
032	Payment schedule of equipment and construction contracts	Controlled	Client	PRICING/FINANCIALS	Don't properly pay/withhold invoice	Equipment or Contractor payment schedule and terms are different than expected or different than typical	N	N	N	Y	Y	Y	Y	Y	May impact cashflow for project and ability to have net funds for invoices.	Confirm each contract payment terms align with EKPC and RUS requirements prior to award. Consider any contingency that should be included in PSR budget cost for additional cost needed to get supplier to accommodate payment terms.

033	Craft productivity and re-work	Controlled	_3rd Party_Client	PERFORMANCE RELATED	Execute less efficiently than planned (poor productivity)	Labor productivity worse than assumed or contractor requires re-work	N	N	Y	Y	Y	Y	Y	Y	Increased costs and potential schedule delays	Utilzing contractors with knowledge of the local area and labor market and scope. Contractors have indicated quality local labor available based on prevoius project history and budgetary bid process.
034	Specifications	Controlled	BMCD	CONTRACTING	Deliver goods/work product after due date	Engineered / Specified Equipments Cannot Be Purchased.	Y	N	Y	N	Y	Y	Y	Y	Schedule Delays / Cost Delays	Schedule sufficient time for proper internal and external reviews prior to issuing for bid. Perform biddability / constructability reviews as early as possible to help identify potential items that may present challenges for supply as specified. Allow for sufficient float / margin in project schedule.
035	Incomplete Deliveries	Controlled	BMCD	SCHEDULE RELATED	Deliver goods/work product after due date	We are unable to complete work on schedule because vendor components are not complete.	Y	N	Y	N	Y	Y	Y	Y	Schedule / Cost impacts	Develop and follow the material management plan and complete proper expiditing.
036	Safety incident, standdown, investigation, etc.	Uncontrolled	_3rd Party_Client	SCHEDULE RELATED	Change project sequence	Delay construction	Y	N	N	Y	Y	Y	Y	Y	Schedule / Cost impacts	Use contractors with good safety records and understanding of project scope. Safety oversight throughout project.
037	Theft	Controlled	BMCD	SCHEDULE RELATED	Deliver goods/work product after due date	Theft of equipment or material prevents work from being complete on schedule	Y	N	Y	N	Y	Y	Y	Y	Schedule / Cost impacts	Evaluate site for security deficiencies and develop plan to mitigate theft on work site.
038	Asbestos abatement	Controlled	Client	ENVIRONMENTAL EVENTS	Unplanned discharge of hazardous materials	Asbestos is unexpectedly encountered requiring abatement prior to work proceeding.	Y	Y	N	N	Y	N	Y	Y	Schedule / Cost impacts	Test early in project after scope is defined enough to determine whether abatement is required. Perform any required abatement well in advance of construction.
039	"First of it's kind" design for CFB boilers of this type / size.	Controlled	BMCD	SCHEDULE RELATED	Underestimate time required to perform work	Design process could take longer than expected since this solution will be novel.	Y	N	Y	N	Y	Y	Y	Y	Schedule / Cost impacts	CFD modeling has already been started and will be refined to help determine technically feasible solution. Add float to engineering schedule.
040	Missed COD may cause compliance issues with the Greenhouse Gas rule.	Controlled	Client	SCHEDULE RELATED	Change start/completion date	Project may take longer to achieve commercial operation than expected. If project COD is after January 2030 this may result in compliance issues with Greenhouse Gas rule.	N	N	N	Y	Y	Y	Y	Y	May result in action by regulatory body.	Allow for sufficient float / margin in project schedule.
041	Contractor delays	Controlled	Client	SCHEDULE RELATED	Change start/completion date	Contractor falls behind schedule due to poor performance and/or productivity, rework, etc.	N	N	N	Y	Y	Y	Y	Y	Increased costs and potential schedule delays. Potential impacts to follow-on work and / or checkout, startup, and commissioning.	Vet Contractors prior to bid / award. Regular planning and progress meetings after award and throughout project execution to identify schedule slips and possible impact mitigation as early as possible. Allow for sufficient float / margin in project schedule.
042	Commissioning delays and/or issues	Controlled	Client	SCHEDULE RELATED	Change start/completion date	Commissioning activities take longer than expected.	N	N	N	Y	Y	Y	Y	Y	Increased costs and potential schedule delays	Prepare a detailed outage schedule and startup and commissioning staffing plan. Provide startup management experienced with similar project scope. Allow for sufficient float / margin in project schedule.
043	Change management	Controlled	Client	PRICING/FINANCIALS	Don't properly pay/withhold invoice	Cost / schedule impacts not fully recognzied or communicated early.	N	N	N	N	Y	Y	Y	Y	Increased costs and potential schedule delays	Establish and follow defined change management process. Communicate potential changes early to facilitate informed decisions and mitigate impacts.

APPENDIX Q – PROJECT SCHEDULE

Activity ID	Activity Name	RD	Start	Finish
EKPC - Spurlock Units 1-4 Cofire		1324	01-Oct-24	17-Dec-29
Milestones		944	01-Apr-26	17-Dec-29
MS-1020	Gas Firing System Technology selection	0		01-Apr-26*
MS-1030	Begin Pre-Outage	0	31-Aug-27	
MS-1100	Target COD - Unit 3	0		09-May-29
MS-1090	Target COD - Unit 2	0		15-May-29
MS-1060	Target COD - Unit 1	0		17-Dec-29
MS-1110	Target COD - Unit 4	0		17-Dec-29
PJM Interconnect		0		
Permitting		1101	01-Oct-24	01-Feb-29
Gas Line Permitting		824	01-Nov-25	01-Feb-29
A2130	Gas Line FERC Application Submitted	0		01-Nov-25*
A2140	Gas Line FERC Certificate	0		01-Nov-26*
A2110	Gas Line FERC NTP	0		01-Feb-27*
A2120	Gas Available	0		01-Feb-29*
Air Permitting		699	01-Oct-24	01-Jul-27
A2150	Air Permit Development	127	01-Oct-24*	01-Apr-25
A2040	Air Permit Application Submittal	0		01-Jul-25*
A2050	Air Permit Review Period	508	02-Jul-25	01-Jul-27
A2060	Proposed Permit Issued by KDAQ (Autroization to Construct)	0		01-Jul-27
RUS NEPA EA		766	01-Oct-24	06-Oct-27
A1980	RUS NEPA EA Application Prep	213	01-Oct-24*	01-Aug-25
A1990	RUS NEPA EA Application Submitted	0		01-Aug-25
A2010	RUS NEPA EA Review Period	553	04-Aug-25	06-Oct-27
A2000	RUS NEPA EA Review Approval	0		06-Oct-27
CPCN		168	04-Nov-24	02-Jul-25
A2020	CPCN Advance Notice	0	04-Nov-24*	
A2030	CPCN Complete	168	04-Nov-24	02-Jul-25
Project Scoping		65	01-Oct-24	06-Jan-25
A2090	Final Project Scoping Report Issue	0		01-Oct-24*
A2100	Board PSR Approval	65	02-Oct-24	06-Jan-25
Engineering		487	02-Jan-25	30-Nov-26
EN-G-1010	Start Detailed Design	0	02-Jan-25	
MS-1000	NTP - Engineering	0	02-Jan-25*	
EN-G-1030	Data Collection	65	02-Jan-25	02-Apr-25
EN-G-1000	CFD Modeling - Final Design	190	03-Apr-25	02-Jan-26
Civil		353	06-Jun-25	26-Oct-26
EN-C-1000	Site Prep, Grading & Drainage	60	06-Jun-25	29-Aug-25
EN-C-1010	Site Finishing	60	03-Aug-26	26-Oct-26
Structural		274	02-Sep-25	29-Sep-26
EN-S-1020	Existing Structure Evaluation / Reinf	85	02-Sep-25	02-Jan-26
EN-S-1010	Structural Steel	165	03-Nov-25	26-Jun-26
EN-S-1000	Piling/Foundation	170	30-Jan-26	29-Sep-26
Mechanical		422	02-Jan-25	27-Aug-26
EN-M-1010	General Arrangement	105	02-Jan-25	29-May-25
EN-M-1000	P&ID	105	27-Feb-25	25-Jul-25
EN-M-1040	U/G Piping Design	150	31-Mar-25	29-Oct-25
EN-M-1050	A/G Piping/Supports Design	320	27-May-25	27-Aug-26
EN-M-1030	Mech Demo Package	65	02-Jun-25	02-Sep-25
Electrical		387	22-May-25	30-Nov-26
EN-E-1050	Misc Elect Plans	100	22-May-25	13-Oct-25
EN-E-1000	Oneline	130	27-May-25	26-Nov-25
EN-E-1030	B/G Raceway	190	30-Jul-25	28-Apr-26
EN-E-1060	Cable Schedule & Routing	140	27-Aug-25	17-Mar-26
EN-E-1040	A/G Raceway	255	02-Oct-25	02-Oct-26
EN-E-1070	Schematic & Wiring Diagram	255	28-Nov-25	30-Nov-26
EN-E-1020	Grounding	128	01-Jun-26	30-Nov-26
I/C		363	27-May-25	28-Oct-26
EN-N-1000	CSA	85	27-May-25	24-Sep-25
EN-N-1030	I/O List	190	02-Sep-25	01-Jun-26
EN-N-1010	Logics & Graphics	165	03-Dec-25	28-Jul-26
EN-N-1040	Instrument Design	150	30-Mar-26	28-Oct-26
Procurement		1077	02-Jan-25	28-Mar-29
1240 - Burner (Safety Shuttoff/LP/Burners/Ignitors)		636	01-Jul-25	04-Jan-28
PR-1240-000	Spec - Burner Equipment	85	01-Jul-25	29-Oct-25
PR-1240-100	Bid - Burner Equipment	85	30-Oct-25	03-Mar-26
PR-1240-410	Evaluate & Award - Burner Equipment	63	04-Mar-26	01-Jun-26
PR-1240-200	Award - Burner Equipment	0		01-Jun-26
PR-1240-400	Burner Equipment Vendor Submittals	105	02-Jun-26	28-Oct-26
PR-1240-300	Burner Equipment - Fab / Deliver	403	02-Jun-26	04-Jan-28
2320 - General Service Pipe		370	20-Apr-26	01-Oct-27
PR-2320-000	Spec - General Service Pipe	20	20-Apr-26	15-May-26
PR-2320-100	Bid/Award - General Service Pipe	45	18-May-26	21-Jul-26
PR-2320-200	Award - General Service Pipe	0		21-Jul-26
PR-2320-310	Fab/Delivery - General Service Pipe (AG)	100	12-May-27	01-Oct-27
PR-2320-300	Fab/Delivery - General Service Pipe (UG)	80	10-Jun-27	01-Oct-27
2490 - Miscellaneous Piping Specials		603	18-May-26	29-Sep-28
PR-2490-000	Spec - Miscellaneous Piping Specials	25	18-May-26	22-Jun-26
PR-2490-100	Bid/Award - Miscellaneous Piping Specials	45	23-Jun-26	25-Aug-26
PR-2490-200	Award - Miscellaneous Piping Specials	0		25-Aug-26
PR-2490-300	Fab/Delivery - Miscellaneous Piping Specials	100	10-May-28	29-Sep-28
2491 - Below Grade Piping Specials		648	16-Mar-26	29-Sep-28
PR-2491-000	Spec - Below Grade Piping Specials	25	16-Mar-26	17-Apr-26
PR-2491-100	Bid/Award - Below Grade Piping Specials	45	20-Apr-26	22-Jun-26



Start Date	01-Oct-24
Finish Date	17-Dec-29
Data Date	01-Mar-24
Run Date	23-Oct-24

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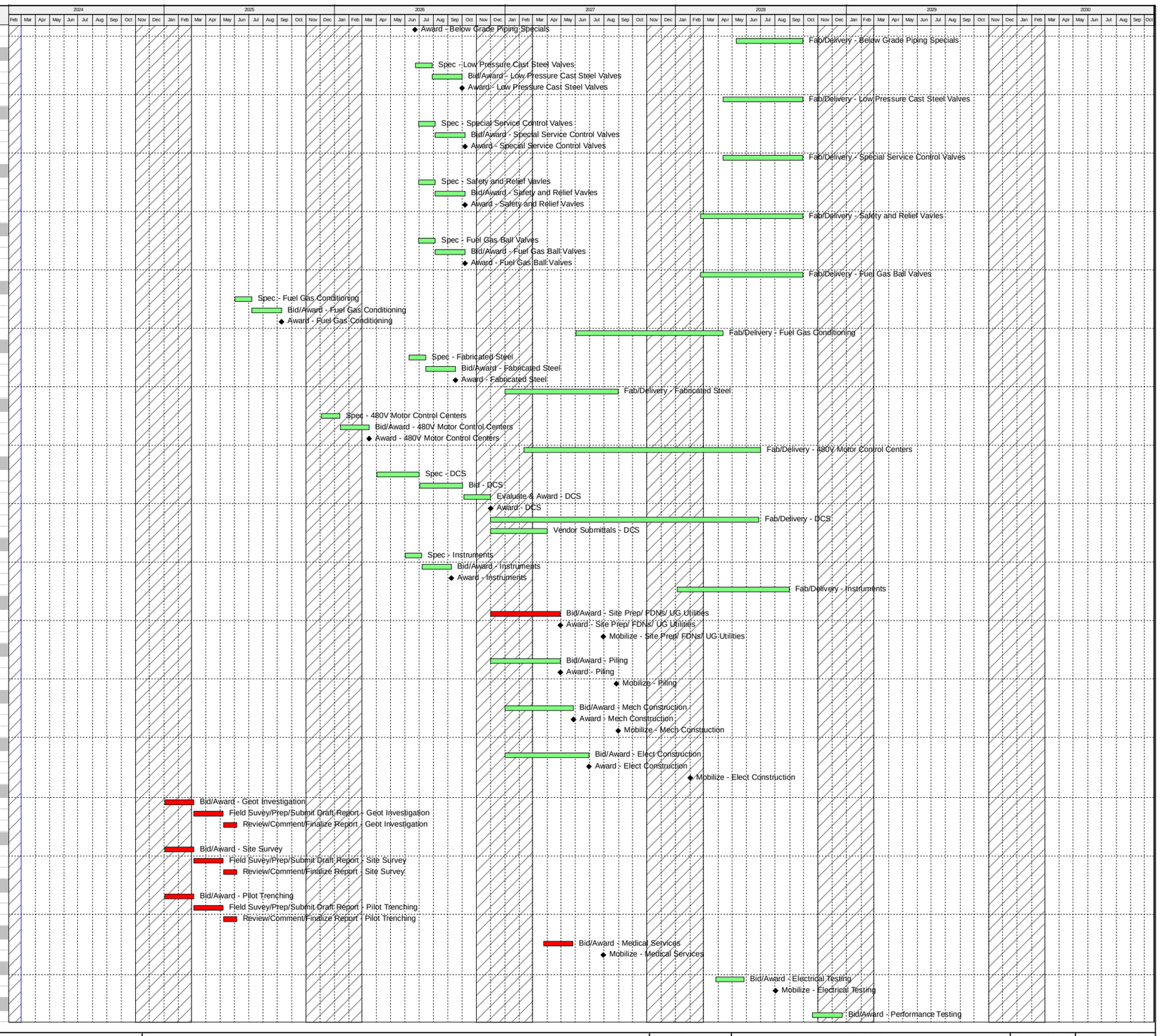
EKPC - Spurlock Units 1-4 Cofire

Project Schedule

Date	Revision	Checked	Approved

Activity ID	Activity Name	RD	Start	Finish
PR-2491-200	Award - Below Grade Piping Specials	0		22-Jun-26
PR-2491-300	Fab/Delivery - Below Grade Piping Specials	100	10-May-28	29-Sep-28
2521 - Low Pressure Cast Steel Valves		578	23-Jun-26	29-Sep-28
PR-2521-000	Spec - Low Pressure Cast Steel Valves	25	23-Jun-26	28-Jul-26
PR-2521-100	Bid/Award - Low Pressure Cast Steel Valves	45	29-Jul-26	30-Sep-26
PR-2521-200	Award - Low Pressure Cast Steel Valves	0		30-Sep-26
PR-2521-300	Fab/Delivery - Low Pressure Cast Steel Valves	120	12-Apr-28	29-Sep-28
2531 - Special Service Control Valves		573	30-Jun-26	29-Sep-28
PR-2531-000	Spec - Special Service Control Valves	25	30-Jun-26	04-Aug-26
PR-2531-100	Bid/Award - Special Service Control Valves	45	05-Aug-26	07-Oct-26
PR-2531-200	Award - Special Service Control Valves	0		07-Oct-26
PR-2531-300	Fab/Delivery - Special Service Control Valves	120	12-Apr-28	29-Sep-28
2550 - Safety and Relief Valves		573	30-Jun-26	29-Sep-28
PR-2550-000	Spec - Safety and Relief Vavles	25	30-Jun-26	04-Aug-26
PR-2550-100	Bid/Award - Safety and Relief Vavles	45	05-Aug-26	07-Oct-26
PR-2550-200	Award - Safety and Relief Vavles	0		07-Oct-26
PR-2550-300	Fab/Delivery - Safety and Relief Vavles	155	23-Feb-28	29-Sep-28
2570 - Fuel Gas Ball Valves		573	30-Jun-26	29-Sep-28
PR-2570-000	Spec - Fuel Gas Ball Valves	25	30-Jun-26	04-Aug-26
PR-2570-100	Bid/Award - Fuel Gas Ball Valves	45	05-Aug-26	07-Oct-26
PR-2570-200	Award - Fuel Gas Ball Valves	0		07-Oct-26
PR-2570-300	Fab/Delivery - Fuel Gas Ball Valves	155	23-Feb-28	29-Sep-28
2762 - Fuel Gas Conditioning		727	02-Jun-25	11-Apr-28
PR-2762-000	Spec - Fuel Gas Conditioning	25	02-Jun-25	07-Jul-25
PR-2762-100	Bid/Award - Fuel Gas Conditioning	45	08-Jul-25	09-Sep-25
PR-2762-200	Award - Fuel Gas Conditioning	0		09-Sep-25
PR-2762-300	Fab/Delivery - Fuel Gas Conditioning	220	01-Jun-27	11-Apr-28
4520 - Fabricated Steel		312	09-Jun-26	30-Aug-27
PR-4520-000	Spec - Fabricated Steel	25	09-Jun-26	14-Jul-26
PR-4520-100	Bid/Award - Fabricated Steel	45	15-Jul-26	16-Sep-26
PR-4520-200	Award - Fabricated Steel	0		16-Sep-26
PR-4520-300	Fab/Delivery - Fabricated Steel	170	31-Dec-26	30-Aug-27
5330 - 480V Motor Control Centers		654	04-Dec-25	30-Jun-28
PR-5330-000	Spec - 480V Motor Control Centers	25	04-Dec-25	12-Jan-26
PR-5330-100	Bid/Award - 480V Motor Control Centers	45	13-Jan-26	16-Mar-26
PR-5330-200	Award - 480V Motor Control Centers	0		16-Mar-26
PR-5330-300	Fab/Delivery - 480V Motor Control Centers	355	10-Feb-27	30-Jun-28
6110 - DCS		570	01-Apr-26	27-Jun-28
PR-6110-000	Spec - DCS	65	01-Apr-26	01-Jul-26
PR-6110-100	Bid - DCS	65	02-Jul-26	02-Oct-26
PR-6110-110	Evaluate & Award - DCS	40	05-Oct-26	30-Nov-26
PR-6110-200	Award - DCS	0		30-Nov-26
PR-6110-300	Fab/Delivery - DCS	400	01-Dec-26	27-Jun-28
PR-6110-310	Vendor Submittals - DCS	85	01-Dec-26	01-Apr-27
6210 - Instruments		573	01-Jun-26	30-Aug-28
PR-6210-000	Spec - Instruments	25	01-Jun-26	06-Jul-26
PR-6210-100	Bid/Award - Instruments	45	07-Jul-26	08-Sep-26
PR-6210-200	Award - Instruments	0		08-Sep-26
PR-6210-300	Fab/Delivery - Instruments	170	04-Jan-28	30-Aug-28
8110 - Site Prep / Foundations / UG Utilities		169	01-Dec-26	30-Jul-27
PR-8110-000	Bid/Award - Site Prep/ FDNs/ UG Utilities	105	01-Dec-26	29-Apr-27
PR-8110-200	Award - Site Prep/ FDNs/ UG Utilities	0		29-Apr-27
PR-8110-300	Mobilize - Site Prep/ FDNs/ UG Utilities	0		30-Jul-27
8210 - Piling		189	01-Dec-26	27-Aug-27
PR-8210-000	Bid/Award - Piling	105	01-Dec-26	29-Apr-27
PR-8210-200	Award - Piling	0		29-Apr-27
PR-8210-300	Mobilize - Piling	0		27-Aug-27
8320 - Mechanical Construction		170	31-Dec-26	30-Aug-27
PR-8320-000	Bid/Award - Mech Construction	105	31-Dec-26	27-May-27
PR-8320-200	Award - Mech Construction	0		27-May-27
PR-8320-400	Mobilize - Mech Construction	0		30-Aug-27
8410 - Electrical Construction		276	31-Dec-26	01-Feb-28
PR-8410-000	Bid/Award - Elect Construction	127	31-Dec-26	29-Jun-27
PR-8410-200	Award - Elect Construction	0		29-Jun-27
PR-8410-300	Mobilize - Elect Construction	0		01-Feb-28
9010 - Geotech Investigation		110	02-Jan-25	05-Jun-25
PR-9010-000	Bid/Award - Geot Investigation	45	02-Jan-25	05-Mar-25
PR-9010-200	Field Suvey/Prep/Submit Draft Report - Geot Investigation	45	06-Mar-25	07-May-25
PR-9010-300	Review/Comment/Finalize Report - Geot Investigation	20	08-May-25	05-Jun-25
9020 - Site Survey		110	02-Jan-25	05-Jun-25
PR-9020-000	Bid/Award - Site Survey	45	02-Jan-25	05-Mar-25
PR-9020-200	Field Suvey/Prep/Submit Draft Report - Site Survey	45	06-Mar-25	07-May-25
PR-9020-300	Review/Comment/Finalize Report - Site Survey	20	08-May-25	05-Jun-25
9030 - Pilot Trenching		110	02-Jan-25	05-Jun-25
PR-9030-000	Bid/Award - Pilot Trenching	45	02-Jan-25	05-Mar-25
PR-9030-200	Field Suvey/Prep/Submit Draft Report - Pilot Trenching	45	06-Mar-25	07-May-25
PR-9030-300	Review/Comment/Finalize Report - Pilot Trenching	20	08-May-25	05-Jun-25
9130 - Medical Services		90	25-Mar-27	30-Jul-27
PR-9130-000	Bid/Award - Medical Services	45	25-Mar-27	26-May-27
PR-9130-300	Mobilize - Medical Services	0		30-Jul-27
9230 - Electrical Testing		90	27-Mar-28	01-Aug-28
PR-9230-000	Bid/Award - Electrical Testing	45	27-Mar-28	26-May-28
PR-9230-300	Mobilize - Electrical Testing	0		01-Aug-28
9250 - Performance Testing		90	20-Oct-28	28-Feb-29
PR-9250-000	Bid/Award - Performance Testing	45	20-Oct-28	22-Dec-28



Start Date 01-Oct-24
Finish Date 17-Dec-29
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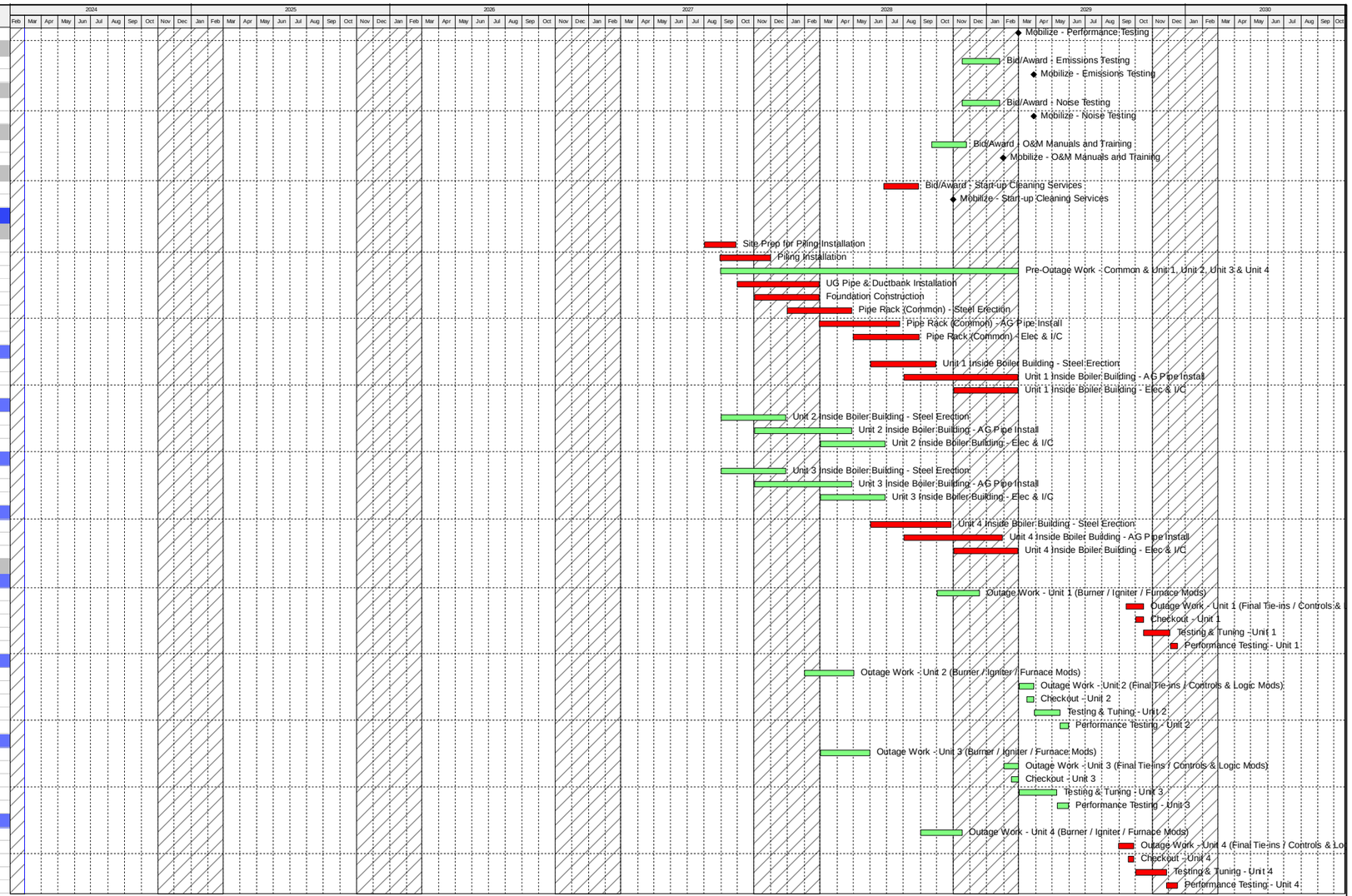
EKPC - Spurlock Units 1-4 Cofire

Project Schedule

Date	Revision	Checked	Approved

Activity ID	Activity Name	RD	Start	Finish
PR-9250-300	Mobilize - Performance Testing	0		28-Feb-29
9260 - Emissions Testing		90	17-Nov-28	28-Mar-29
PR-9260-000	Bid/Award - Emissions Testing	45	17-Nov-28	24-Jan-29
PR-9260-300	Mobilize - Emissions Testing	0		28-Mar-29
9270 - Noise Testing		90	17-Nov-28	28-Mar-29
PR-9270-000	Bid/Award - Noise Testing	45	17-Nov-28	24-Jan-29
PR-9270-300	Mobilize - Noise Testing	0		28-Mar-29
9400 - O&M Manuals and Training		90	22-Sep-28	31-Jan-29
PR-9400-000	Bid/Award - O&M Manuals and Training	45	22-Sep-28	24-Nov-28
PR-9400-300	Mobilize - O&M Manuals and Training	0		31-Jan-29
9610 - Start-up Cleaning Services		90	26-Jun-28	31-Oct-28
PR-9610-000	Bid/Award - Start-up Cleaning Services	45	26-Jun-28	28-Aug-28
PR-9610-300	Mobilize - Start-up Cleaning Services	0		31-Oct-28
Construction & Startup		605	02-Aug-27	17-Dec-29
Pre-Outage Work		401	02-Aug-27	28-Feb-29
C1250	Site Prep for Piling Installation	40	02-Aug-27	27-Sep-27
C1200	Piling Installation	65	30-Aug-27	30-Nov-27
C1000	Pre-Outage Work - Common & Unit 1, Unit 2, Unit 3 & Unit 4	380	31-Aug-27	28-Feb-29
C1260	UG Pipe & Ductbank Installation	103	01-Oct-27	28-Feb-28
C1270	Foundation Construction	81	02-Nov-27	28-Feb-28
C1280	Pipe Rack (Common) - Steel Erection	85	31-Dec-27	28-Apr-28
C1290	Pipe Rack (Common) - AG Pipe Install	105	28-Feb-28	25-Jul-28
C1300	Pipe Rack (Common) - Elec & I/C	85	01-May-28	29-Aug-28
Unit 1		187	01-Jun-28	26-Feb-29
C1310	Unit 1 Inside Boiler Building - Steel Erection	85	01-Jun-28	29-Sep-28
C1320	Unit 1 Inside Boiler Building - AG Pipe Install	145	01-Aug-28	26-Feb-29
C1330	Unit 1 Inside Boiler Building - Elec & I/C	80	01-Nov-28	26-Feb-29
Unit 2		210	01-Sep-27	28-Jun-28
C1340	Unit 2 Inside Boiler Building - Steel Erection	82	01-Sep-27	29-Dec-27
C1350	Unit 2 Inside Boiler Building - AG Pipe Install	125	01-Nov-27	27-Apr-28
C1360	Unit 2 Inside Boiler Building - Elec & I/C	85	01-Mar-28	28-Jun-28
Unit 3		210	01-Sep-27	28-Jun-28
C1370	Unit 3 Inside Boiler Building - Steel Erection	82	01-Sep-27	29-Dec-27
C1380	Unit 3 Inside Boiler Building - AG Pipe Install	125	01-Nov-27	27-Apr-28
C1390	Unit 3 Inside Boiler Building - Elec & I/C	85	01-Mar-28	28-Jun-28
Unit 4		187	01-Jun-28	26-Feb-29
C1400	Unit 4 Inside Boiler Building - Steel Erection	105	01-Jun-28	27-Oct-28
C1410	Unit 4 Inside Boiler Building - AG Pipe Install	125	01-Aug-28	29-Jan-29
C1420	Unit 4 Inside Boiler Building - Elec & I/C	80	01-Nov-28	26-Feb-29
Startup		479	01-Feb-28	17-Dec-29
Unit 1		308	02-Oct-28	17-Dec-29
C1010	Outage Work - Unit 1 (Burner / Igniter / Furnace Mods)	55	02-Oct-28	18-Dec-28
C1210	Outage Work - Unit 1 (Final Tie-ins / Controls & Logic Mods)	22	14-Sep-29	15-Oct-29
C1220	Checkout - Unit 1	10	02-Oct-29	15-Oct-29
C1030	Testing & Tuning - Unit 1	34	16-Oct-29	03-Dec-29
C1040	Performance Testing - Unit 1	10	04-Dec-29	17-Dec-29
Unit 2		339	01-Feb-28	30-May-29
C1060	Outage Work - Unit 2 (Burner / Igniter / Furnace Mods)	65	01-Feb-28	01-May-28
C1430	Outage Work - Unit 2 (Final Tie-ins / Controls & Logic Mods)	20	01-Mar-29	28-Mar-29
C1440	Checkout - Unit 2	10	15-Mar-29	28-Mar-29
C1080	Testing & Tuning - Unit 2	34	29-Mar-29	15-May-29
C1090	Performance Testing - Unit 2	10	16-May-29	30-May-29
Unit 3		319	01-Mar-28	31-May-29
C1110	Outage Work - Unit 3 (Burner / Igniter / Furnace Mods)	65	01-Mar-28	31-May-28
C1450	Outage Work - Unit 3 (Final Tie-ins / Controls & Logic Mods)	20	01-Feb-29	28-Feb-29
C1460	Checkout - Unit 3	10	15-Feb-29	28-Feb-29
C1130	Testing & Tuning - Unit 3	50	01-Mar-29	09-May-29
C1140	Performance Testing - Unit 3	15	10-May-29	31-May-29
Unit 4		328	01-Sep-28	17-Dec-29
C1160	Outage Work - Unit 4 (Burner / Igniter / Furnace Mods)	55	01-Sep-28	17-Nov-28
C1230	Outage Work - Unit 4 (Final Tie-ins / Controls & Logic Mods)	20	31-Aug-29	28-Sep-29
C1240	Checkout - Unit 4	10	17-Sep-29	28-Sep-29
C1180	Testing & Tuning - Unit 4	40	01-Oct-29	26-Nov-29
C1190	Performance Testing - Unit 4	15	27-Nov-29	17-Dec-29



Start Date	01-Oct-24
Finish Date	17-Dec-29
Data Date	01-Mar-24
Run Date	23-Oct-24

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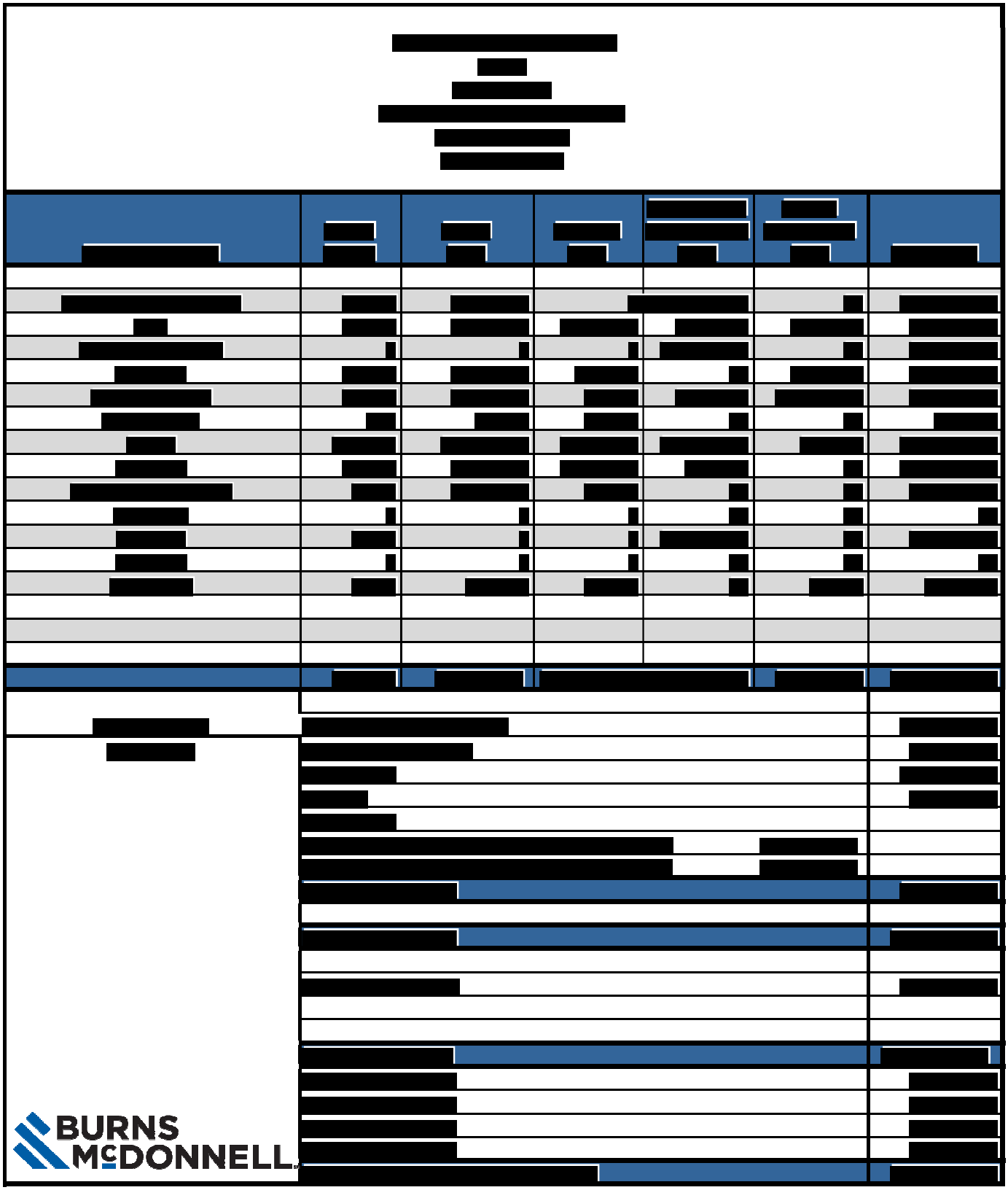
EKPC - Spurlock Units 1-4 Cofire

Project Schedule

Date	Revision	Checked	Approved

APPENDIX R – CAPITAL COST ESTIMATE



APPENDIX S – CASH FLOW

BURNS McDONNELL

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