

Section No. 5.1
CEA: 1430
Date: January 5, 1968
Author: H.B. Dygert
K.J. Johnston -
Approved by R.B. West
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ELECTRICAL DESIGN BASIS
for the
ELECTRICAL FACILITIES
within the
PROJECT BATTERY LIMITS

Project: Aroclors Expansion
Division: Organic
Plant: Anniston
Plant Location: Anniston, Alabama

Electrical Design Section
Central Engineering Department
Monsanto Company
800 North Lindbergh Boulevard
St. Louis, Missouri 63166

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1. References

Documents

Project Scope Report	August 29, 1967
Code of Accounts	September 29, 1967
Project Organization and Procedure	October 5, 1967
Master Project Schedule	March 4, 1968
Equipment List	June 16, 1967
Scope of Work	August 28, 1967
Project Scope Report (1452)	Dec. 13, 1967
Code of Accounts (1452)	Jan 3, 1968

2. Introduction

This Electrical Design Basis describes the in battery limits Electrical Systems (bonding, control, grounding, lighting and power) that will be designed by the members of the Electrical Design Section for the Aroclor Expansion Project.

The appropriation for the electrical facilities is as follows:

Code Category	Amount
01	\$15,500
04 (Electrical only)	5,000
10	0
13	<u>26,000</u>
Total capital for Equipment, material and labor	\$46,500
80	\$10,000
90, 92, & 93 (Expense)	\$14,000 Approximately

A two thousand dollar overrun is expected in the code 13 account due to additional lighting.

3. General Description of the Electrical Facilities

Installation in the tank farm area includes 9 pump motors with local and remote pushbuttons, and 3 agitator motors with local pushbuttons. Approximately 8 street type lighting fixtures for loading docks and Area lighting, and approximately 15 lighting fixtures in the tank farm area. All mercury vapor lights will be constant wattage type.

In the drumming and flaking area installations consist of 20 motors, a motor control center for motors in both areas, and approximately 23-175 watt mercury vapor lights for the building.

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A 300 KVA Pole mounted Transformer will be installed to feed the motor Control Center. The existing HB 40 (200 KVA) Transformer will be removed and scrapped. The existing HB 40 Load will be fed by a new feeder from the existing Aroclor Motor Control Center.

Because of building locations and grading work an extensive amount of pole line replacement and rerouting will be done for CEA 1430 and CEA 1452.

4. Project Risk

There is no risk on this project.

5. Electrical Equipment and Material Removals.

The existing HB-40 Transformer is to be removed and scrapped. This Transformer (200 KVA) is 30 to 40 years old and if reused would become a safety and housekeeping problem.

The existing feeder from the HB-40 Transformer to the HB-40 load will be removed.

6. Schedule

	Tank Farm	Flaking Drumming
Electrical Design Completion	March 25, 1968	May 13, 1968
Electrical Drawing Completion	April 1, 1968	May 20, 1968
Start Construction on Project	May 27, 1968	July 8, 1968
Startup Date on Project	August 12, 1968	Oct. 14, 1968

7. Electrical Drawings

Approximately 18 new drawings and revisions to 3 existing drawings will be needed for this project. See attached list.

8. Electrical Purchasing

CED will purchase all motors, motor control centers, pushbutton, stations, panels, lighting fixtures, power transformers, circuit breakers, feeder cables, multi-conductor cables and cable tray. The contractor will provide all wire (except cables) conduit, conduit fittings, supports, lamps, fuses (other than in new motor control center), and wire markers.

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9. Construction and Startup Assistance Provided or Arranged for by the Electrical Design Section

The Electrical Equipment and controls on this project are not complicated. No vendor assistance is anticipated and assistance by the Electrical Design Group should be minimal but further coverage can be made available at the request of the project Manager.

10. Completion Criteria

This project will be considered to be Electrically complete when all electrical equipment that was scheduled for removal has been removed, and all new electrical equipment has been properly installed and the operation of the new Electrical Equipment has been demonstrated to be satisfactory to the project Manager and to the Plant Manager or his designee.

11. Electrical Codes

All Electrical installations shall be in accordance with the 1965 National Electrical Code.

12. Electrical Standards

This project will use those electrical items and materials that are covered by the CED Electrical Standards as applicable to the Anniston Plant.

13. Hazard Classification

Liquid biphenyl will be the only hazardous material connected with this project. Liquid biphenyl has a flash point of 113°C and biphenyl dust under certain conditions can explode. However, by proper temperature control (below 80°C) of the liquid and separation of main electrical equipment from the biphenyl flaker area the project will be basically non-hazardous. Some TEFC or encapsulated motors and explosion proof controls may be used near the biphenyl area after further evaluation.

14. Special Corrosive or Dust Conditions

NONE

15. Special Protective Coatings and Equipment Painting

All painted equipment is to have a paint system which is 5 mils thick.

16. Power Supply Requirements and Source of Power

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						Estimated Demand	Installed
440	Volt	3	Phase	60	Hertz	power	for Motors 200KVA 300 HP
440	"	3	"	"	"	"	Heaters 2 2
440	"	3	"	"	"	"	Lighting 15KVA 15 KVA
110	"	1	"	"	"	Instruments 3KVA 5 KVA	
						220KVA	22KVA+300 HP

A 480 volt 400 Amp (500 MCM) feeder from the new 300 KVA transformer to the new MCC will be installed on this project.

17. Wiring Systems

All wire will be copper and stranded. No conductor smaller than #14 will be installed. Control wire will be #14, Lighting conductors will be #12 and above. Type THW 600 volt insulation is specified.

18. Supports for Conduit and Equipment Mounting

A cable tray will be routed atop the pipe bridge from the motor control center to the tank farm area. In the flaking and drumming area trapeze type hangers and beam clamps connected to the building steel will be used to support the conduit.

19. Motors

There will be approximately 35 motors installed, all motors are 3 phase induction type with TEFC or encapsulated enclosures. See attached list.

20. Motor Control Centers

The motor control center shall be a front access NEMA 1A enclosure with Class I Type B wiring and fusible disconnect switch combination starters.

The motor control center shall consist of approximately 18-size 1 starters, 12-size 2 starters, 1 - 3 pole main disconnect 400 ampere switch, 5-60 ampere 3 pole disconnects. All starters shall have 480 volt to 120 volt control transformers. A watt hour meter will also be mounted in the MCC.

21. Individually Mounted Motor Starters

Two individually mounted NEMA 4, Size 1 fusible disconnect combination starters for sewage pumps. Two individually mounted manually starters will be installed in tank farm area for drum unloading.

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22. Motor Control Circuit Requirements

All starters other than sewage pump starters will be equipped with 480/120 volt control transformer with one side of the secondary fused, the other side grounded. Pumps in the tank farm will have local and remote pushbuttons, other motors will have local pushbuttons only. No complicated interlocking involved. Sewage pumps will have a combination float switch alternator control with a man-off-auto selector switch, and 270 to 120v. control transformers.

23. Conductor Identification

Control Circuit Conductors will be labeled at all terminal blocks and devices using Brady 500 wire markers with numbers and/or letters that are indicated on the appropriate Electrical drawings.

24. Power Receptacles

NONE

25. Lighting Systems

Approximately 15-175 watt light fixtures will be installed in the tank farm area, approximately 6-400 watt street type light fixtures will be installed for the loading dock and tank farm perimeter, and approximately 23-175 watt light fixtures will be used in the drumming and flaking area. All mercury vapor fixtures will be constant wattage type. Some incandescent lighting will be installed in the manufacturing area to provide light after a power failure. No provisions for emergency lighting system. Lighting transformer and panel will be located in the new warehouse.

26. Bonding and Grounding (Earthing) Systems

Power Systems All noncurrent carrying parts of electrical Equipment will be connected to the motor control center ground buss through the conduit system and with grounding type conduit bushings at the equipment. An extra wire connected to the ground buss in the motor control center will be run in the cable tray to insure a proper ground in the tank farm area.

The Building shall be grounded with individual ground rods located near and bonded to every other building column. The tank Farm area shall be grounded in a similar manner.

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27. Lightning or Surge Protection Equipment other than Grounding

The 300 KVA transformer is self protected - with the Lightning arresters and primary fuses.

28. Unit Heaters, Heating and Ventilating Equipment.

Two electric heaters will be installed in warehouse valve houses (CEA 1452)

29. Annunciator Alarms Systems

NONE

30. Equipment Nameplates

Supplied by CED

31. Interlocks

No special or complicated interlocking systems are required for this job.

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Project 1452

32. This project includes a 120' x 240' warehouse and a 30' x 60' office and cafeteria building.

The Electrical section provided two drawings for the lighting and receptacles for the office building. The electrical purchases and installation will be part of a lump sum contract.

The Electrical section will provide a feeder to the office building from the new Motor Control Center for Project 1430.

There will be approximately two new drawings showing inside and outside lighting, grounding, and ventilating for the warehouse. The warehouse will be fed from the new M.C.C. for Project 1430.

The Code Category 13, direct Electrical Capital expenditure authorized for this project is \$12,900.