**2023-2024 FFA/GEMC**

**Speech/Demonstration Topic**

**PROBLEM:**

The contestant will be expected to thoroughly explain the calculations and installation of a Pole Mounted Main Farm Service. This installation will consist of a Self-Contained Pole Mounted Meter with a pole-mounted 200-amp Main Breaker Load Center serving as the site disconnect. Power will be supplied to the following locations. A farm residence located 120 feet from the Pole, a farm shop located 110 feet from the pole, and a beef show barn located 85 feet from the pole. Voltage drop should not exceed 3%. All connections and calculations will be made in accordance with the National Electric Code and Agriculture Wring Handbook.

**Load Calculations:**

Determine diversified demand in accordance with Section 20 of the Agriculture Wiring Handbook. The loads used to calculate demand for size service equipment and over current protection are:

Residence – 90 amps, 240V

Farm Shop – 45 amps, 240V

Beef Barn – 25 amps, 240V

**Materials List:**

The following list of materials will either be attached to the demo frame or laid out for the contestants to use as they explain the installation of the circuits.

1 - 200 Amp Meter Base

1 - Eaton Type BR 200-Amp 8 Spaces Main Breaker Load Center

1 - #6 Soft Drawn Bare Copper Conductor installed

2 - 5/8” Grounding Rod attached to display board

2 - 5/8” Grounding Clamps

1 - 100 Amp Double Pole Breaker

1 - 50 Amp Double Pole Breaker

1 - 30 Amp Double Pole Breaker

6 - 4/0 AL Type USE-2 or RHH or RHW-2 Cable Service Entrance Cable

1 - #2 AL Type USE-2 or RHH or RHW-2 Multiwire Cable Serving Residence

1 - # 6 CU UF Multiwire Cable Serving Farm Shop

1 - # 10 CU UF Multiwire Cable Serving Livestock Barn

1 - 2 ½” Service Entrance Cap

3 - 2 ½” Ridge PVC Schedule 40 Conduit (Length Varies)

4 - 2 ½” Male Conduit Fitting

2 - 2 ½” Rain Tight Hub (One for Meter Base, One for Load Center)

**References:**

2023 National Electrical Code

Agricultural Wiring Handbook, 17th Edition

Poster Display Board

The grounding conductor, grounded conductor, and meter base enclosure are bonded.

The meter base grounding conductor is bonded to an assumed driven ground

4/0 AL USE-2/RHH

#10/3 w Ground Copper

UF cable to Ag Shop 85 ft From

Pole

Cable Dimension .727” Width x .215” Thickness = Cable Area .1563in2

2 ½” Schedule 40 PVC Conduit

#2-2-2-4 AL USE RHH/RHW-2 cable to Farm Residence 120ft From Pole

Cable Area = .944 in2

#6/3 w Ground Stranded Copper

UF cable to Ag Shop 110 ft From

Pole

Cable Dimension 1.223” Width x .361” Thickness = Cable Area .4415 in2

2 ½” Schedule 40 PVC Conduit less than 24”

2 ½” Schedule 40 PVC Conduit