MEDIUM VOLTAGE EXPERIENCE

ELECTRICAL DESIGN FOR SYSTEMS UP TO 34.5KV

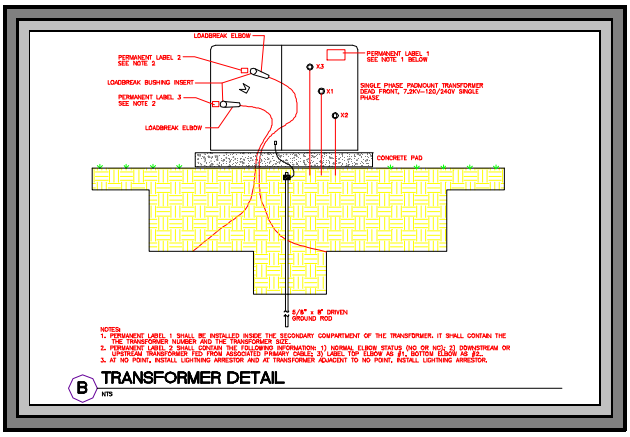
Yates Engineering Services, Ltd. has extensive experience in the design of medium voltage distribution systems. Mr. Donald L. Yates, P.E. "cut his teeth" on these types of projects while working for Oklahoma Gas & Electric and later in his position with Sussex Rural Electric Cooperative. With his work at these firms, he not only gained invaluable design experience, he was also responsible for construction supervision, operation and maintenance of these facilities. When Mr. Yates started YES, he remained active in this field by providing design and construction administration services on medium voltage projects for the non-utility sector. Shown below are descriptions of some of these projects:

Plant 1 Renovation - Ok Foods, Inc.
Fort Smith, Arkansas
Electrical Construction Cost - $1,200,000.00

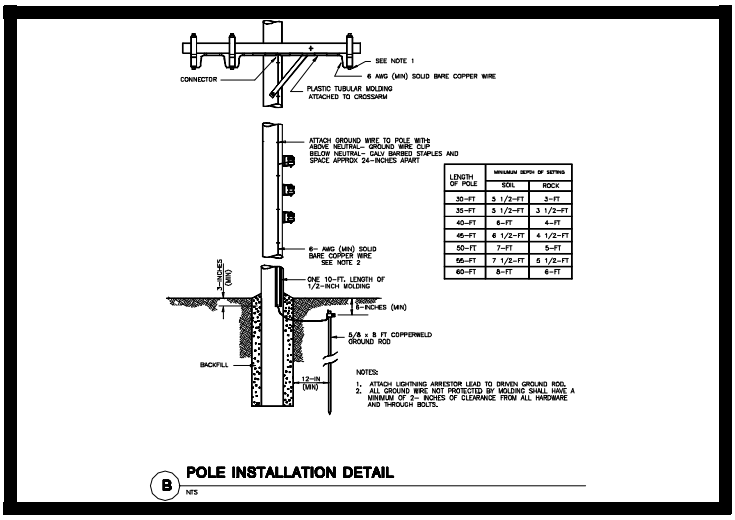
Conditions in Plant 1 Prior to Renovation

This was a project to completely renovate electrically a 100,000 square foot poultry kill facility that was 40 years old. Not only were the interior electrical systems inadequate, the exterior systems were inadequate also. The primary distribution system consisted of approximately ½ mile of 12.5 KV overhead power line (477AS33 conductors) with four underground radial feeds to other parts of the facility. The power to Plant 1, and a large part of Plant 2 were fed by radial underground conductors which served two 3750 KVA transformers. The riser pole which fed this underground system did not have load-break capabilities, so it was necessary to kill power to OK Foods entire facility to take the 3750 KVA transformers offline. In addition, further complicating this project, outage time had to be kept to a bare minimum, since the facility operated on a 24 hour, 7 day a week basis.

The design goal was to provide a distribution system that was capable of delivering the power required by the facility, and also providing the capability of isolating problem transformers, while keeping the other OK Food production facilities in operation. The new system included a looped underground distribution system which fed two new 2500 KVA transformers and also an existing 2500 KVA transformer, which served the Reed Lane facility. Load-break capabilities were provided on the riser poles and at the transformers. The concrete encased underground duct system fed 750MCM copper conductors through one manhole and approximately 1000 feet of conduit.



Single Phase Padmount Transformer Installation Detail



Pole Installation Detail.

One of the existing 3750 KVA transformers was kept in service to serve the refrigeration load in Plant 2. The other 3750 KVA transformer was serviced, and now functions as an OK Foods system spare.

The design that was implemented met the project goals, was completed approximately $100,000.00 under budget and was built on-schedule, with a 13 month construction deadline.

Bay 1 Renovation - Baldor Motors and Drives
Fort Smith, Arkansas
Electrical Construction Cost - $1,400,000.00

Approximately 70,000 square feet of industrial space was being renovated for the addition of production space and a new short circuit testing lab. Also, another 140,000 square feet of building space needed to be provided with adequate power for future Baldor operations.

The design included underground 750 MCM cable/duct system feeding a line-up of metal enclosed switch gear. A vacuum breaker was used as the main device and the downstream devices were equipped with fuses. This combination was used to provide proper coordination between the utility's protective devices and Baldor's various electrical systems. This switchgear fed 3-2500 KVA transformers, a 1500 KVA transformer and three unit substations. Two of the 2500 KVA transformers were connected electrically in parallel on the secondary side to provide a low impedance, high fault current capability in the short circuit testing lab.

Nelson Hall Homes - Fort Smith Housing Authority
Fort Smith, Arkansas
Electrical Construction Cost - $300,000.00

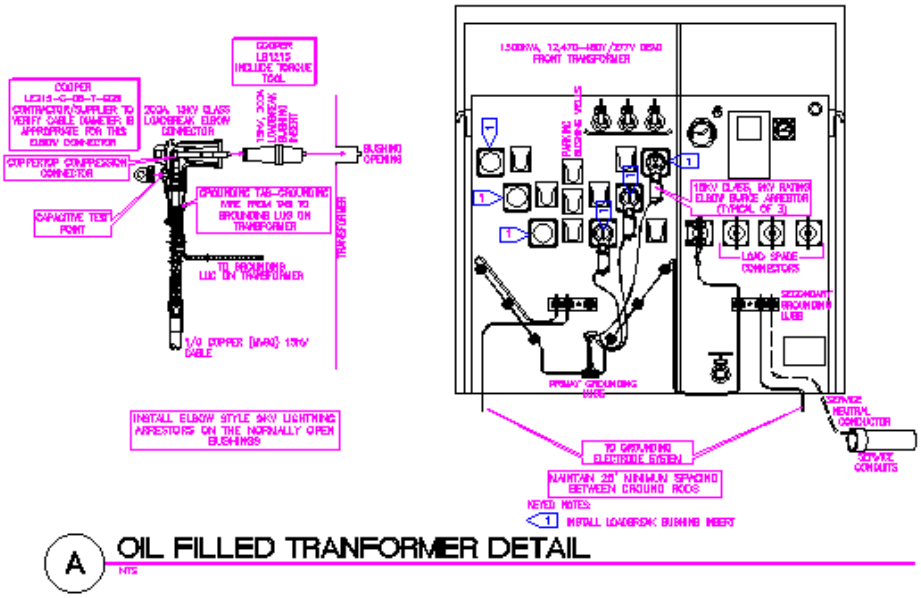

Arkansas Refrigerated Services

Nelson Hall Homes is a housing project that was constructed in the early 1960s. Electrically, the facility is primary metered, and the Housing Authority owns all of the underground primary (12.5KV) distribution system.

The development was fed via an overhead switch yard that was enclosed with an eight foot wooden fence. Cutouts were mounted on a galvanized rack, and they provided sectionlizing and fault current protection to the underground feeders. The underground primary conductors consisted of single phase copper conductors, with exposed concentric neutrals that were direct buried. Nelson Hall Homes had been experiencing numerous outages due

to primary cable problems.

The project consisted of replacement of 9000 feet of underground primary cable, replacement of 29 single phase padmount transformers and replacement of one three phase transformer. In addition, the overhead switch yard was eliminated by replacing it with a 600 amp, 15KV switching cubicle. All of the transformers were equipped with remotely read fault Indicators, to help speed fault locating in the event of equipment failure. The new conductor was a high quality jacketed concentric neutral cable that was direct buried.



A OIL FILLED TRANFORMER DETAIL
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