02.08-05/01/97-02280

Contractor's Closeout Report
For
Access Improvements and Utility Construction
Operable Unit 14, Site 69
MCB Camp Lejeune, North Carolina

Prepared for:

DEPARTMENT OF THE NAVY
Contract No. N62470-93-D-3032
Delivery Order 0087

Prepared by

OHM Remediation Services Corp.
Norcross, Georgia

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Program Manager

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Project Manager

May 1997

OHM Project No. 17849

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1.0 INTRODUCTION

OHM has completed all activities as required under LANTDIV RAC Contract No. N62470-93-D-3032, Delivery Order No. 87 - Debris Removal at Site 69 of Operable Unit 13, Marine Corps Base, (MCB) Camp LeJeune, North Carolina, in accordance NAVFAC Specification Section 01010 General Paragraphs dated February 1995 and OHM's Remedial Action Work Plan dated December 5, 1995, and revisions dated January 5, 1996.

This Closeout Report has been prepared in accordance with Specification Section 01010, Paragraph 1.3.1.10 and describes how OHM installed the permanent power line and access improvements.

Marine Corps Base (MCB), Camp Lejeune, North Carolina was placed on the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) National Priorities List (NPL) that became effective on October 4, 1989 (54 Federal Register 41015, October 4, 1989). The United States Environmental Protection Agency (USEPA) Region IV, the North Carolina Department of Environment, Health and Natural Resources (NC DEHNR) and the United States Department of the Navy (DoN) then entered into a Federal Facilities Agreement (FFA) for MCB Camp LeJeune. The primary purpose of the FFA was to ensure that environmental impacts associated with past and present activities at the Base were thoroughly investigated and appropriate CERCLA and Response/ Resource Conservation and Recovery Act (RCRA) Corrective Action alternatives were developed and implemented as necessary to protect public health and the environment.

Site 69 is located in the southwestern area of the base and is in the southern portion of the Rifle Range area. The site is situated west of the New River Estuary and is approximately 6 acres in size.

Site 69, the Rifle Range Chemical Dump, is located west of the New River Estuary in the area of MCB Camp Lejeune know as the Rifle Range. Site 69 is a former disposal site (i.e., landfill) and is approximately 6 acres in size. Access is restricted by a 6-foot high chain link fence with a locked entrance gate. The site is heavily wooded with several species of trees including pine, sweetgum, dogwood, and oak. Within the fenced-in boundary, the forest type is mostly new growth with a predominance of pine species. Old growth forests (i.e., oak and sweetgum) dominate the land areas outside the boundaries of the site fence.

The site is located approximately 3 miles east-southeast of the intersection of Highway 17 and Route 210. The site is situated where a light-duty, unnamed roadway splits to form a "Y." For this report, this road will be referred to as the "access road."

The New River is located about 1/4 mile east of the site. Everett Creek is located about 1/2 mile south of the site. An unnamed tributary to the New River is situated about 1/4 mile north of the site. A light-duty road borders the site to the west. Both Everett Creek and the unnamed tributary drain into the New River.

Site 69 is situated at a topographic high. Most of the site within the fenced area is flat; however, the topography surrounding the site slopes gently in all directions. During the site field investigation which was conducted from January to March of 1994, portions of the site area exhibited standing/ponding water, which could indicate poor drainage.

Surface water run-off from the northern portion of the site may drain toward the unnamed tributary located to the north; however, the surrounding area is heavily wooded and consists of a dense underbrush that could inhibit off-site drainage at great distances. Surface run-off from the southeastern portion of the site reportedly drains to unnamed ditches that drain into the New River. Surface run-off from the southwestern portion of the site drains into the Everett Creek basin, which could potentially drain into Everett Creek and the New River.

Site 69 was used as a chemical waste dump between 1950 and 1976. The waste materials were reportedly disposed in pits or trenches, 6 to 20 feet deep. Various wastes have been reportedly disposed of at the site including polychlorinated biphenyls (PCBs), fire retardants, pentachlorophenol, dichloro-diphenyltrichloroethane (4,4'-DDT), trichloroethylene (TCE), malathion, diazinon, lindane, calcium hypochlorite, gas cylinders, high test hypochlorite (HTH), drums of "gas" [possibly training agent containing chloroacetophone (CN), chemical agent test kits for chemical warfare, and fired and unfired blank rifle cartridges (Water and Air Research (WAR) 1983].

Based on conversations with personnel from the U. S. Army Environmental Center (USAEC), formerly the U. S. Army Toxic and Hazardous Materials Agency (USATHAMA) and the U. S. Army Technical Escort Unit (TEU), there is a high probability that chemical agent training kits are also buried at the site. PCBs were reportedly sealed in cement septic tanks prior to disposal at the site. The presence of the fired and unfired rifle cartridges indicate that troop training exercises have occurred in this area (WAR, 1983).

In 1970, an explosion reportedly occurred at Site 69 during a disposal operation. Containers of 4,4'-DDT, TCE, and calcium hypochlorite were placed in a pit at the site. While the containers were being covered with earth, an explosion and fire occurred (WAR, 1983).

The site is inactive at present. Access is restricted by a chain-link fence. No known training activities are presently conducted within the fenced-in area.

2.0 SUMMARY OF ACTION

The bulk of the activities performed at the project can be divided into three major phases. The initial phase of work included improvements of the access to the site as indicated in the scope of work. As a second major phase of field work, temporary power was provided to the two treatability study wells to enable operation of pumps and blowers. The third phase of the project involved the provision of a permanent overhead power supply to the two remote treatability study wells. Photographic documentation of the various construction activities are located in Appendix A. Upon completion and inspection of the new power supply construction, the system was turned over to Base personnel for their use.

2.1 SUBMITTALS

On October 16, 1995, draft project plans were submitted for review and comment. The plans consisted of a Work Plan including Erosion and Sediment Control provisions and a Site Specific Health and Safety Plan.

The plans provided a brief description of the project objectives, schedule, site work and construction requirements, and removal requirements.

Review comments were incorporated into the plans and the Final Plans issued on December 5, 1995. A further revision to the Plans to clarify an ambiguity was issued on January 5, 1996.

The 75 percent notification letter was issued on February 16, 1996.

Two submittals of proposed materials were made on this project. The initial submittal for the bulk of the permanent material incorporated into the permanent power line construction was forwarded on January 19, 1996 and approved on January 26, 1996. The second material submittal was forwarded on February 29, 1996 and returned approved on March 1, 1996. Copies of the approvals are located in Appendix E.

2.2 ESTABLISH ROUTING AND RESOLVE WETLANDS ISSUES

Surveyors from the firm of John L. Pierce - Surveying performed the initial survey to establish the centerline of the proposed route in September, 1995. Subsequent to this survey it was determined that the proposed route could possible interfere with aircraft traffic during maneuvers at the Rifle range. The line was rerouted during October to avoid conflict with the landing area and the full width of the right-of-way staked. During October and

November, 1995, the Base Forestry Department supervised the harvesting of merchantable timber from the right-of-way.

During the harvesting of the trees performed by the Base subcontractor, several areas of suspected wetlands were encountered. These areas were subsequently delineated by the Base wetlands expert. For the next two months, correspondence with the Corps of Engineers was conducted with the final conclusion that the proposed overhead power line construction falls within the jurisdiction of the General Nationwide Permit. A copy of the permit and findings is located in Appendix B.

2.3 MOBILIZATION AND SITE PREPARATION

Activities included the erection of caution tape to identify and delineate the work areas and the implementation of all necessary measures for site drainage, siltation, and erosion control.

2.4 ACCESS IMPROVEMENTS

On October 26, 1995, personnel and equipment were mobilized to the site to commence the task of access improvements. The route to the site is via a series of dirt trails, specifically, Red Trail, TLZ Owl Road and an unnamed access road. The approximately two miles covered by this route were completely regraded and reshaped with a center crown and the side drainage ditches graded to enhance storm water flow.

At the existing wye intersection between TLZ Owl Road and the access road to the site, an 18-inch corrugated metal pipe was installed as shown on Figure 1 in Appendix C to route storm water flow across the access road to the influent area for an existing 18-inch culvert which crosses TLZ Owl Road. Eight loads of ABC stone were spread in this area and at the confluence of TLZ Owl Road and the Brown Trail.

2.5 PERMANENT POWER LINE CONSTRUCTION

A Pre-Construction meeting was held at the offices of the Resident Officer In Charge of Construction at MCB Camp Lejeune on January 24, 1996. Immediately following this meeting, construction of the overhead power line commenced.

2.5.1 Clearing and Grubbing

The clearing of the right-of-way was performed in approximately three weeks. During this operation, Baker Environmental's drilling subcontractor required upgraded access within the area of the chemical dump and required the removal of various trees. Two rolls of

Mirafi geotextile and 20 loads of stone were used in the upgrading of the access within the chemical dump area.

Clearing and grubbing of the power line right-of-way involved the removal of trees (including stumps) left in place by the timber harvester. For those trees whose stumps were not removed (i.e. areas designated as wetlands), a stump height of no more than six inches was maintained. This reduced stump height was directed by the Base personnel to permit passage of mowing machinery.

As areas were cleared, trees and limbs were stacked along the edges of the right-of-way. Restoration of original contours was effected by traversing the right-of-way dragging a weighted section of chain-link fencing.

2.5.2 Overhead Power Line Construction

Permanent overhead power line construction began in earnest on January 29, 1996. Personnel and equipment operated by E & R, Inc had mobilized to the site during the prior week to receive and properly stage permanent materials for the upcoming construction effort. Conventional rubber tired pole trucks and augers were employed to install the poles along the right-of-way. After several rain days, the right-of-way became virtually impassable to all but four wheel drive vehicles. E & R elected to demobilize and await arrival of a track mounted pole setting vehicle.

The track mounted vehicle arrived on-site on February 26, 1996 and all remaining poles were set during the ensuing four days. (E & R's work week was four ten hour days, Monday through Thursday.) Wire pulling followed on the heels of pole installation. All wire was pulled and installed completely by March 15, 1996. Final inspection of the completed system was conducted on March 21, 1996 and the line placed in service.

In April, the Base advised that aids to navigation would be required on the waterway span. Orange balls furnished by the Base and beacons procured by E & R were installed on April 19, 1996.

The completed system which spans 5,876 feet includes 34 new 40-feet power poles spaced as indicated on Figure 2 located in Appendix C. The 400-feet waterway crossing employs two 90-feet poles with steel cross arms, one at each end, to maintain an 80-feet clearance at mid-span over the waterway. Primary voltage of the system is 12.47 Kva supplied via three main conductors, composed of aluminum alloy conductor, bare (AAAC) sized at No. 2/0 per conductor. Three 50 Kva pole mounted transformers were provided located on Pole 36 to provide 480 volt three phase power to the distribution center detailed on Figure 3, Appendix C.

Details of all permanent materials supplied are located in Appendix D.

2.6 TEMPORARY POWER SUPPLY

Temporary power for the supply of electricity to the Treatability Study wells and blowers was employed on-site from February 19, 1996 through March 21, 1996. A diesel generator set and portable fuel supply capable of providing 110 percent of the power required for the operation of the wells for up to one week without fuel resupply was temporarily located adjacent to the power distribution panel.

2.7 SECONDARY POWER DISTRIBUTION

Secondary power distribution via insulated conductors housed in watertight flexible conduit was provided. The conduit is laid over the surface of the ground and follows a routing that is least susceptible to incidental damage.

2.8 DEMOBILIZATION AND SITE RESTORATION

At the completion of the power line construction activities, the right-of-way was shaped and contoured to match the existing adjacent contours. Due to the dense forrest surrounding the right-of-way, the requirement for seeding was waived and the area left to reforest itself. Final contours employed were based both on existing surroundings and on the minimization of potential for erosion and or sediment runoff.

3.0 *FINAL HEALTH AND SAFETY REPORT*

3.1 MOBILIZATION AND SITE PREPARATION

The site preparation for site 69 at Camp Lejeune, North Carolina, included the following:

- Mobilization
- Placement of porta-john in a predesignated location in accordance with OSHA regulations
- Prior to the start of on-site operations, all on-site OHM personnel read, understood and signed the OHM Site-Specific Health and Safety Plan (HASP) and in accordance with OSHA requirements, the following items were set-up on-site:
  - An employee Right-To-Know poster and station
  - Material Safety Data Sheets (MSDSs) for all on-site chemicals
  - A hospital route and map was posted in the command center, and a copy placed in the glove compartments of all site vehicles
  - The site-specific evacuation plan was placed in the glove compartment of all site vehicles
  - Briefing at Lot 203 for subcontractor

3.2 ON-SITE OPERATIONS

The overhead power line installation from the Rifle Range to Site 69 at Camp Lejeune, North Carolina, included:

- Grading and drainage improvements to TLZ Owl Road
- Clearing of all trees and brush left within the right-of-way by the Forestry Department's harvester
- Overhead power line installation
- Site restoration

All the above tasks were accomplished using field personnel, an excavator equipped with a bucket or grappler and a dozer. EPA Level D protective clothing was used and required each employee to wear a hard hat, safety glasses, cotton work gloves and steel-toed shoes. When using chainsaws, chaps and leather gloves were worn by operators of the saw.

On-site communication was established between work zones and consisted of verbal communications, line of sight observations, two-way radios or hand-held cellular telephones. Off-site communications via hand-held cellular telephones were available to summon emergency services had this been required.

3.3 AIR MONITORING

Prior to site clearing activities, baseline air monitoring was conducted. Due to the results of the baseline monitoring (non-detect) and since no excavation activities were conducted, additional air monitoring was determined not to be required.

3.4 TRAINING REQUIREMENTS

OHM employees, subcontractors and site visitors allowed access to the Chemical Dump Area were required to have completed the 40-hour health and safety training course for Hazardous Waste Site Operations in accordance with 29 CFR 1910.120 and had to read, understand and sign the HASP.

3.5 ACCIDENTS AND/OR INJURIES

The project was completed without an OSHA Reportable Accident or Lost Time Injury.

4.0 SUMMARY OF RECORD DOCUMENTS

The record documents submitted to the Navy Technical Representative for Delivery Order 87 include the remedial action work plan, the site safety plan, and the Contractor's Closeout Report. Documentation associated with quality control is discussed in Section 6.0.

5.0 FIELD CHANGES

5.1 FIELD CHANGES

During field operations, weekly quality control (QC) progress meetings were held with the Navy Technical Representative (NTR). During these meetings, items of concern and project status were discussed. Also during the QC meetings, field changes were discussed and implemented when conditions dictated. The following is a summary of changes agreed to by OHM and the Navy with a brief explanation:

- *Line Routing*
  The original routing of the line had to be revised to go around the TLZ at the Rifle Range. The final spacing of poles was revised to miss suspected wetlands areas.

- *Tie-In Point*
  The initial tie-in point at the Rifle Range was moved to a location designated by Base personnel.

- *Driller Access*
  Additional access improvements including clearing, geofabric provision and installation and provision and installation of IBC stone was performed to enhance the well installation.

- *Stump Height*
  The height of remaining stumps was reduced from 10 inches in the Work Plan to 6 inches.

- *Secondary Power Distribution*
  Secondary power distribution cabling and water-tight flexible conduit were provided and installed. Additional circuit breakers with 20 milliamp trips were procured and installed. A watt-hour meter was provided and installed.

- *Aids to Navigation*
  Beacons were provided for each of the 90-feet poles and beacons and orange balls were installed on the tall poles and on each conductor at midspan.

6.0 QUALITY CONTROL SUMMARY

Inspections were performed in accordance with the requirements of the contract (Section 6.11). Inspection results were documented. A weekly QC progress meeting was conducted and the minutes recorded and submitted to the ROICC by the Site Supervisor.

Additional submittals forwarded to the ROICC and their frequency of submission were as follows:

Daily:	Sign-in Log Health and Safety Report Daily Cost Report
Monthly:	Cost Variance Report
As Required:	Progress Report

Appendix A

Photographic Documentation

Project No. 17849 **Date:** 11/16/96
Contract No. N62470-93-D-3032
Delivery Order: 87
Location : Site 69
Description: wetland delineation

Project No. 17849 **Date:** 11/16/96
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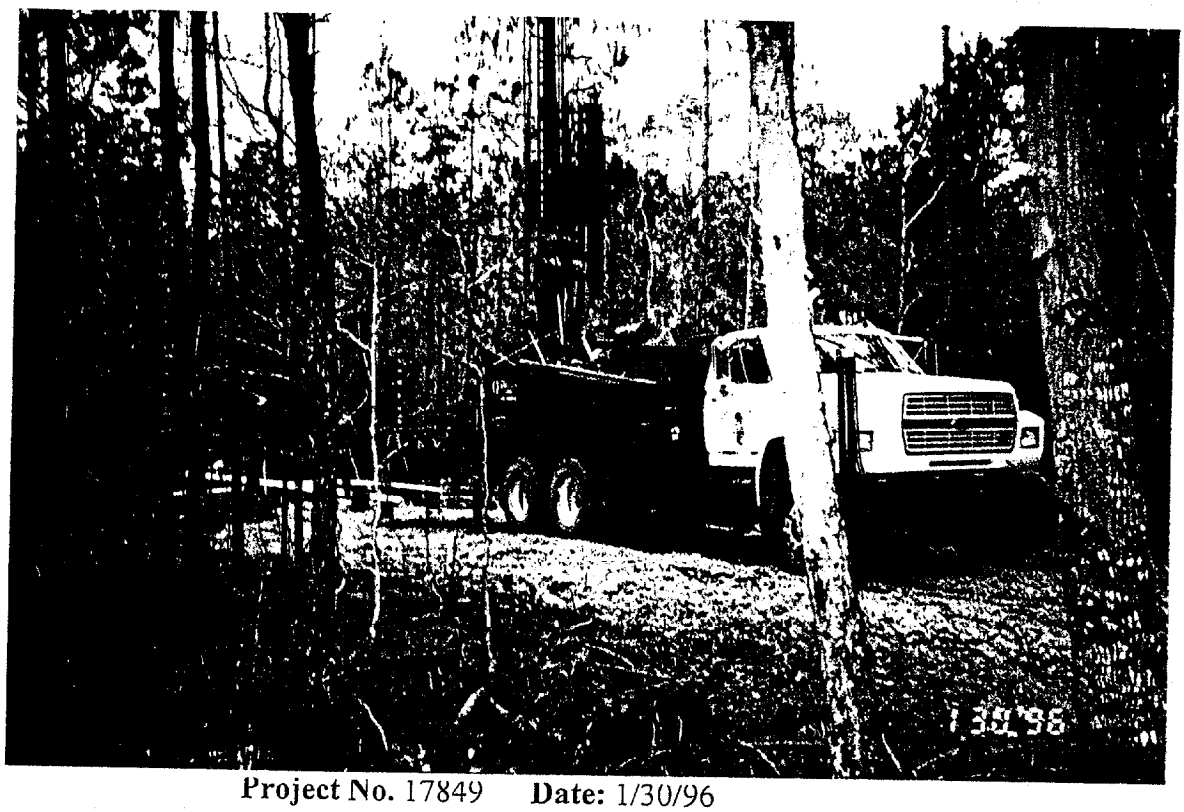
Delivery Order: 87
Location : Site 69
Description: wetland delineation



Project No. 17849 **Date:** 1/30/96
Contract No. N62470-93-D-3032
Delivery Order: 87
Location : Site 69
Description: temporary access road for well installation

Project No. 17849 **Date:** 1/30/96
Contract No. N62470-93-D-3032
Delivery Order: 87
Location : Site 69
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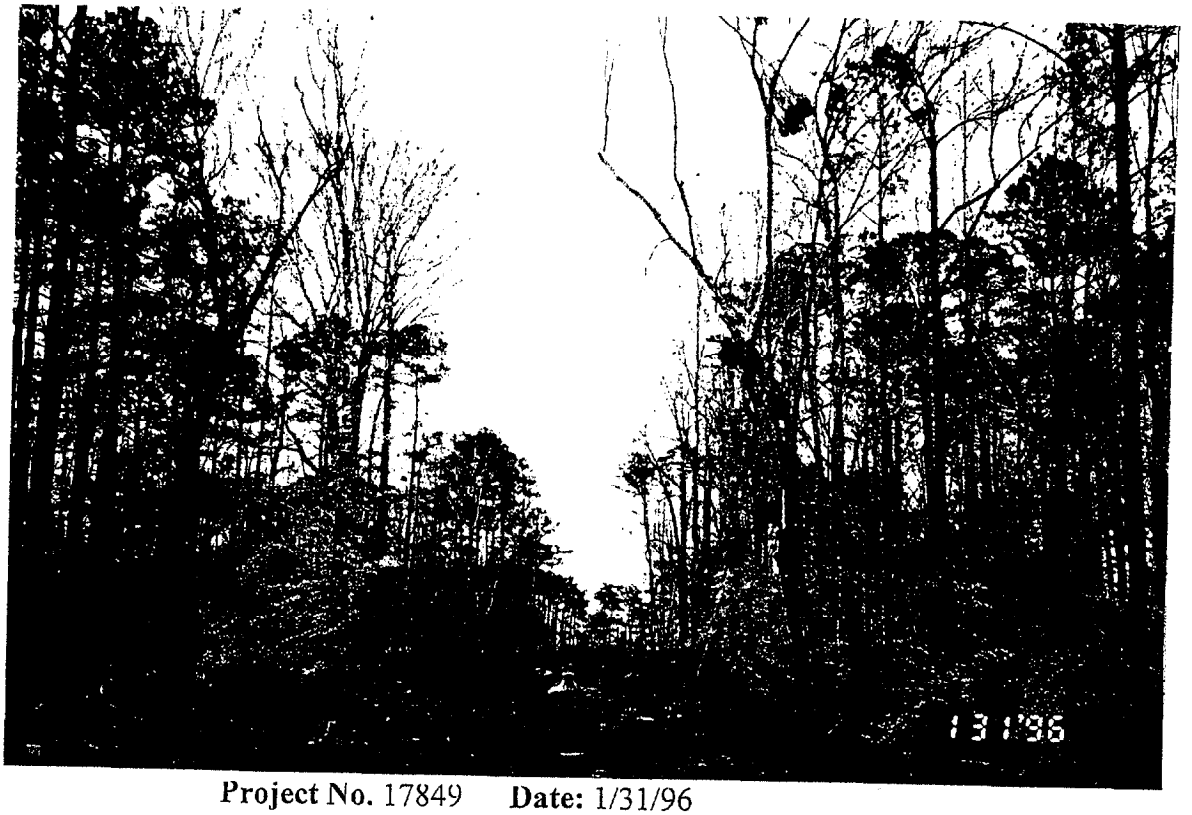
Delivery Order: 87
Location : Site 69
Description: temporary access road for well installlation



Project No. 17849 **Date:** 1/31/96
Contract No. N62470-93-D-3032
Delivery Order: 87
Location : Site 69
Description: clearing and grubbing

Project No. 17849 **Date:** 1/31/96
Contract No. N62470-93-D-3032
Delivery Order: 87
Location : Site 69
Description: clearing and grubbing

Project No. 17849 **Date:** 1/31/96
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Delivery Order: 87
Location : Site 69
Description: clearing and grubbing

Project No. 17849 **Date:** 1/31/96
Contract No. N62470-93-D-3032
Delivery Order: 87
Location : Site 69
Description: clearing and grubbing

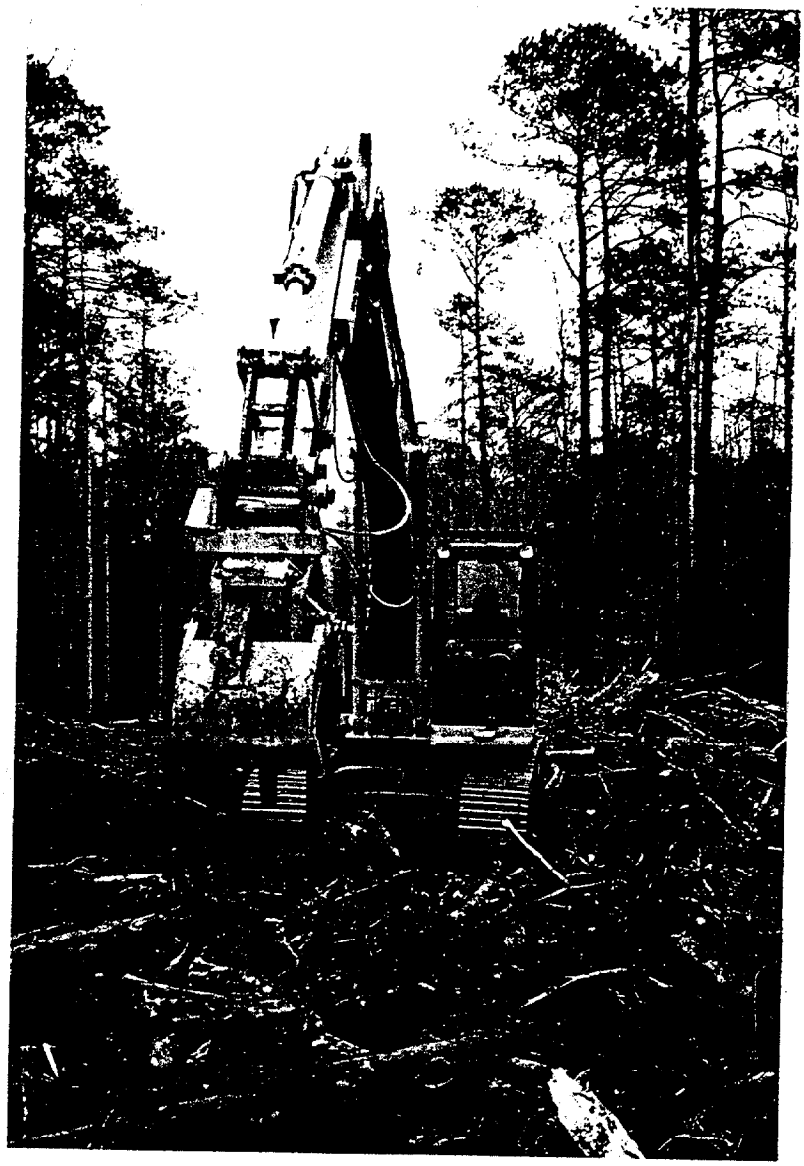
Project No. 17849 **Date:** 2/1/96
Contract No. N62470-93-D-3032
Delivery Order: 87
Location : Site 69
Description: stagged power poles

Project No. 17849 **Date:** 2/1/96
Contract No. N62470-93-D-3032
Delivery Order: 87
Location : Site 69
Description: clearing and grubbing

Project No. 17849 **Date:** 2/1/96
Contract No. N62470-93-D-3032
Delivery Order: 87
Location : Site 69
Description: clearing and grubbing

Project No. 17849 **Date:** 2/2/96
Contract No. N62470-93-D-3032
Delivery Order: 87
Location : Site 69
Description: clearing and grubbing

Project No. 17849 **Date:** 2/28/96
Contract No. N62470-93-D-3032
Delivery Order: 87
Location : Site 69
Description: clearing and grubbing

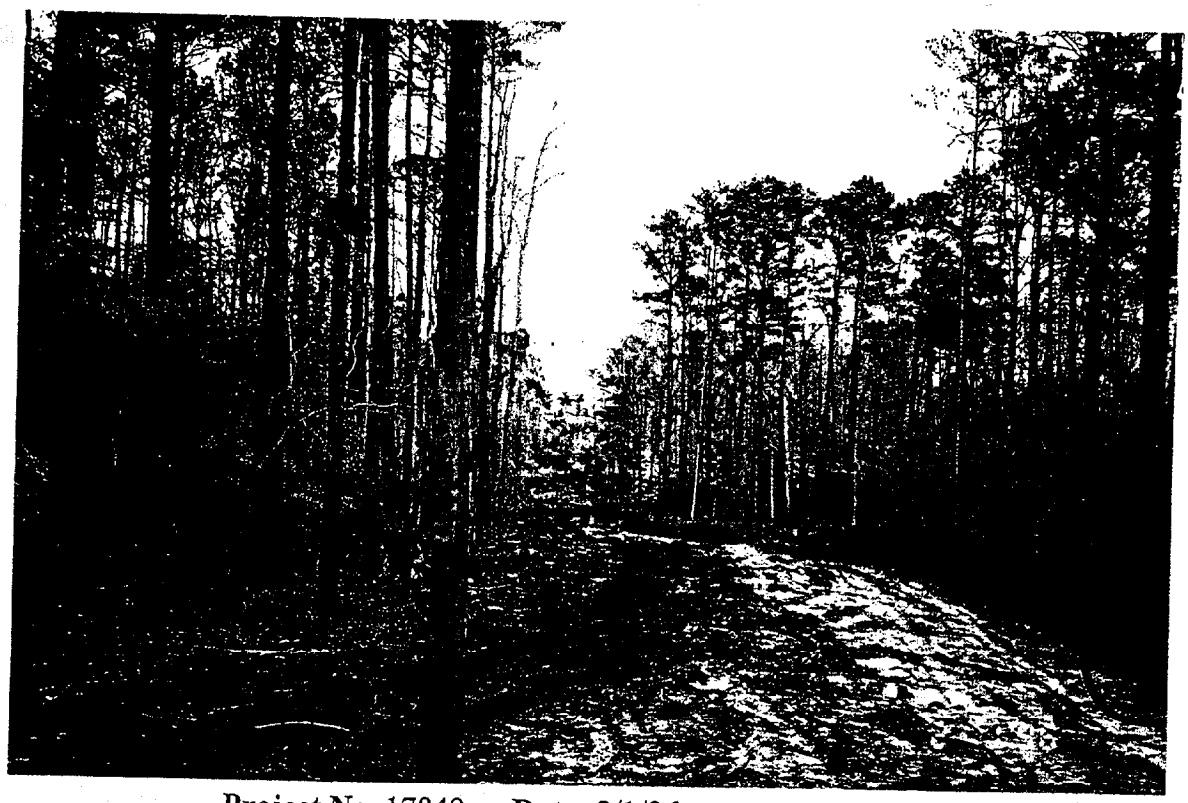


Project No. 17849 **Date:** 2/28/96
Contract No. N62470-93-D-3032
Delivery Order: 87
Location : Site 69
Description: clearing and grubbing

Project No. 17849 **Date:** 1/30/96
Contract No. N62470-93-D-3032
Delivery Order: 87
Location : Site 69
Description: power poles at chemical dump area

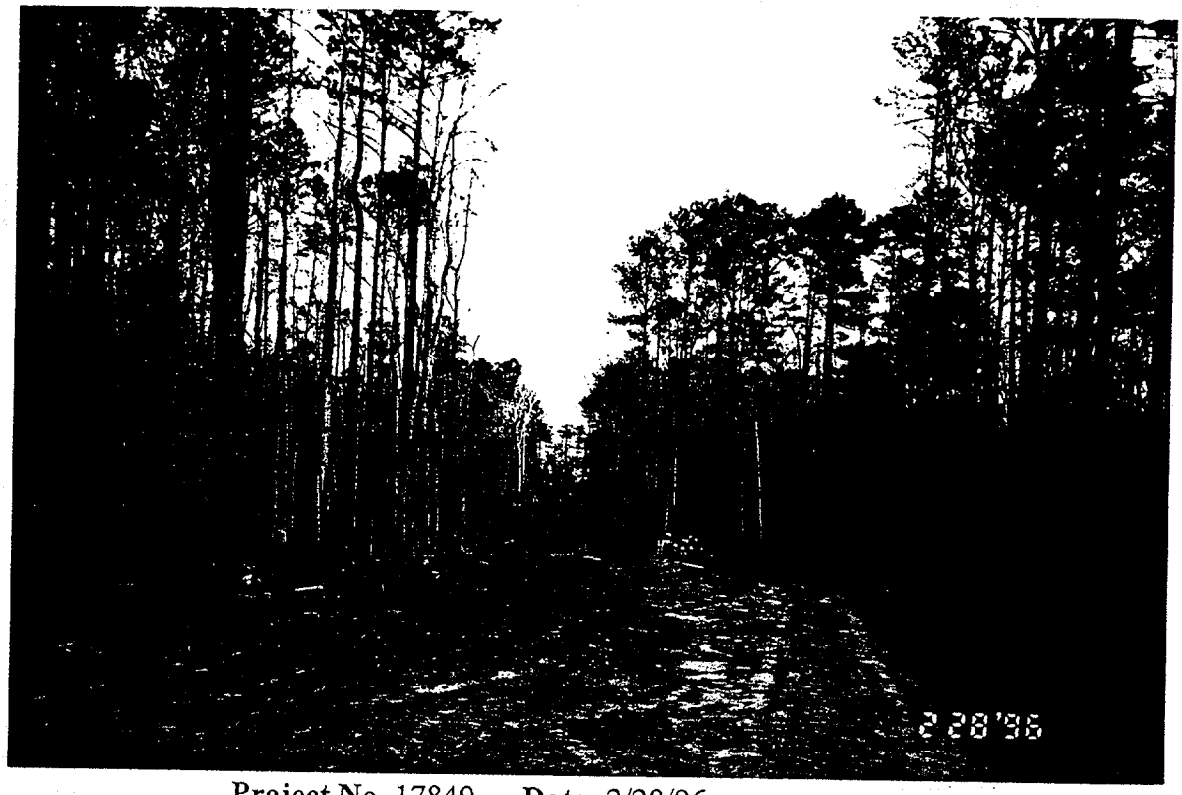
Project No. 17849 **Date:** 1/30/96
Contract No. N62470-93-D-3032
Delivery Order: 87
Location : Site 69
Description: power poles next to chemical dump area

Project No. 17849 **Date:** 2/1/96
Contract No. N62470-93-D-3032
Delivery Order: 87
Location : Site 69
Description: power poles installed on chemical dump side



Project No. 17849 **Date:** 2/1/96
Contract No. N62470-93-D-3032
Delivery Order: 87
Location : Site 69
Description: cleared area for power poles

Project No. 17849 **Date:** 2/28/96
Contract No. N62470-93-D-3032
Delivery Order: 87
Location : Site 69
Description: power pole



Project No. 17849 **Date:** 2/28/96
Contract No. N62470-93-D-3032
Delivery Order: 87
Location : Site 69
Description: installation of power pole

Project No. 17849 **Date:** 2/28/96
Contract No. N62470-93-D-3032
Delivery Order: 87
Location : Site 69
Description: installation of power pole

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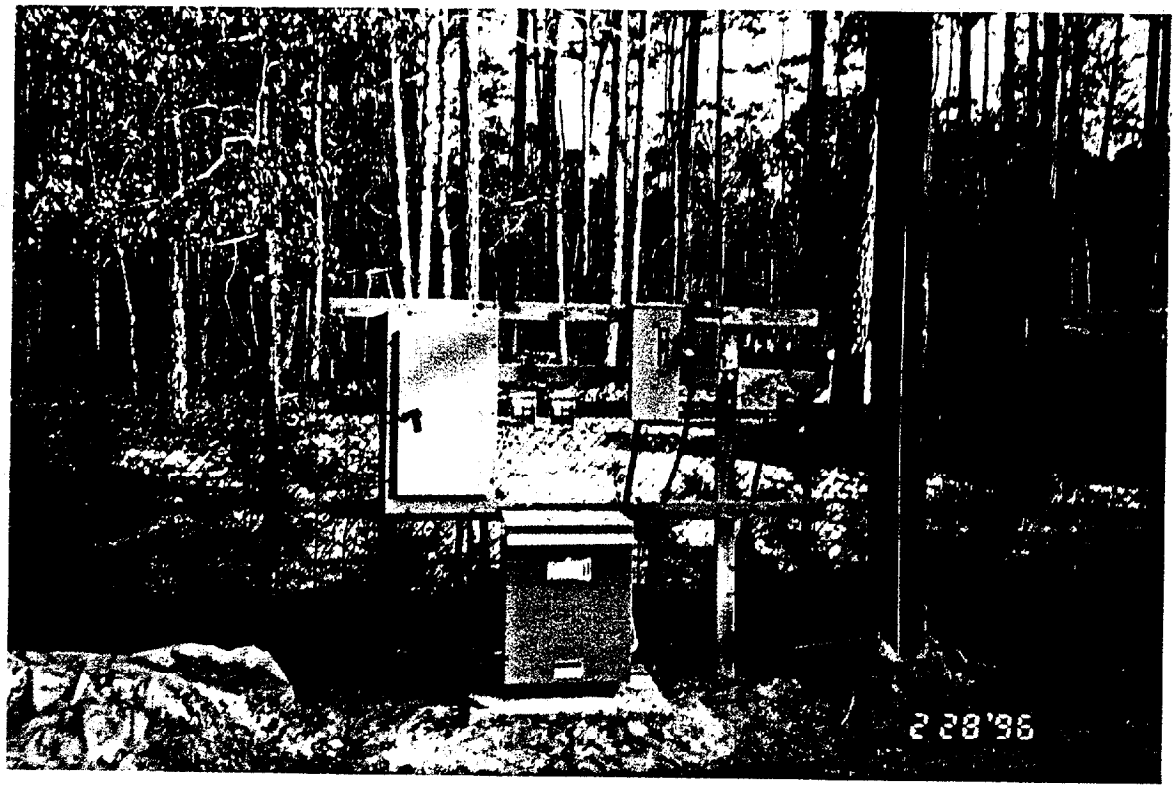
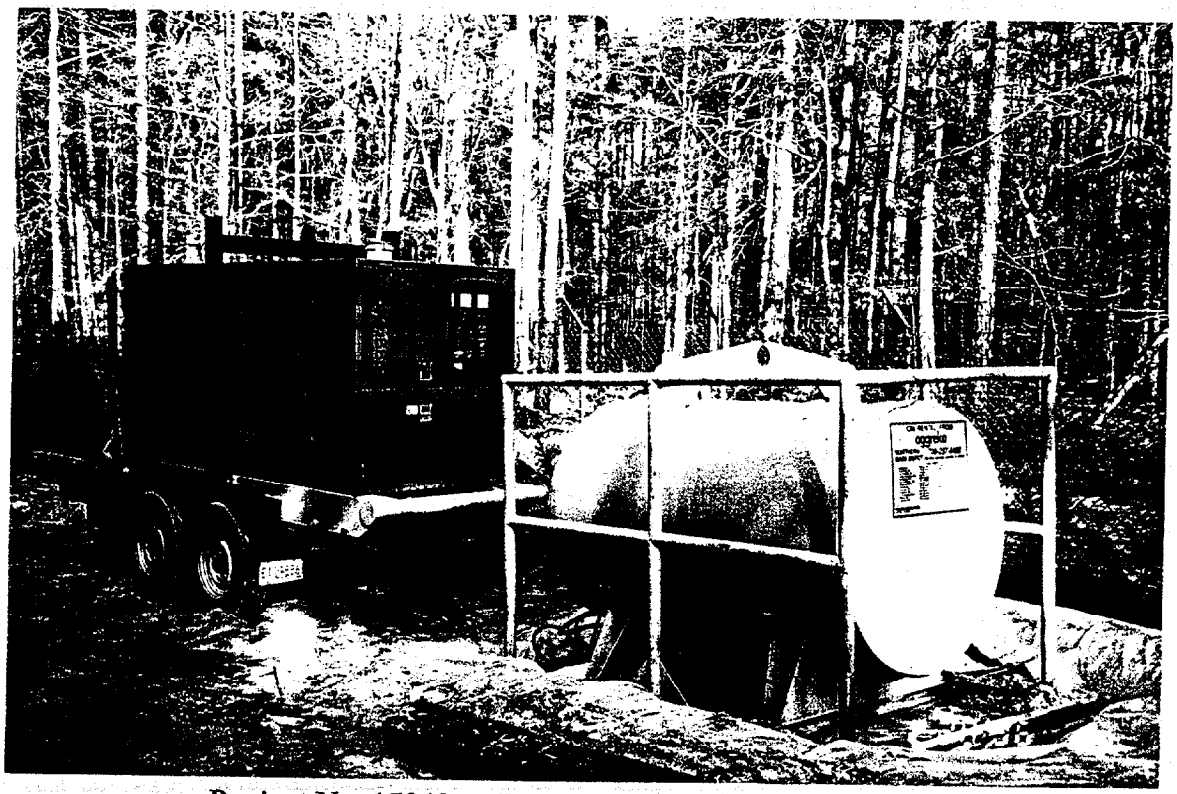
Contract No. N62470-93-D-3032
Delivery Order: 87
Location : Site 69
Description: installation of power pole



Project No. 17849 **Date:** 2/28/96
Contract No. N62470-93-D-3032
Delivery Order: 87
Location : Site 69
Description: circuit breaker and transformer



Project No. 17849 **Date:** 2/28/96
Contract No. N62470-93-D-3032
Delivery Order: 87
Location : Site 69
Description: 50 KW generator for temporary power

Appendix B

Wetlands Permit

U.S. ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT

Action ID. _____ County Onslow

GENERAL PERMIT (REGIONAL AND NATIONWIDE) VERIFICATION

Property Owner/Agent Commanding General, AC/S EMC (John Townsend) agent: James I
Address Marine Corps Base, PSC Box 20004 of OHM
Camp Lejeune, NC 28542-0004 Norcross, Ga 30092
Telephone No. (404) 729-3900

Size and Location of project (waterbody, road name/number, town, etc.)
The project site is located at Site 69, at the Marine Corps Base area known as the Rifle Range, on the east side of Highway 210, off of TLZ Owl Road, adjacent to a tributary of Stones Bay, near Dixon, NC

Description of Activity
the construction of an aerial powerline over approximately 675 linear feet of Section 10 waters and Section 404 wetlands

✓ Section 404 (Clean Water Act, 33 USC 1344) only.

✓ Section 10 (River and Harbor Act of 1899) only.

____ Section 404 and Section 10.

19810049 Regional General Permit or Nationwide Permit Number.

Any violation of the conditions of the Regional General or Nationwide Permit referenced above may subject the permittee to a stop work order, a restoration order, and/or appropriate legal action.

This Department of the Army Regional General/Nationwide Permit verification does not relieve the undersigned permittee of the responsibility to obtain any other required Federal, State, or local approvals/permits. The permittee may need to contact appropriate State and local agencies before beginning work.

By signature below, the permittee certifies an understanding and acceptance of all terms and conditions of this permit.

Property Owner/Authorized Agent Signature _____
Regulatory Project Manager Signature Mindy Sugg
Date 1-8-96 Expiration Date 12-31-99

SURVEY PLATS, FIELD SKETCH, WETLAND DELINEATION FORM, ETC., MUST BE ATTACHED TO THE YELLOW (FILE) COPY OF THIS FORM, IF REQUIRED OR AVAILABLE.

DEPARTMENT OF THE ARMY
Wilmington District, Corps of Engineers
Post Office Box 1890
Wilmington, North Carolina 28402-1890

General Permit No. 198100049
Name of Permittee: General Public
Effective Date: January 1, 1994
Expiration Date: December 31, 1999

DEPARTMENT OF THE ARMY
GENERAL PERMIT

A general permit to perform work in or affecting navigable waters of the United States and waters of the United States, upon recommendation of the Chief of Engineers, pursuant to Section 10 of the Rivers and Harbors Act of March 3, 1899 (33 U.S.C. 403), and Section 404 of the Clean Water Act (33 U.S.C. 1344), is hereby modified and renewed by authority of the Secretary of the Army by

District Engineer
U.S. Army Engineer District, Wilmington
Corps of Engineers
Post Office Box 1890
Wilmington, North Carolina 28402-1890

TO MAINTAIN, REPAIR AND INSTALL AERIAL AND SUBAQUEOUS UTILITY LINES WITH ATTENDANT STRUCTURES AND TO DISCHARGE EXCAVATED AND/OR FILL MATERIALS WITHIN CONSTRUCTION/ACCESS CORRIDORS IN NAVIGABLE WATERS AND WATERS OF THE UNITED STATES IN THE STATE OF NORTH CAROLINA.

1. Special Conditions.

a. Work authorized by this general permit includes the installation of pipes and pipelines for the transportation of any gaseous liquid, liquefiable or slurry substance and any cable, line or wire for the transmission of electrical energy, telephone or telegraph messages, and radio and television communication. This general permit authorizes the temporary discharge of excavated material from trenches or footings, the temporary discharge of excavated or fill material for construction of access roads, the temporary stockpiling of excavated or fill material for bedding and backfill and the discharge of material for bedding and backfill, including outfall and intake structures. All work will conform to the standards contained herein. Other construction activities are not authorized by this general permit.

b. Excavation or discharge of dredged or fill material in any emergent wetlands, forested wetlands, beds of submerged aquatic vegetation or shellfish beds is discouraged. Whenever practicable, utility line routes will avoid areas of concentrated shellfish production and submerged beds of vascular aquatic vegetation.

c. Installation of aerial utility lines in Currituck Sound, Core Sound, lower Pamlico Sound, Falls Lake, Jordan Lake and other areas identified as important to avifauna migration and movement, will be specifically coordinated with the U.S. Fish and Wildlife Service.

d. To install a utility line under the authority of this general permit, the permittee must apply to the District Engineer by submitting a written description of the work and appropriate drawings on 8-1/2 inch by 11 inch paper. Immediately after receipt of an application, the District Engineer will assign an action identification number and examine the proposal to determine the applicability of this general permit. If the proposal satisfies the general permit conditions, the District Engineer will so inform the permittee by letter which may contain additional, specific conditions to assure that the work will have only a minimal impact on resources. The permittee may not commence construction until he receives the District Engineer's letter. Copies of this letter, with drawings, will be furnished to the Director, Atlantic Marine Center, National Ocean Service, Norfolk, Virginia, and NOAA, the National Ocean Survey, Marine Chart Branch, Rockville, Maryland.

e. The temporary discharge of excavated or fill material in waters or wetlands will be for the absolute minimum period of time necessary to accomplish the work.

f. This general permit does not authorize any permanent changes in preconstruction elevation contours in waters or wetlands. A permittee will have a specific plan for restoring wetland contours. Any excess material will be removed to a highground disposal area.

g. The area of waters of the U.S. that is disturbed will be limited to the minimum necessary to install the utility line. The work area authorized by this general permit, including temporary access roadways, will be minimized to the greatest extent practicable. In no case will the work corridor width exceed forty (40) feet.

h. This general permit does authorize temporary roadway access, as determined by the District Engineer, to be essential for maintenance, repair and/or installation of utility lines.

(1) Temporary access roadways will not span more than one-half way across any waters or wetlands at any one time.

(2) Temporary access roadways will be constructed of non-erodible materials.

i. Material resulting from trench excavation may be temporarily sidecast into waters of the U.S. provided that the material is not placed in such a manner that it is dispersed by currents or other forces.

j. In wetlands, the top 6" to 12" of the trench will be backfilled with topsoil from the trench.

k. Measures will be taken to prevent live or fresh concrete from coming into contact with waters of the State until the concrete has hardened.

l. Stabilization will be required immediately on completion of each individual utility line crossing. Any exposed slopes and streambanks must be stabilized immediately upon installation of the utility line.

m. Appropriate erosion and sedimentation control measures, in accordance with State standards as directed by the North Carolina Division of Environmental Management, will be employed whenever excavated or fill materials are discharged in or near waters or wetlands.

n. This general permit does not authorize the discharge of fill material for roadways or any excavation of channels in navigable waters of the United States, waters subject to Section 10 of the Rivers and Harbors Act of 1899. Equipment operating in such waters must work from barges or wooden mats.

o. This general permit does not authorize the discharge of excavated or fill material in fin fish or shrimp nursery areas or areas subject to anadromous fish spawning runs during the period between March 1 and November 15 of any year. This general permit does not authorize the discharge of excavated or fill material in designated trout waters during the period between November 1 and April 15 of any year.

p. This general permit does not authorize any work which would adversely affect any public water supply intake.

q. In areas where a subaqueous utility line is to cross a Federally-maintained channel, i.e., the Atlantic Intracoastal Waterway (AIWW), it will be buried at a minimum depth of six (6) feet below the depth of the authorized channel. In other areas where subaqueous lines are subject to interfere with navigation, they will be installed at a minimum depth of two (2) feet below the substrate.

r. The minimum clearance for aerial communication lines, or any lines not transmitting electrical power, will be ten (10) feet above the clearance required for bridges in the vicinity as established by the U.S. Coast Guard.

s. The clearance for an aerial line is based on the low point of the line under conditions which produce the greatest sag, taking into consideration temperature, load, wind, length or span and the type of supports. The minimum clearance for an aerial electrical power transmission line will be governed by the system voltage as indicated below:

Nominal System Voltage, kilovolt	Minimum Clearance Above Bridge Clearance (As Established by the U.S. Coast Guard)
115 and below	20 feet
138	22
161	24
230	26
350	30
500	35
700	42
750 to 765	45

t. The District Engineer reserves the right to require that subaqueous lines be placed at greater depths or aerial lines be placed at greater heights if the general public interest so indicates.

u. This general permit does not apply to utility lines that are a part of a water power project. Federal authorization for such lines must be obtained from the U.S. Department of Energy.

v. This general permit does not relieve the permittee from the responsibility of obtaining an easement to cross navigable waters from the North Carolina Department of Administration, State Property Office, pursuant to North Carolina General Statutes 143-341 (4), 146-11 and 146-12.

2. General Conditions.

a. There will be no unreasonable interference with navigation or the right of the public to riparian access by the existence or use of activities authorized by this general permit.

b. A permittee, upon receipt of written notice from the Wilmington District Engineer of failure to comply with the terms or conditions of this general permit, will, within 60 days, without expense to the U.S. Government, and in such manner as the Wilmington District Engineer may direct, affect compliance with the terms and conditions or return the worksite to a pre-work condition.

c. The permittee must make every reasonable effort to perform the work authorized herein in a manner so as to minimize any adverse impact on fish, wildlife and natural environmental values.

d. The permittee must perform the work authorized herein in a manner so as to minimize any degradation of water quality. The activity will be conducted in such a manner as to prevent a significant increase in turbidity outside the area of construction or construction-related discharge. Increases such that the turbidity in the waterbody is 50 NTU's or less in all rivers not designated as trout waters by the North Carolina Division of Environmental Management (NCDEM), 25 NTU's or less in all saltwater classes and in all lakes and reservoirs, and 10 NTU's or less in trout waters, are not considered significant.

e. The permittee will permit the Wilmington District Engineer or his representative to make periodic inspections at any time deemed necessary in order to assure that the activity is being performed or maintained in strict accordance with the Special and General Conditions of this permit.

f. This general permit does not convey any rights, either in real estate or material, or any exclusive privileges; and it does not authorize any injury to property or invasion of rights or any infringement of Federal, State or local laws or regulations, nor does it obviate the requirement to obtain State or local assent required by law for the activity authorized herein. These may include, but are not necessarily limited to, a Dredge and/or Fill Permit (N.C.G.S. 113-229), a Coastal Area Management Act (CAMA) Permit (N.C.G.S. 113A-118), an Easement to Fill (N.C.G.S. 146-12) and a Water Quality Certification pursuant to Section 401 of the Clean Water Act.

g. Authorization provided by this general permit may be either modified, suspended or revoked in whole or in part if the Wilmington District Engineer, acting on behalf of the Secretary of the Army, determines that such action would be in the best public interest. Unless subject to modification, suspension or revocation, the term of this general permit shall be five years. Any modification, suspension or revocation of this authorization will not be the basis for any claim for damages against the U.S. Government.

h. This general permit does not authorize the interference with any existing or proposed Federal project and the permittee will not be entitled to compensation for damages or injury to the structures or work authorized herein which may be caused by or result from existing or future operations undertaken by the United States in the public interest.

i. This general permit will not be applicable to proposed construction when the Wilmington District Engineer determines that the proposed activity would significantly affect the quality of the human environment and determines that an Environmental Impact Statement (EIS) must be prepared.

j. This general permit will not be applicable to proposed construction when the Wilmington District Engineer determines, after any necessary investigations, that the proposed activity would adversely affect areas which possess historic, cultural, scenic, conservation or recreational values. Application of this exemption applies to:

(1) Rivers named in Section 3 of the Wild and Scenic Rivers Act (15 U.S.C. 1273), those proposed for inclusion as provided by Sections 4 and 5 of the Act and wild, scenic and recreational rivers established by State and local entities.

(2) Historic, cultural or archeological sites listed in or eligible for inclusion in the National Register of Historic Places as defined in the National Historic Preservation Act of 1966 and its codified regulations, the National Historic Preservation Amendment Acts of 1980 and 1992, the Abandoned Shipwreck Act of 1987 and the Native American Graves Protection and Repatriation Act.

(3) Sites included in or determined eligible for listing in the National Registry of Natural Landmarks.

(4) Endangered or threatened species or habitat of such species as determined by the Secretaries of Interior or Commerce and concerned in accordance with the Endangered Species Act (16 U.S.C. 1531).

k. Permittees are advised that development activities in or near a floodway may be subject to the National Flood Insurance Program which prohibits any development, including fill within a floodway that results in any increase in base flood elevations.

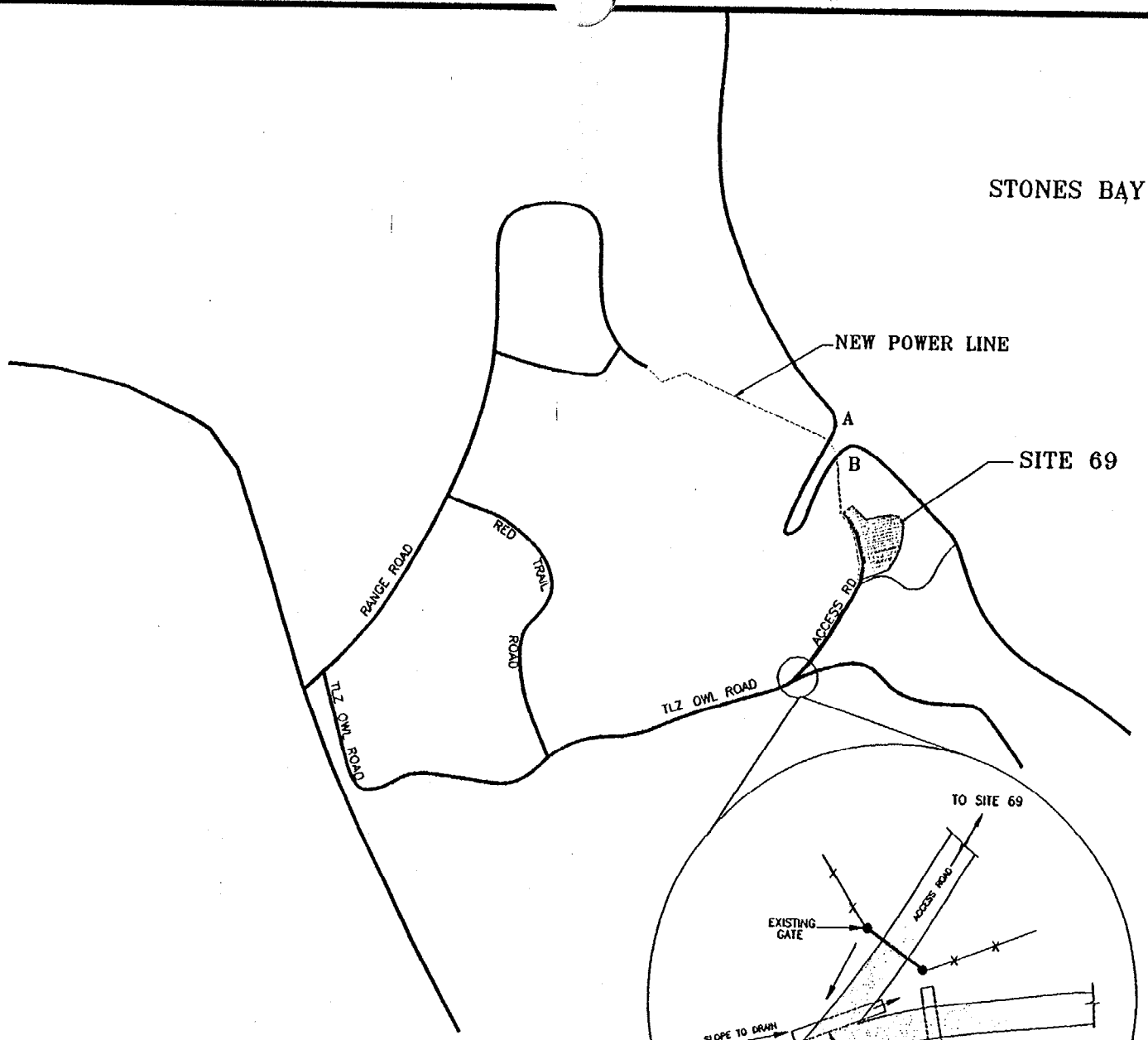
l. At his discretion, the Wilmington District Engineer may determine that this general permit will not be applicable to a specific construction proposal. In such case, the procedure for processing an individual permit in accordance with 33 CFR 325 will be available.

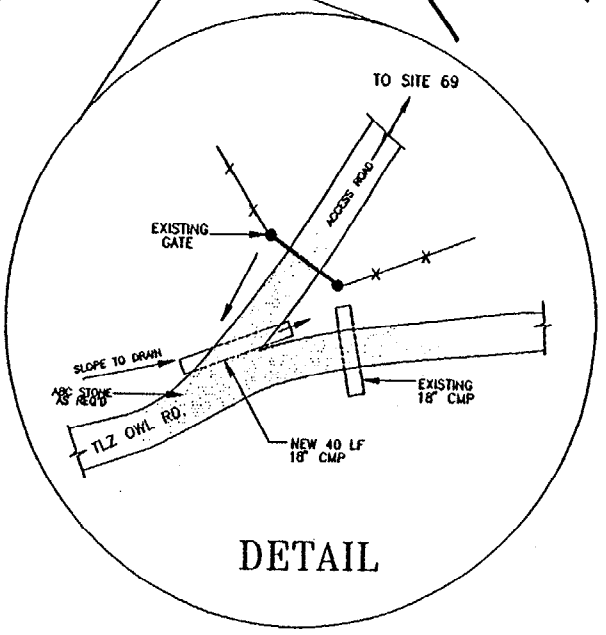
BY AUTHORITY OF THE SECRETARY OF THE ARMY:

George L. Cajigal
Colonel, Corps of Engineers
District Engineer

Appendix C

As-built Drawings





DETAIL

NOT TO SCALE

OHM Remediation Services Corp.
NORCROSS, GEORGIA
A SUBSIDIARY OF OHM CORPORATION

DRAWN BY	J. COLLINS	12/5/95
CHECKED BY	J. DUNN	
FILE:	SITE1.DWG	

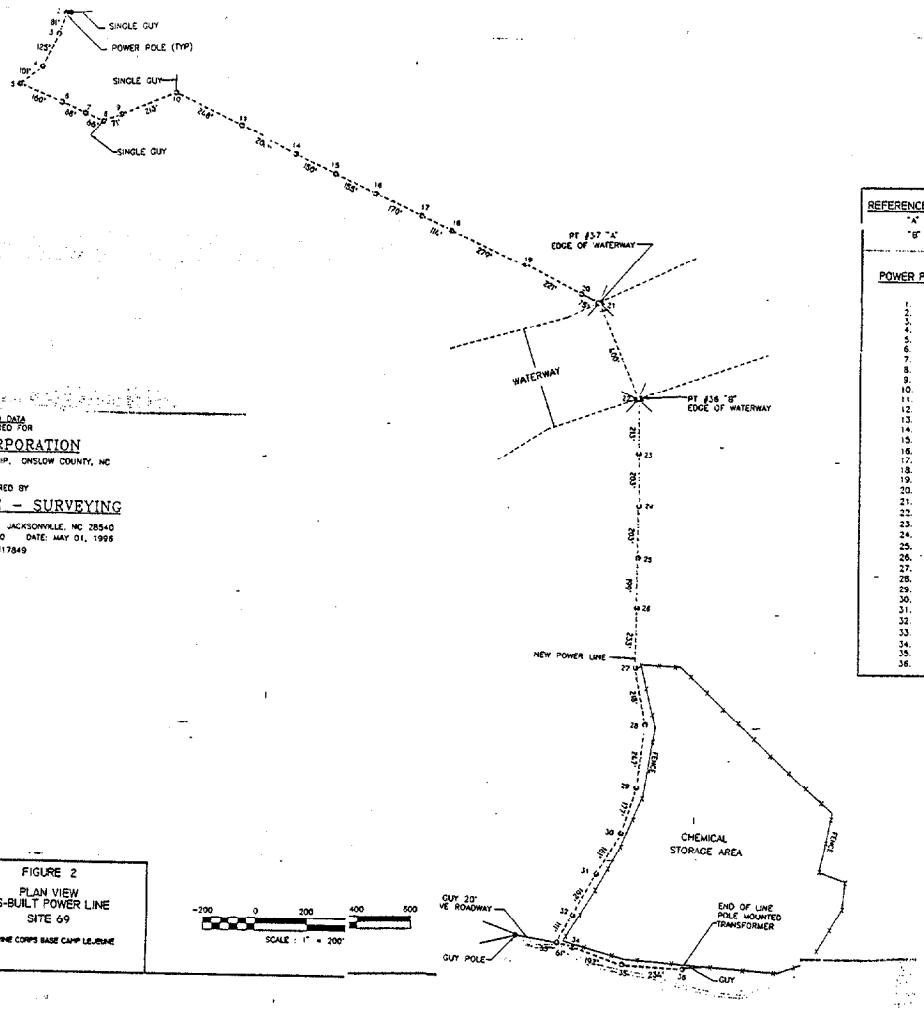
REV.	SHEET #	PROJECT NO.
1		17849

FIGURE 1

SITE MAP
AS BUILT
SITE 69

MARINE CORPS BASE CAMP LEJEUNE

C:\OHM\LEJEUNE\17849\PHASE\SITE1.DWG



FIELD DATA
PREPARED FOR

OHM CORPORATION

CAMP LEJEUNE TOWNSHIP, ONSLOW COUNTY, NC

PREPARED BY

JOHN L. PIERCE - SURVEYING

409 JOHNSON BLVD. JACKSONVILLE, NC 28540
PHONE: 910- 346-9800 DATE: MAY 01, 1998
JOB #17849

REFERENCE POINT	NORTHING	EASTING
"A"	48761.3541	52412.1583
"B"	48382.1317	52560.9414

POWER POLE	NORTHING	EASTING
1.	50078.2790	50058.5748
2.	50077.8497	50040.0043
3.	49996.9120	50011.8421
4.	49871.3844	49946.6888
5.	49809.0973	49858.6741
6.	49738.7199	50018.7600
7.	49694.3355	50107.0621
8.	49661.7774	50173.4089
9.	49687.7563	50245.0031
10.	49765.1678	50458.3640
11.	49638.4070	50706.8268
12.	49532.9942	50907.3588
13.	49448.0986	51070.5075
14.	49353.7934	51253.0191
15.	49276.2902	51403.4879
16.	49196.9046	51558.0257
17.	49109.3830	51727.8046
18.	49050.5720	51842.1428
19.	48907.5981	52121.0441
20.	48796.2900	52342.3410
21.	48758.0344	52412.7084
22.	48381.4664	52561.0155
23.	48178.1402	52367.5321
24.	47974.3341	52573.1379
25.	47771.0932	52578.5070
26.	47572.5173	52583.6578
27.	47338.7796	52590.2104
28.	47120.8828	52635.7053
29.	46872.9258	52612.7283
30.	46868.2512	52583.0173
31.	46535.0487	52478.2090
32.	46372.5842	52393.7838
33.	46261.8672	52338.0350
34.	46244.6119	52397.6353
35.	46189.4450	52590.2261
36.	46182.4684	52824.5736

LEGEND

- INDICATES 40' TIMBER POLE W/O C
- INDICATES 90' TIMBER POLE W/ST CROSS-ARM AND TWO GUYS.

OHM Remediation Services Corp.

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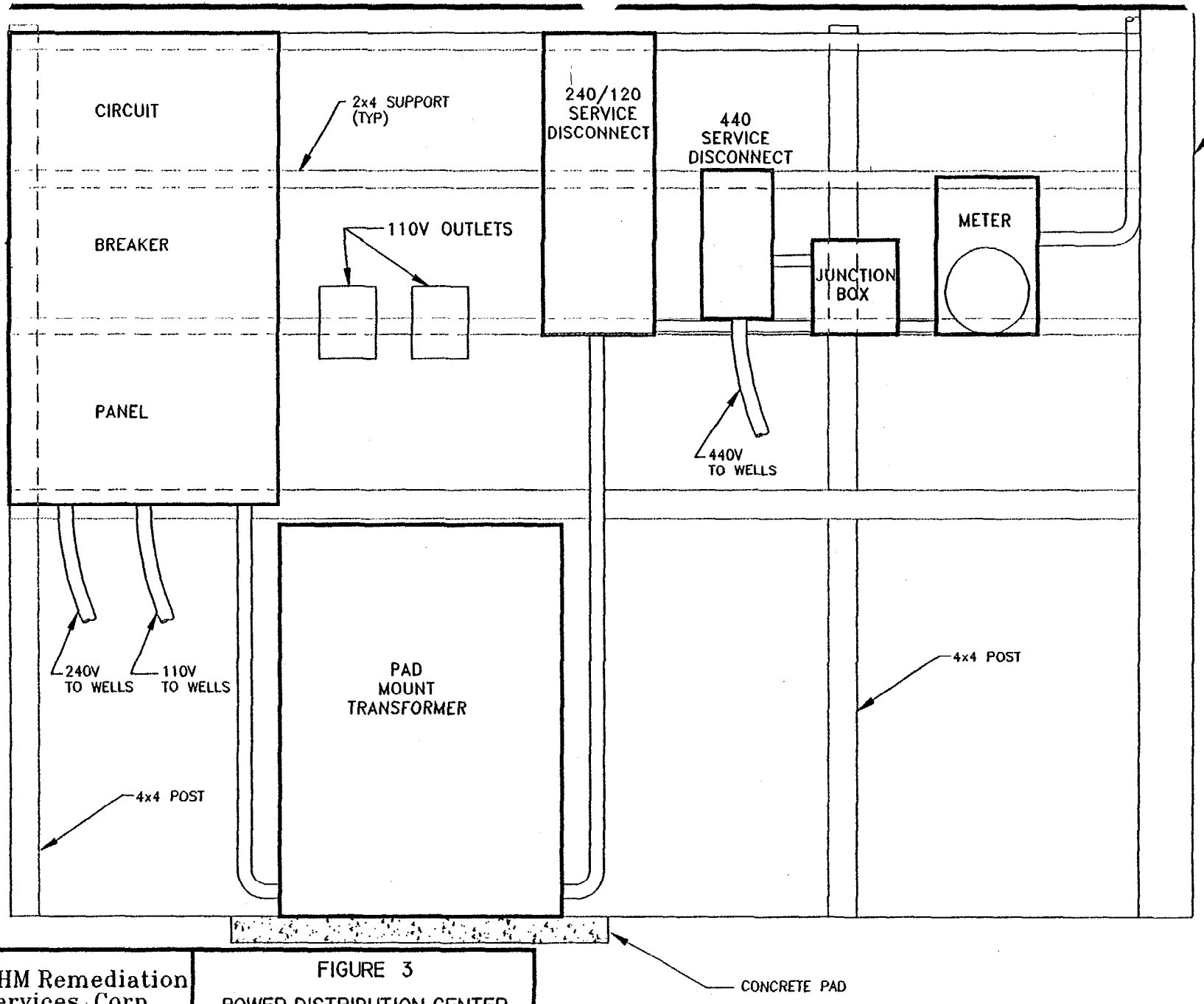
CHECKED BY	J. DUNN	5/2/98
FILE	POLE.DWG	
REV	SHEET #	PROJECT NO. 17849

FIGURE 2
PLAN VIEW
AS-BUILT POWER LINE
SITE 69
MARINE CORPS BASE CAMP LEJEUNE



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CHECKED BY	J. DUNN	
FILE:	WG	
REV. 1	SHEET # 1	17849

FIGURE 3
POWER DISTRIBUTION CENTER
AS BUILT
SITE 69

MARINE CORPS BASE CAMP LEJEUNE

NOT SCALE

C:\OHM\LANTDIV\LEJEUNE\17849\FIG3.DWG

1	30a	TO BLOWERS	2	30a	SPARE
3	30a	TO BLOWERS	4	30a	SPARE
5	30a	TO BLOWERS	6	30a	SPARE
7	20	SPARE	8	20	SPARE
9	20	SPARE	10	20	SPARE
11	20	SPARE	12	20	SPARE
13	20	SPARE	14	20	SPARE
15	20	SPARE	16	20	SPARE
17	20	SPARE	18	20	SPARE
19	20	SPARE	20	20	SPARE
21	20	SPARE	22	20	SPARE
23	20	SPARE	24	20	SPARE
25	15a	WELL RECEPTACLES	26	20a	GFI RECEPTACLES
27	20a	GFI PUMPS	28	20a	GFI RECEPTACLES
29	BLANK		30	BLANK	
31	100a	MAIN BREAKER			
33	100a	MAIN BREAKER			
35	100a	MAIN BREAKER			

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CHECKED BY	J. DUNN	
FILE:	SITE1.DWG	
REV. 1	SHEET # —	PROJECT NO. 17849

FIGURE 4
CIRCUIT BREAKER SCHEDU
AS BUILT
SITE 69

MARINE CORPS BASE CAMP LEJEUNE

C:\OHM\LANTDIV\LE 849\FIG4.DWG

JOHN L. PIERCE - SURVEYING

LAND SURVEYING - LAND PLANNING - MAPPING
OFFICE: 910-346-9800
FAX NO.: 910-346-1210

Post Office Box 1665
409 Johnson Blvd.
Jacksonville, N.C. 28541

John L. Pierce, R.L.S., L-2396

PROJECT NO. 17849

REFERENCE	NORTHING	EASTING
Point "C"	47341.5976	52763.2743
Point "B"	48382.1317	52560.9414
Point "A"	48761.3541	52412.1583
Point "D"	46815.5701	53356.5913
Mon.Well "69GW13S"	46544.9591	53473.3165

POWER POLE	NORTHING	EASTING
1	50078.2790	50058.5749
2	50077.8497	50040.0043
3	49996.9120	50011.8421
4	49871.9844	49946.6889
5	49809.0973	49858.6741
6	49736.7199	50018.7600
7	49694.3355	50107.0621
8	49661.7774	50173.4089
9	49687.7563	50245.0031
10	49765.1678	50458.3660
11	49636.4070	50706.8268
12	49532.9942	50907.3588
13	49448.0986	51070.5075
14	49353.7954	51253.0191
15	49276.2902	51403.4879
16	49196.9046	51558.0257
17	49109.3830	51727.8046
18	49050.5720	51842.1428
19	48907.6961	52121.0461
20	48794.2900	52342.3410
21	48758.0544	52412.7064
22	48381.4664	52561.0155
23	48178.1482	52567.5321
24	47974.3341	52573.1379
25	47771.0932	52578.5070
26	47572.5173	52583.6576
27	47339.7796	52590.2104
28	47120.8828	52635.7053
29	46872.9258	52612.7283
30	46696.2512	52563.0173
31	46535.0487	52478.2090
32	46372.5842	52393.7838
33	46261.8672	52336.0350
34	46244.6119	52397.6353
35	46189.6650	52590.2261
36	46182.4684	52824.5736

Appendix D

Permanent Materials

Table of Contents
Permanent Materials

Site 69, Stone Bay Ranges
Marine Corps Base
Camp Lejeune, North Carolina

Contract N62470-93-D-3032

ITEM #( )

Panelboard Application

Standards

All GE panelboards meet the latest revision of the following standards.

- National Electrical Code-Ref. Article 384
- UL67 panelboards. UL50 cabinets and boxes. UL943 GFCI.
- UL489 molded case circuit breakers. UL98 fusible switches.
- CSA listing for Spectra Series™ Power Panelboards.

Note—only panelboards containing all UL Listed devices can be UL labeled.

- NEMA PB1.
- Federal Specifications
  - –Panelboards, W-P-115a.
    - Type 1 – Circuit breaker equipped
    - Class 1 – Panelboards
    - Class 2 – Load centers
  - –Molded case circuit breakers, WC-375B/GEN.
  - –Fusible switches, W-S-865c.

Application

The following classifications and limitations of panelboards have been established by the Underwriters Laboratories and the National Electrical Code. Note—*an overcurrent protective device is a circuit breaker pole or single fuse.*
Panelboards have no fire wall ratings.

Lighting Panelboards

- More than 10 percent of panelboard circuits are rated 30 amperes or less, for which neutral connections are provided.
- Maximum 42 overcurrent protective devices per panel (including subfeeds but not main overcurrent protective devices). If more than 42 are required, two or more separate panelboards must be used. Example: A 2-pole device is considered as two overcurrent devices.
- When two or more separate panelboards are used, sub-feed lugs or thru-feed lugs (of same capacity as incoming mains) must be included in all sections except one. Cables or bus bars for interconnection are not included.

Distribution Panelboards

There is no limitation as to the number and rating of branch circuits, except as determined by available enclosures.

Service Entrance Equipment

- Must be located near the point of entrance of building supply conductors.
- Lighting and appliance panels must have one but not more than two main disconnects with a current rating equal to or less than panelboard rating.
- Distribution panels may have up to six operating handles to entirely disconnect panelboard from the source.
- Must include connector for bonding and grounding neutral conductor.
- A service entrance-type UL label must be factory installed and will be provided on the equipment (when specified).

Interrupting Ratings—Circuit Breakers

Panelboards have integrated short circuit ratings. When fully rated, the rating is that of the lowest rated device in the panelboard. When series connected rated, the rating is that of the main and branch-tested/UL Listed combination. See table on page 13-5.

Short-circuit Ratings—Fusible Switch Unit

The interrupting rating of the fuse must equal or exceed the short-circuit rating of the switch. If it is lower, then the interrupting rating of the switch is the same as the fuse. Switches have no short-circuit rating if renewable fuses are used.

ITEM # (1)

Circuit Breaker Interrupting Ratings

Molded Case Circuit Breakers Interrupting Ratings

Molded Case Circuit Breakers						Federal Specs C/B Class W-C-375B	UL Listed Interrupting Ratings in Thousand Amps									
				Rated Volts			rms Symmetrical ac Volts								dc volts	
Construction	Frame	Trip Range (Amps)	No. Poles	ac	dc		120	120/240	240	277	347	480Y/277	480	600	125	250
HQ Frames	THQB	15-70	1	120/240	—	12a	10	10	—	—	—	—	—	—	—	—
	THQL	15-125	2	120/240	—	12a	—	10	—	—	—	—	—	—	—	—
		15-100	2, 3	240	—	12b	—	—	10	—	—	—	—	—	—	—
HHQ Frames	THHQL THHQB	15-70	1	120/240	—	14a	22	22	—	—	—	—	—	—	—	—
		15-125	2	120/240	—	14a	—	22	—	—	—	—	—	—	—	—
		15-100	2, 3	240	—	14b	—	—	22	—	—	—	—	—	—	—
XQ Frames	TXQL, TXQB	15-30	1, 2	120/240	—	15a	—	65	—	—	—	—	—	—	—	—
		15-30	3	240	—	15b	—	—	65	—	—	—	—	—	—	—
Standard Frames	TEY	15-100	1	277	125	—	—	—	65	14	—	—	—	—	10	—
		15-100	2, 3	480Y/277	250	—	—	—	65	—	—	14	—	—	—	10
	TEB	15-100	1	120	125	12a	10	10	—	—	—	—	—	—	5	—
	TEB	15-100	2	240	250	12b	—	—	10	—	—	—	—	—	—	5
		15-100	3	240	—	12b	—	—	10	—	—	—	—	—	—	—
	TED①	15-100	1	277, 347	125	13a	—	—	—	14	10	—	—	—	10	—
	TED4	15-100	2	480	250	13b	—	—	18	—	—	—	14	—	—	10
	TED4	15-150	3	480	—	13b	—	—	18	—	—	—	14	—	—	—
	TED6	15-100	3	600	—	18a	—	—	18	—	—	—	14	14	—	—
	TED6	110-150	3	600	—	N/A	—	—	18	—	—	—	14	14	—	—
	TQD	125-225	2, 3	240	—	12b	—	—	10	—	—	—	—	—	—	—
	TFJ	70-225	2	480	250	20a	—	—	25	—	—	—	22	—	—	10
	TFK	70-225	2	480	250	20a	—	—	25	—	—	—	22	—	—	10
	TFJ	70-225	3	600	—	20a	—	—	25	—	—	—	22	18	—	—
	TFK	70-225	3	600	—	20a	—	—	25	—	—	—	22	18	—	—
	SFH	70-250	3	600	—	20a, 22a	—	—	65	—	—	—	25	18	—	—
	SFL	70-250	3	600	—	21a, 23a	—	—	100	—	—	—	65	25	—	—
	TJD	250-400	2, 3	240	250②	14b	—	—	22	—	—	—	—	—	—	10
	TJJ	125-400	2, 3	600	250②	21a	—	—	42	—	—	—	30	22	—	10
	TJK4	125-400	2, 3	600	250②	21a	—	—	42	—	—	—	30	22	—	10
	TJK6	250-600	2, 3	600	250②	21a	—	—	42	—	—	—	30	22	—	10
	TKM8	300-800	2, 3	600	250②	21a	—	—	42	—	—	—	30	22	—	10
	TKM12	600-1200	2, 3	600	—	21a	—	—	42	—	—	—	30	22	—	—
	SKH8	300-800	3	600	—	21a, 23a	—	—	65	—	—	—	35	25	—	—
	SKH12	600-1200	3	600	—	21a, 23a	—	—	65	—	—	—	35	25	—	—
Hi-Break® Frames	THED①	15-30	1	347	125	13a	—	—	—	65	18	—	—	—	20④	—
	THED4	15-100	2	480	250	22a	—	—	65	—	—	—	25	—	—	20④
	THED4	110-150	3	480	—	—	—	—	42	—	—	—	25	—	—	—
	THED6	15-100	3	600	—	22a	—	—	65	—	—	—	25	18	—	—
	THED6 —	110-150	3	600	—	N/A	—	—	42	—	—	—	25	18	—	—
	THQD	125-225	2, 3	240	—	N/A	—	—	22	—	—	—	—	—	—	—
	THFK	70-225	2, 3	600	250②	20a	—	—	65	—	—	—	25	18	—	20④
	THJK4	125-400	2, 3	600	250②	23a	—	—	65	—	—	—	35	25	—	20④
	THJK6	250-600	2, 3	600	250②	23a	—	—	65	—	—	—	35	25	—	20④
	THKM8	300-800	2, 3	600	250②	23a	—	—	65	—	—	—	35	25	—	20④
	THKM12	600-1200	2, 3	600	—	23a	—	—	65	—	—	—	35	25	—	—
Hi-Interrupting Circuit Breakers	TEL	15-150	3	480	—	13b	—	—	100	—	—	—	65	25	—	—
	TFL	70-225	3	600	—	—	—	—	100	—	—	—	65	25	—	—
	TLB4	250-400	3	480	—	—	—	—	85	—	—	—	65	—	—	—
Fuseless Current Limiting Circuit Breakers	THLC1⑤	15-150	3	600	—	—	—	—	200	—	—	—	50	—	—	—
	THLC2	125-225	3	600	—	—	—	—	200	—	—	—	50	—	—	—
	THLC4	250-400	3	600	—	—	—	—	200	—	—	—	50	—	—	—
Fused Current Limiting Frames	TB1	15-100	2, 3	600	—	26a	—	—	200④	—	—	—	200④	200④	—	—
	TB4	125-400	2, 3	600	—	26a	—	—	200④	—	—	—	200④	200④	—	—
	TB6	300-600	3	600	—	26a	—	—	200④	—	—	—	200④	200④	—	—
	TB8	600-800	3	600	—	26a	—	—	200④	—	—	—	200④	200④	—	—
Molded Case Circuit Breakers w/MicroVersaTrip® 4-Function	TJ4V	150-600	3	600	—	21a	—	—	42	—	—	—	30	22	—	—
	TK4V	800-1200	3	600	—	21a	—	—	42	—	—	—	30	22	—	—
	TJL4V	150-600	3	600	—	23a	—	—	100	—	—	—	65	30	—	—
	TKL4V	800-1200	3	600	—	23a	—	—	100	—	—	—	65	42	—	—

④ TED/THED, IP-347V-30A Max., device is suitable for 10kAIC at 480Vac, but not labeled or listed.

② 3-pole devices are not dc rated.

③ DC ratings above 10,000 AIC are not UL Listed.

④ UL Listed for only 100,000 AIC when internally mounted accessories are used.

⑤ THLC1, 15-50A, is rated 480 Vac Max. The 480V IC rating is 150,000A RMS.

Molded Case Switches Short Circuit Withstand Rating

Underwriters Laboratories is now listing molded case switches with short circuit withstand ratings when protected by specified protective devices. Previously the maximum short circuit withstand rating for molded case switches was six times the continuous current rating of the switch.

Publication GIZ-2691-27 lists molded case switches and their UL Listed short circuit withstand ratings which are marked on each switch. Protective devices for the switch must be on the line side of the switch.

ITEM #(1)

Owens Electric Supply Co.
South Kerr Ave
P.O. Box 3427
Wilmington, NC 28406

DATE : 10/12/95 PAGE : 1
TIME : 16:10:29 v4.3
TELEPHONE: (910)791-6058
FAX: (910)395-1376

BILL OF MATERIAL: Site 69 Power Panel PROP: 0-OW168

TO: Southerland Electric
U.S. Highway 17 North
P.O. Box 626
Jacksonville, NC 28540

Scott Sosa;

Valued Customer, We are pleased to quote as follows,
Unless specifically referred to, no addendums are included

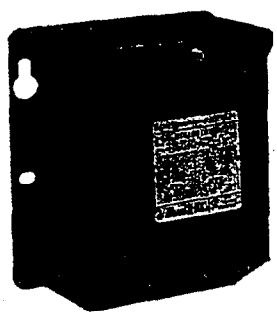
ITEM	QTY	CAT #/NAME	DESCRIPTION
1	1	9T23B3873	Transformer, QL 3Phs (66) 150C Rise 45 KVA 3 Ph 480 TO 208Y/120 6 Taps Indoor
	1	9T18Y4317G05	Weathershield kit three phase
2	1	PANEL A	Panelboard, Type AQ (101) 30 Ckts Single Section Panel Bottom Feed Surface Mnt 3P4W 120/208V 10 KAIC 100A 3 Pole THQB Main 4 15 Amp 1 Pole THQB 6 20 Amp 3 Pole THQB 2 30 Amp 3 Pole THQB 1 NEMA 3R 12 Cabinets 3 Ground-Box bonded TGL2 1 AB373 Box 1 AQF3301AB Interior
	1	TH3362R	Safety Switch, HD (131) 60A fusible 3 pole 3 wire 600V Outdoor
	1	TGL1	Ground Kit, 4 Sm 3 Lg
4	3	TRS45R	Low Volt Power Fuse(131F) UL Class RK5 Time Delay - 600V

Net Quote Price $ 1 per

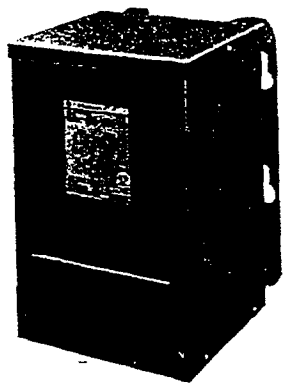
ITEM #(2)

Dry Type General Purpose Transformers

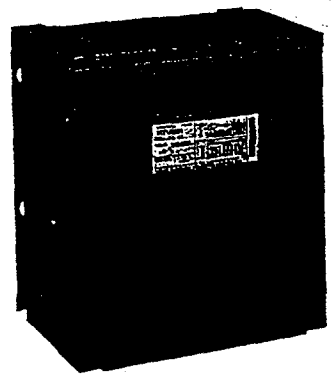
Types QB, QMS, QMS 3, and QL
600 Volts and Below



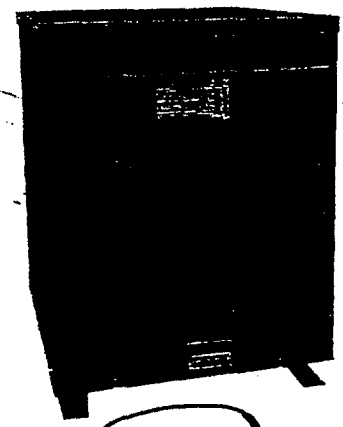
Type QB,
.050 kVA-3 kVA,
single-phase



Type QMS,
5 kVA-25 kVA,
single-phase



Type QMS 3
3 kVA-15 kVA
three-phase



Type QL,
25 kVA-167 kVA,
single-phase
15 kVA-1500 kVA,
three-phase

General Information

The complete family of transformers from GE provide quiet, reliable transformer operation.

All of the dry-type transformers through 1,000 kVA are UL Listed under the requirements of Standard 506 and 1561. In addition, each transformer meets the requirements of NEMA ST-20, 1992. Type QB and QMS models are also CSA Certified. Type QMS 3 models are CUL listed.

General purpose transformers are rated 600 volts and below for supplying appliance, lighting and power loads from electrical distribution systems. Standard distribution voltages are 600, 480, and 240 volts; standard load voltages are 480, 240, 208, and 120 volts. The transformer is used to obtain the load voltage from the distribution voltage. Since no vaults are required for installation, these transformers can be located right at the load to provide the correct voltage for the application. This eliminates the need for long, costly, low-voltage feeders.

Construction

Types QB, QMS and QMS 3

Core and coils are contained within a NEMA 3R nonventilated weatherproof enclosure. Type QB, QMS, and QMS 3 units feature encapsulated core and coils.

Type QL

Units are enclosed in a NEMA 2 drip-proof metal enclosure with natural-draft ventilation. Core-and-coil assembly is mounted on rubber isolation pads to reduce noise. Weathershield kits are available for conversion to a NEMA 3R enclosure suitable for outdoor service.

How to Select

- Establish phase and frequency.
- Determine the primary voltage—the voltage presently available.
- Determine the secondary voltage–the voltage needed at the load.
- Determine the kVA load, allowing room for expansion.
- Using the facts determined in the three steps, locate the transformer model in the listings on the following pages.

Voltage Tap Arrangement

Transformer taps compensate for high or low line voltages. Standard NEMA, ANSI three-phase taps are two 5 percent taps below normal on transformers smaller than 30 kVA. This arrangement provides a 10 percent range of tap voltage adjustment.

Most standard QL units rated 15 through 500 kVA have available six universal voltage taps—four 2½ percent below normal, and two 2½ percent above normal. This arrangement provides a 15 percent range of tap voltage adjustment.

Temperature Class

Industry standards classify insulation systems in accordance with the rating system shown below.

Insulation System Classification			
Ambient	+ Winding Rise	+ Hot Spot	= Temp. Class
40°C	55°C	10°C	105°C
40°C	80°C	30°C	150°C
40°C	115°C	25°C	180°C
40°C	150°C	30°C	220°C

All standard, general purpose, GE transformers meet all applicable NEMA, ANSI, UL, and IEEE standards.

The design life of transformers having different insulation systems is the same, since the allowable temperature rise of an insulation material system is predicated on a specified life for all insulation. The lower temperature systems are designed for the same life as higher temperature systems.

Termination

Improved termination spacing and wiring compartment room gives greater flexibility in selecting various UL Listed connectors for either copper or aluminum cable. A listing of suitable connectors is packaged with each GE transformer.

ITEM # (2)

Dry Type General Purpose Transformers

Types QB, QMS, QMS 3, and QL
600 Volts and Below

Sound Levels

All general purpose transformers are as quiet, or quieter than the 1986 ANSI and NEMA Standards for sound levels. Average sound levels are warranted not to exceed the values listed for each load rating shown in the adjacent table. Sound characteristics vary *between transformers of identical voltage and kVA rating. The* range of variation may be 4 to 8 decibels.

These values apply only to specified test conditions because the characteristic of the installation can cause them to be higher under operating conditions. Where acoustical noise is deemed to be of unusual concern, proper steps should be taken during installation to minimize audible noise transmission.

Sound Levels in Decibels①

(For 150°C Rise Models)

kVA	Sound levels in decibels①
	ANSI-C89 Average
0-9	40
10-50	45
51-150	50
151-300	55
301-500	60

① Measured per ANSI C89.2-1986.

Wall Mounting Brackets (For 150°C Rise Models)

Separate, optional wall-mounting brackets are available as accessories on transformers through 75 kVA. Each kit consists of two brackets. **Note:** Not available for outdoor weather protected (G62) units.

kVA	Bracket Catalog Number (Includes 2 Per Set)	List Price, GO-66
Single-phase		
.050-25	Standard on all QB and QMS units	
25	9T18Y5042	$141.00
37.5-50	9T18Y5043	196.00
Three-phase		
3-15	Standard on all QMS 3 units	
15-50	9T18Y5042	141.00
75	9T18Y5043	196.00

Weathershield Kits (For 150°C Rise Models)

UL Approved for Customer Installation
Kits supplied with tamper resistant hardware

kVA	Kit Catalog Number	List Price, GO-66
Single-phase		
25	9T18Y4317G12	$256.00
37.5,50	9T18Y4317	256.00
75	9T18Y4317G02	256.00
100	9T18Y4317G03	256.00
167	9T18Y4317G04	359.00
Three-Phase		
15	[illegible]	256.00
30, 45, 50	9T18Y4317G05	256.00
75, 112.5	[illegible]	256.00
150	9T18Y4317G07	359.00
225	9T18Y4317G08	359.00
300	9T18Y4317G09	359.00
400, 500	9T18Y4317G10	359.00

Transformer Installation Lug Kits

- Complete hardware requirement package
- Mechanical set screw construction (no special tools required)
- Connectors UL Listed for copper or aluminum

kVA	Catalog Number	List Price, GO-66
Single-phase		
25, 37.5	9T18Y7240G02	$130.00
50	9T18Y7241G03	170.00
75	9T18Y7240G03	250.00
100	9T18Y7242G07	250.00
	9T18Y7242G05	600.00
T[illegible]hase		
.5	9T18Y7327	70.00
30, 45	9T18Y7240	150.00
75	9T18Y7241	225.00
112.5	9T18Y7242	225.00
150	9T18Y7242G03	350.00
225	9T18Y7242G02	445.00
300	9T18Y7242G04	700.00
400, 500	9T18Y7242G06	1050.00
750	9T18Y7242G10	1250.00

ITEM # (2)

Dry Type General Purpose Transformers

Three-phase (Cont'd.)

Refer to page 10-8 for maximum outline dimensions and weights

15-1500 kVA, Indoor, Type QL — UL Listed

For Outdoor NEMA 3R Enclosure add suffix G62 to Catalog Number

kVA	480 Volts Delta Primary Secondary 208Y/120 Volts					480 Volts Delta Primary Secondary 240 Volts Delta					600 Volts Delta Primary Secondary 208Y/120 Volts				
	Hertz	Catalog Number	① Taps	List Price, GO-66	Wiring Diagram No. Page 10-9	Hertz	Catalog Number	① Taps	List Price, GO-66	Wiring Diagram No. Page 10-9	Hertz	Catalog Number	① Taps	List Price, GO-66	Wiring Diagram No. Page 10-9
15	60	9T23B3871	6	$ 2793.00	18	60	9T23B3881	6	$ 2913.00	19	60	9T23B3891	6	$ 3112.00	18
30	60	9T23B3872	6	3272.00	18	60	9T23B3882	6	3272.00	19	60	9T23B3892	6	3511.00	18
45	60	9T23B3873	6	3935.00	18	60	9T23B3883	6	3935.00	19	60	9T23B3893	6	4234.00	18
50	60	9T23B3864	6	4754.00	18	—	—	—	—	—	—	—	—	—	—
75	60	9T23B3874	6	5920.00	18	60	9T23B3884	6	5920.00	19	60	9T23B3894	6	6363.00	18
112.5	60	9T23B3875	6	7869.00	18	60	9T23B3885	6	7869.00	19	60	9T23B3895	6	8467.00	18
150	60	9T23B3876	6	10261.00	18	60	9T23B3886	6	10261.00	19	60	9T23B3896	6	11031.00	18
225	60	9T23B3877	6	13923.00	18	60	9T23B3887	6	13923.00	19	60	9T23B3897	6	16462.00	18
300	60	9T23B3878	6	17588.00	18	60	9T23B3888	6	17588.00	19	60	9T23B3898	6	21254.00	18
400	60	9T23B3866	6	24310.00	18	—	—	—	—	—	—	—	—	—	—
500	60	9T23B3879	6	29108.00	18	60	9T23B3889	6	29108.00	19	60	—	—	—	—
750	60	9T23B3867	②	51063.00	21	—	—	—	—	—	—	—	—	—	—
1000③	60	9T23B3868	②	58481.00	28	—	—	—	—	—	—	—	—	—	—
1500③	60	Consult Factory													

15-1000 kVA, Indoor, Copper-Winding, Type QL — UL Listed

For Outdoor NEMA 3R Enclosure add suffix G62 to Catalog Number

kVA	480 Volts Delta Primary Secondary 208Y/120 Volts					480 Volts Delta Primary Secondary 240 Volts Delta					600 Volts Delta Primary Secondary 208Y/120 Volts				
	Hertz	Catalog Number	① Taps	List Price, GO-66	Wiring Diagram No. Page 10-9	Hertz	Catalog Number	① Taps	List Price, GO-66	Wiring Diagram No. Page 10-9	Hertz	Catalog Number	① Taps	List Price, GO-66	Wiring Diagram No. Page 10-9
15	60	9T23Q9871	6	3492.00	18	60	9T23Q9881	6	3639.00	19	—	—	—	—	—
30	60	9T23Q9872	6	4089.00	18	60	9T23Q9882	6	4089.00	19	—	—	—	—	—
45	60	9T23Q9873	6	4918.00	18	60	9T23Q9883	6	4918.00	19	—	—	—	—	—
50	60	9T23Q9864	6	5945.00	18	—	—	—	—	19	—	—	—	—	—
75	60	9T23Q9874	6	7398.00	18	60	9T23Q9884	6	7398.00	19	—	—	—	—	—
112.5	60	9T23Q9875	6	9834.00	18	60	9T23Q9885	6	9834.00	19	—	—	—	—	—
150	60	9T23Q9876	6	12829.00	18	60	9T23Q9886	6	12829.00	19	—	—	—	—	—
225	60	9T23Q9877	6	17403.00	18	60	9T23Q9887	6	17403.00	19	—	—	—	—	—
300	60	9T23Q9878	6	21981.00	18	60	9T23Q9888	6	21981.00	19	—	—	—	—	—
	60	9T23C4066	6	33611.00	18	—	—	—	—	—	—	—	—	—	—
	60	9T23C4079	6	39720.00	18	60	9T23C4089	6	39948.00	19	—	—	—	—	—
	60	9T23C4067	4	69521.00	22	—	—	—	—	—	—	—	—	—	—
	60	9T23C4068	2	77273.00	28	—	—	—	—	—	—	—	—	—	—

kVA	208 Volts Delta Primary Secondary 480Y/277 Volts					240 Volts Delta Primary Secondary 208Y/120 Volts					480 Volts Delta Primary Secondary 480Y/277 Volts				
	Hertz	Catalog Number	① Taps	List Price, GO-90	Wiring Diagram No. Page 10-9	Hertz	Catalog Number	① Taps	List Price, GO-90	Wiring Diagram No. Page 10-9	Hertz	Catalog Number	① Taps	List Price, GO-90	Wiring Diagram No. Page 10-9

9, 15 kVA, Indoor/Outdoor, Type QMS 3 — UL Listed — CUL Listed

9	60	9T21J9712	4	$2310.00	30	60	9T21J9713	4	$2310.00	30	60	9T21J9710	4	$2310.00	30
15	60	9T21J1710	4	2730.00	30	60	9T21J1711	4	2730.00	30	60	9T21J1712	4	2730.00	30

kVA	208 Volts Delta Primary Secondary 480Y/277 Volts					240 Volts Delta Primary Secondary 208Y/120 Volts					480 Volts Delta Primary Secondary 480Y/277 Volts				
	Hertz	Catalog Number	① Taps	List Price, GO-66	Wiring Diagram No. Page 10-9	Hertz	Catalog Number	① Taps	List Price, GO-66	Wiring Diagram No. Page 10-9	Hertz	Catalog Number	① Taps	List Price, GO-66	Wiring Diagram No. Page 10-9

15-1500 kVA, Indoor, Type QL — UL Listed

For Outdoor NEMA 3R Enclosure add suffix G62 to Catalog Number

15	60	9T23B3801	6	$ 3515.00	26	60	9T23B3811	6	$ 3515.00	18	60	9T23B3851	6	$ 3377.00	18
30	60	9T23B3802	6	3929.00	26	60	9T23B3812	6	3929.00	18	60	9T23B3852	6	3925.00	18
45	60	9T23B3803	6	4719.00	26	60	9T23B3813	6	4719.00	18	60	9T23B3853	6	4719.00	18
50	60	9T23B3014	6	5716.00	26	60	9T23B3013	6	5716.00	18	60	9T23B3012	6	5710.00	18
75	60	9T23B3804	6	7100.00	26	60	9T23B3814	6	7100.00	18	60	9T23B3854	6	7100.00	18
112.5	60	9T23B3805	6	9446.00	26	60	9T23B3815	6	9446.00	18	60	9T23B3855	6	9445.00	18
150	60	9T23B3806	3	12314.00	23	60	9T23B3816	3	12314.00	20	60	9T23B3856	6	12314.00	18
225	60	9T23B3807	3	16703.00	23	60	9T23B3817	3	16703.00	20	60	9T23B3857	6	16703.00	18
300	60	9T23B3808	3	21103.00	23	60	9T23B3818	3	21103.00	20	60	9T23B3858	6	21103.00	18
400	60	9T23B3015	3	29167.00	23	—	—	—	—	—	60	9T23B3017	6	29167.00	18
500	60	9T23B3809	3	35144.00	23	60	9T23B3819	3	35144.00	20	60	9T23B3859	6	35144.00	18
500	60	9T23B3809	3	35144.00	23	60	9T23B3819	3	35144.00	20	60	9T23B3859	6	35144.00	18

① **Tap Arrangements:**
N–No taps
2–(2) 5% taps below rated primary volts.
3–(3) 5% taps: 1 above and 2 below rated primary volts.
4–(4) 2½% taps: 2 above and 2 below rated primary volts.
6–(6) 2½% taps: 2 above and 4 below rated primary volts.

② 750 kVA has (2) 3.1% full capacity primary taps above and below rated voltages. 1000 kVA has (1) 3.6% full capacity primary tap above and below rated voltage.

③ Not CSA certified.

ITEM # (3)

Spec-Setter™ Safety Switches, Heavy Duty Type TH

30-1200 Amperes
240, 480 and 600 Volts ac,
600 Volts dc

Heavy Duty Safety Switches with 317 Stainless Steel Type NEMA 4/4X, Water & Dust-tight

- Superior corrosion resistance and high temperature strength
- Excellent resistance to pitting corrosion due to chlorides
- Excellent resistance to reducing acids and similar media
- Standard lead time 2 weeks

240/600 Volts—Fusible

Max. Ampere Rating	Volts	Catalog Number	List Price, GO-131
30	600	TH2261SSDC3	$1875.00
30	240	TH3221SS317	1572.00
30	600	TH3361SS317	1965.00
60	600	TH3362SS317	2163.00
100	600	TH3363SS317	4313.00
200	600	TH3364SS317	6042.00

600 Volts—Non-Fusible

Max. Ampere Rating	Volts	Catalog Number	List Price, GO-131
30	600	THN3361SS317	$ 1653.00
60	600	THN3362SS317	1965.00
100	600	THN3363SS317	4009.00
600	600	THN3366SS317	14744.00

Spec-Setter™ Safety Switches

Schematic Diagram	Max. Ampere Rating	Indoor, Type 1① Catalog Number	Indoor, Type 1① List Price, GO-131	Outdoor, Type 3R② Catalog Number	Outdoor, Type 3R② List Price, GO-131	Water- and Dust-tight Types 4/4X Stainless Steel Catalog Number	Water- and Dust-tight Types 4/4X Stainless Steel List Price, GO-131	Drip- and Dust-tight Type 5, 12 and JIC Without Knockouts Catalog Number	Drip- and Dust-tight Type 5, 12 and JIC Without Knockouts List Price, GO-131	Horsepower Ratings ac NEC Std 480V 3-ph	ac NEC Std 600V 3-ph	ac Time Delay 480V 3-ph	ac Time Delay 600V 3-ph	dc 125 Volts	dc 250 Volts	dc 600 Volts

600 Volts—Fusible

Two-pole, 600 Volts dc

	30	TH2261DC	$ 294.00	TH2261RDC	$ 495.00	TH2261SSDC	$ 1350.00	TH2261JDC	$ 460.00	—	—	—	—	—	—	15
	60	TH2262DC	357.00	TH2262RDC	580.00	TH2262SSDC	1403.00	TH2262JDC	481.00	—	—	—	—	—	—	25
	100	TH2263DC	653.00	TH2263RDC	906.00	TH2263SSDC	2972.00	TH2263JDC	796.00	—	—	—	—	—	—	25

Three-pole, 480, 480Y/277④ and 600 Volts ac—250 Volts dc

	30	TH3361	294.00	TH3361R	495.00	TH3361SS	1349.00	TH3361J	501.00	5	7½	15	20	—	5	—
	60	TH3362	357.00	TH3362R	580.00	TH3362SS	1486.00	TH3362J	515.00	15	15	30	50	—	10	—
	100	TH3363	653.00	TH3363R	906.00	TH3363SS	2961.00	TH3363J	827.00	25	30	60	75	—	20	—
	200	TH3364	943.00	TH3364R	1250.00	TH3364SS	4149.00	TH3364J	1288.00	50	60	125	150	—	40	—
	400	TH3365	2454.00	TH3365R	2921.00	TH3365SS	8165.00	TH3365J	2833.00	100	125	250	350	—	50	—
	600	TH3366	4128.00	TH3366R	5765.00	TH3366SS	11612.00	TH3366J	4776.00	150	200	400	500	—	50	—
	800⑧	TC72367	8257.00	TC72367R⑤	10239.00	—	—	—	—	—	—	—	—	—	—	—
	1200⑧	TC72368	10858.00	TC72368R⑤	13303.00	—	—	—	—	—	—	—	—	—	—	—

Four-pole, 480 and 600 Volts ac

										2-ph	2-ph	2-ph	2-ph			
	30	TH6661	1971.00	TH6661	1971.00	—	—	TH6661	1971.00	7½	10	20	25	—	5	—
	60	TH6662	2363.00	TH6662	2363.00	—	—	TH6662	2363.00	15	20	40	50	—	10	—
	100	TH6663	2874.00	TH6663	2874.00	—	—	TH6663	2874.00	25	30	50	50	—	20	—
	200	TH6664	6464.00	TH6664	6464.00	—	—	TH6664	6464.00	50	50	—	—	—	40	—

600 Volts—No Fuse

Two-pole, 600 Volts dc

										240V 1-ph	240V 3-ph	480V 3-ph	600V 3-ph			
	30	THN2261DC	153.00	THN2261RDC	275.00	THN2261SSDC	1112.00	THN2261JDC	301.00	—	—	—	—	—	—	15
	60	THN2262DC	277.00	THN2262RDC	482.00	THN2262SSDC	1337.00	THN2262JDC	340.00	—	—	—	—	—	—	25
	100	THN2263DC	437.00	THN2263RDC	674.00	THN2263SSDC	2752.00	THN2263JDC	541.00	—	—	—	—	—	—	25

Three-pole, 480 and 600 volts ac—250 Volts dc or Two-pole with Switching Neutral

	30	THN3321⑥	146.00	—	—	—	—	—	—	3	10	—	—	3	5	—
	30	THN3361	153.00	THN3361R	275.00	THN3361SS	1135.00	THN3361J	352.00	3	10	20	30	3	5	—
	60	THN3362	277.00	THN3362R	482.00	THN3362SS	1349.00	THN3362J	457.00	10	20	50	60	5	10	—
	100	THN3363	437.00	THN3363R	674.00	THN3363SS	2753.00	THN3363J	649.00	20	40	75	100	—	20	—
	200	THN3364	663.00	THN3364R	819.00	THN3364SS	3759.00	THN3364J	862.00	30	60	125	150	—	40	—
	400	THN3365	1485.00	THN3365R	2033.00	THN3365SS	7614.00	THN3365J	2137.00	—	125	250	350	—	50	—
	600	THN3366	2646.00	THN3366R	4069.00	THN3366SS	10222.00	THN3366J	3478.00	—	200	400	500	—	50	—
	800⑧	TC36367	5392.00	⑦	—	—	—	—	—	—	—	—	—	—	—	—
	1200⑧	TC36368	7236.00	⑦	—	—	—	—	—	—	—	—	—	—	—	—

Four-pole, 480 and 600 Volts ac⑤ ⑥

											2-ph	2-ph	2-ph			
	30	THN6661	1752.00	THN6661	1752.00	—	—	THN6661	1752.00	—	10	20	25	—	5	—
	60	THN6662	2029.00	THN6662	2029.00	—	—	THN6662	2029.00	—	20	40	50	—	10	—
	100	THN6663	2498.00	THN6663	2498.00	—	—	THN6663	2498.00	—	30	50	50	—	20	—
	200	THN6664	5616.00	THN6664	5616.00	—	—	THN6664	5616.00	—	50	—	—	—	40	—

① 200-600 amp devices available factory reversed for bottom feed. Add "B" suffix to Catalog Number (e.g., TH3365B). **List Price adder $38.00, GO-131.** UL Listed.

② 30-200 amp devices have removable closing cap. Larger ampere devices require field cut openings. Order hubs separately, see page 2-13.

③ Type TH electrical performance does not apply to Type TC switches. Class "L" fuses are ac only.

④ Order neutral kits from pages 2-10 and 2-11.

⑤ Not CSA Certified.

⑥ 250 volts ac or 250 volts dc only. Compact enclosure.

⑦ Use molded case switch in circuit breaker enclosure.

⑧ Use four poles of six-pole switch. Reference page 2-8 for additional information.

References:

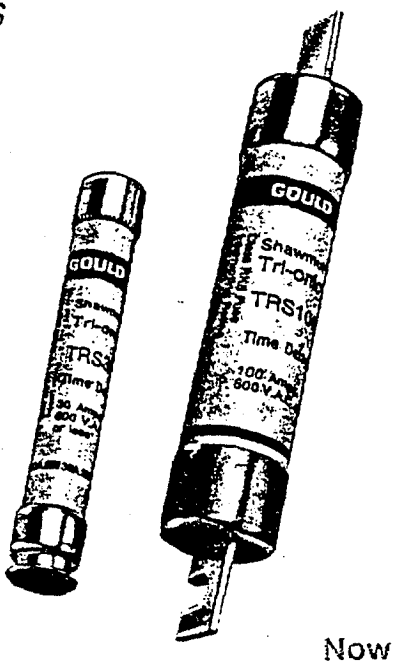
Accessories and Lug Sizes. . . Pages 2-10 thru 2-13
Descriptive Bulletin. GEA-12144
Dimensions and Knockouts. . Pages 2-14 thru 2-18
Replacement Parts Bulletin GEF-4452

ITEM # (4)

Tri-onic®– Class RK5
Time Delay Fuses

TR/TRS

UL Class RK5
Time Delay
Current Limiting
200kA I.R.
250 and 600 Volts AC
1/10 to 600 Amperes
UL Listed
CSA Certified
DC Ratings



Most popular fuse for motor branch circuits. Also suitable for general purpose protection of transformers, service entrance equipment, feeder circuits and branch circuits. The time delay characteristic of the Tri-onic fuse allows it to ignore normal surge conditions without compromising overcurrent protection.

This is a rejection fuse. Replacement of this fuse with a fuse of a lower voltage or lower interrupting rating is not possible provided this fuse is used with rejection fuse blocks such as those listed on page 40.

The fiberglass body provides superior reliability in adverse industrial environments.

FEATURES
- Fiberglass body for dimensional stability
- Imprint labeling for permanent identification

Now Available – New DC Ratings
TRS70R thru TRS600R are now DC Listed at 100kA, 600VDC, per UL 198L.

Special 600VDC rated Tri-onic fuses with MSHA certification are available in ratings of 35 thru 400 amperes. These are Cat. Nos. TRS35RDC thru TRS400RDC. See page 41.

Standard Fuse Ampere Ratings, Catalog Numbers

AMPERE RATING	CATALOG NUMBER 250V	600V	AMPERE RATING	CATALOG NUMBER 250V	600V	AMPERE RATING	CATALOG NUMBER 250V	600V	AMPERE RATING	CATALOG NUMBER 250V	600V
1/10	TR1/10R	TRS1/10R	2 1/4	TR2 1/4R	TRS2 1/4R	10	TR10R	TRS10R	90	TR90R	TRS90R
15/100	TR15/100R	TRS15/100R	2 1/2	TR2 1/2R	TRS2 1/2R	12	TR12R	TRS12R	100	TR100R	TRS100R
2/10	TR2/10R	TRS2/10R	2 9/10	TR2 9/10R	TRS2 9/10R	15	TR15R	TRS15R	110	TR110R	TRS110R
3/10	TR3/10R	TRS3/10R	3	TR3R	TRS3R	17 1/2	TR17 1/2R	TRS17 1/2R	125	TR125R	TRS125R
4/10	TR4/10R	TRS4/10R	3 3/10	TR3 3/10R	TRS3 3/10R	20	TR20R	TRS20R	150	TR150R	TRS150R
1/2	TR1/2R	TRS1/2R	3 1/2	TR3 1/2R	TRS3 1/2R	25	TR25R	TRS25R	175	TR175R	TRS175R
6/10	TR6/10R	TRS6/10R	4	TR4R	TRS4R	30	TR30R	TRS30R	200	TR200R	TRS200R
8/10	TR8/10R	TRS8/10R	4 1/2	TR4 1/2R	TRS4 1/2R	35	TR35R	TRS35R	225	TR225R	TRS225R
1	TR1R	TRS1R	5	TR5R	TRS5R	40	TR40R	TRS40R	250	TR250R	TRS250R
1 1/8	TR1 1/8R	TRS1 1/8R	5 6/10	TR5 6/10R	TRS5 6/10R	45	TR45R	TRS45R	300	TR300R	TRS300R
1 1/4	TR1 1/4R	TRS1 1/4R	6	TR6R	TRS6R	50	TR50R	TRS50R	350	TR350R	TRS350R
1 4/10	TR1 4/10R	TRS1 4/10R	6 1/4	TR6 1/4R	TRS6 1/4R	60	TR60R	TRS60R	400	TR400R	TRS400R
1 6/10	TR1 6/10R	TRS1 6/10R	7	TR7R	TRS7R	70	TR70R	TRS70R	450	TR450R	TRS450R
1 8/10	TR1 8/10R	TRS1 8/10R	8	TR8R	TRS8R	75	TR75R	TRS75R	500	TR500R	TRS500R
2	TR2R	TRS2R	9	TR9R	TRS9R	80	TR80R	TRS80R	600	TR600R	TRS600R

Sl with 5 dial

POLYPHASE SELF-CONTAINED WATTHOUR METERS

WITH TYPE M-90 5-DIAL DIRECT-READING ELECTRONIC DEMAND REGISTERS,

NOT PROGRAMMED, NO OPTIONS

ITEM # (5)

Meter Type and Circuit	Meter Class	Volts	Test Amps	Watthour Constant K_h	Register Ratio (R_r) Mult. = 1	Socket-connected Catalog Number	Bottom-connected Catalog Number
FORM 12S	**VM-62 for use on residential network**						
2-STATOR 3-wire, 120/208-volt network 	100	120 ①	15	7.2	27 7/9	702X005015	.....
	200	120 ①	30	14.4	13 8/9	702X005004	.....
FORM 12S	**VM-62 for use on 3-wire, 3-phase**						
2-STATOR 3-wire, 3-phase 5 terminal 	100	240	15	14.4	13 8/9	700X002983	.....
	300	240	30	28.8	6 17/18	700X002977	.....
	100	480	15	28.8	6 17/18	700X002950	.....
	200	480	30	57.6	3 17/36	700X002944	.....
FORM 16S, 16A	**VM-64 for use on 4-wire Y, 3-phase**						
3-STATOR 4-wire Y, 3-phase 	100	120Y	15	10.8	18 14/27	701X015437	.....
	200	120Y	30	21.6	9 7/27	701X015439	.....
	100	240Y ②	15	21.6	9 7/27	701X015438	.....
	200	240Y ②	30	43.2	4 17/27	701X015419	.....
FORM 14S, 14A	**VM-65 for use on 4-wire Y, 3-phase**						
2-STATOR 4-wire Y, 3-phase 	100	120Y	15	10.8	18 14/27	700X024027	700X030299
	200	120Y	30	21.6	9 7/27	700X024812	▲
	100	240Y ②	15	21.6	9 7/27	700X024838	700X030300
	200	240Y ②	30	43.2	4 17/27	700X024849	▲
FORM 15S, 15A	**VM-66 for use on 4-wire Δ, 3-phase**						
2-STATOR 4-wire Δ, 3-phase 	100	240	15	14.4	13 8/9	700X038528	▲
	200	240	30	28.8	6 17/18	700X038513	▲

① Voltage coils are wound and rated for line-to-neutral voltage, and this is the value listed.

② Types VM-64 and VM-65 240 volt motors will operate correctly on 480Y/277-volt systems. M-90 registers rated 277 volts will be provided with these meters. If meter nameplates are to be marked "480Y/277 V", the order must so specify.

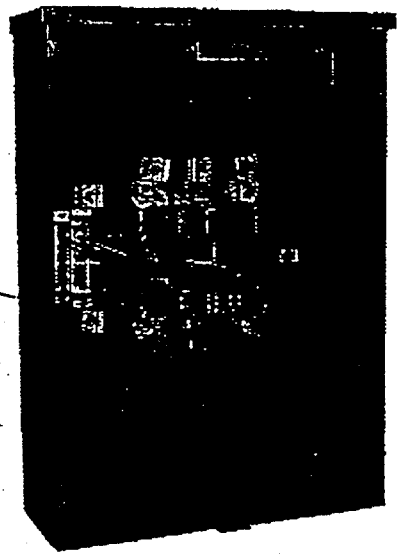
▲ TA15 Class 100 and TA30 Class 200 bottom-connected meters are available for special applications. However, the terminal block openings will only accept No. 2 AWG wire.

MILBANK

**125 AMP.
7 TERMINAL
RINGLESS ONLY**

ITEM # (6)

OVERHEAD



NU9320-R-XL

UNDERGROUND

NU7573-DL

FIG. 1

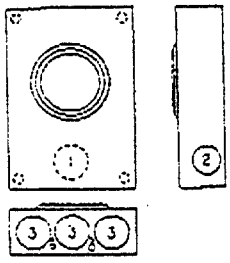
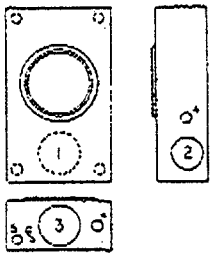


FIG. 2



UL

RINGLESS ORDERING INFORMATION

SERVICE	RINGLESS CAT. NO.	HUB	②LUG CU/AL	BY-PASS	DIMENSIONS D"	W"	H"	CONCENTRIC K.O.'S 1	2	3	4	5	Fig.
OVERHEAD	NU7573-(*)	①	2/0	YES	47⅛"	10"	18½"	2"	2"	2"	¾"	¼", ½"	2
OVERHEAD	NU8100-(*)	①	2/0	NO	47⅛"	10"	18½"	2"	2"	2"	¾"	¼", ½"	2
UNDERGROUND	NU9320-(*)	①	2/0	YES	47⅛"	13"	19"	3"	2½"	3"	¼"	¼", ½"	1
UNDERGROUND	NU9321-(*)	①	2/0	NO	47⅛"	13"	19"	3"	2½"	3"	¼"	¼", ½"	1

① For proper hub selection see hub suffix chart.

② Extruded aluminum connectors are tin plated. Units supplied with bonded, duplex neutral.

③ Lever supplies clamping action on meter spades and also operates bypass device.

FACTORY INSTALLED HUBS

SMALL HUB OPENING	
HUB SIZE	CAT. SUFFIX
Plain Top	— O
1"	— WL
1¼"	— YL
1½"	— ZL
2"	— DL
2½"	— EL
hub opening closing plate	— RL — XL

ITEM 7

General Wood Preserving Company Inc.

Post Office Box 370 ■ Leland, North Carolina 28451 ■ Telephone (919) 371-3131

December 20, 1994

E & R, INC.
BOX 3552
KINSTON, NC 28501

Poles: Poles provided shall be wood poles machine trimmed by turning, Douglas Fir or Southern Yellow Pine conforming to ANSI 05.1 and REA DT-5C. Poles will be gained, bored and roofed before treatment. Poles shall be full length pressure treated in accordance with AWPA C-4, with creosote conforming to AWPA P1 or with oil-borne preservatives and petroleum conforming to AWPA P8 and P9, respectively. Poles shall be branded by the manufacturer with his mark and date of treatment, height, and class of pole, wood species, preservative code and retention. Brand will be placed so that the bottom of the brand or disc is ten (10) feet from the pole butt for poles up to fifty (50) feet long. Poles fifty five (55) feet and longer shall have the brand located at fourettn (14) feet from the pole butt. Framing shall be in accordance with Drawing M-20.

Jennie Parmenter
Customer Service

ITEM 8

AAAC-C201

All Aluminum Alloy Conductor. Bare.

APPLICATIONS

Used as bare overhead conductor for primary and secondary distribution. Designed utilizing a high-strength aluminum alloy to achieve a high strength-to-weight ratio; affords better sag characteristics. Aluminum alloy gives AAAC-6201 higher resistance to corrosion than ACSR.

SPECIFICATIONS

Southwire's AAAC-6201 bare conductor meets or exceeds the following ASTM specifications:

B-398 Aluminum-Alloy 6201-T81 Wire for Electrical Purposes.
B-399 Concentric-Lay-Stranded 6201-T81 Aluminum Alloy Conductors.

CONSTRUCTION

Aluminum alloy 6201 wires, concentrically stranded.

Seal Wire Company

ITEM 8

Shelby, North Carolina 28150

Phone 482-3804
Area Code 704

P. O. Box 165

STANDARD BARE COPPER WIRE
American Wire Gauge (B & S)

SOLID WIRE			
SIZE AWG.	NOM. DIA. INCHES	CIRCULAR MIL AREA	WEIGHT PER MFT
4/0	.4600	211,600	640.5
3/0	.4096	167,800	507.9
2/0	.3648	133,100	402.8
1/0	.3249	105,500	319.5
1	.2893	83,690	253.3
2	.2576	66,370	200.9
4	.2043	41,740	126.4
6	.1620	26,250	79.46
8	.1285	16,510	49.97
10	.1019	10,380	31.43
12	.0808	6,530	19.77
14	.0640	4,107	12.43
17	.0452	2,048	8.200

SIZES AS REQUIRED

STRANDED CABLE				
SIZE AWG.	NUMBER OF STRANDS		OVERALL DIA. INCHES	WEIGHT PER MFT
500MCM	—	37	.813	1544
350MCM	—	19	.679	1081
250MCM	—	19	.574	771.9
4/0	—	19	.528	653.3
4/0	—	7	.522	653.3
3/0	—	7	.464	518.1
2/0	—	7	.414	410.9
1/0	—	7	.368	325.7
1	—	7	.328	258.4
2	—	7	.292	204.9
4	—	7	.232	128.9
6	—	7	.184	81.05
8	—	7	.146	50.98
10	—	7	.116	32.06
12	—	7	.092	20.16
14	—	7	.073	12.68

SIZES AS REQUIRED

ITEM # _____
SECTION _____
PARAGRAPH _____

BARE COPPER WIRE MANUFACTURED IN COMPLIANCE WITH FOLLOWING ASTM SPECIFICATIONS:

SOLID WIRE	
Hard Drawn	B-1-70
Medium Drawn	B-2-70
Soft-Drawn	B-3-74

CONCENTRIC LAY STRANDED	
Hard, Medium or Soft Drawn	B-8-72

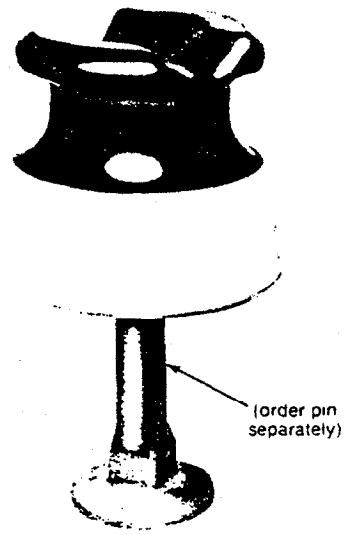
ITEM 9

COOPER POWER SYSTEMS

Pin-Type Insulators and Insulator Pins—continued

PIN-TYPE INSULATORS

Hot-press formed.
High-strength, non-porous construction; glaze over porcelain improves strength and resists contamination accumulation.
Semi-conductive radio glaze on head and upper portions reduces radio and tv interference.
Deep petticoats assure high insulating characteristics.
Meets applicable portions of ANSI Standard C29.5; pin hole accepts ANSI-standard threaded pins; order separately (see Pages 66—72).



NP8D8

Catalog no. for standard pin-type insulator Catalog no. for high-strength pin-type insulator*	NP8D8□■ NP8D8S□	NP9D8□■ NP9D8S■	NP21D8□■ NP21D8S□	NP22D8■ NP22D8S■	NP23D8■ NP23D8S■
ANSI class	55-2	55-3	55-4	55-5	55-6
Typical application (kV)	7.2	13.2	13.2	13.2	19.9 34.5
Flashover voltage (kV)					
Critical impulse (1.2 x 50 μs wave)					
Positive	70	90	105	130	150
Negative	85	110	130	150	170
60 Hz					
Wet	25	30	35	45	50
Dry	45	55	65	80	100
Low-frequency puncture voltage (kV)	70	90	95	115	135
Radio influence voltage (RIV)					
Test voltage to ground (kV)	5	10	10	15	22
Max RIV at 1000 kHz (μV)	50	50	50	100	100
Leakage distance (in.)	5	7	9	12	15
Dry arcing distance (in.)	3-3/8	4-1/2	5	6-1/4	8
Cantilever strength (lb)	2500	2500	3000	3000	3000
Pinhole diameter—threaded porcelain (in.)	1	1	1	1	1
Minimum pin height (in.)	4	5	5	6	7-1/2
Neck diameter (in.)	2-1/4	2-1/4	2-7/8	2-7/8	3-1/2
Groove height relationship (in.)	9/16—7/8	9/16—7/8	9/16—7/8	9/16—7/8	5/16—5/8
NEMA neck designation	C	C	F	F	J

*For information on pricing and availability, contact your McGraw-Edison sales representative

□ REA-approved
■ ANSI/NEMA standard.
◇ AT&T specification

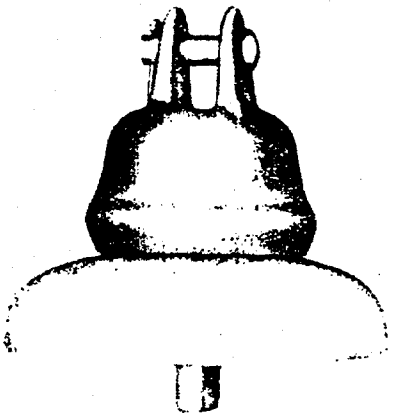
PORCELAIN PRODUCTS CO. | Talley Industries

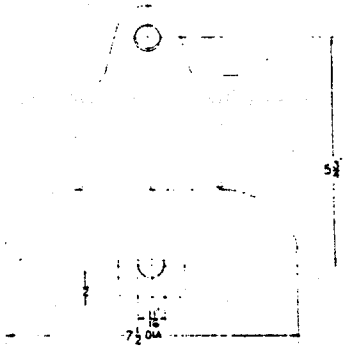
PP 225 N. Patterson Street
Carey, Ohio 43316
419/396 7621

ITEM 9

SUSPENSION INSULATORS

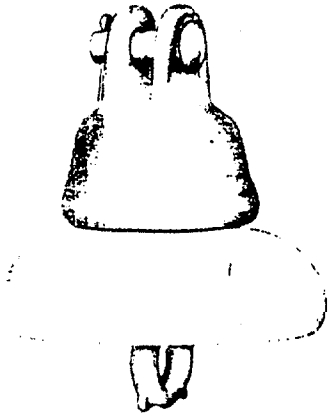
CLEVIS TYPE STEEL HARDWARE

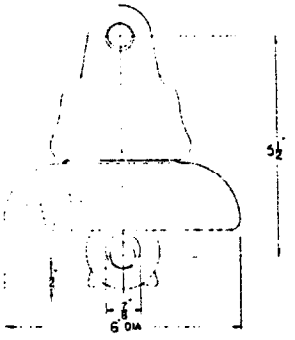




No. 87512

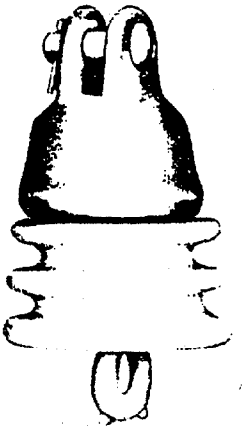
CLEVIS TYPE STEEL HARDWARE

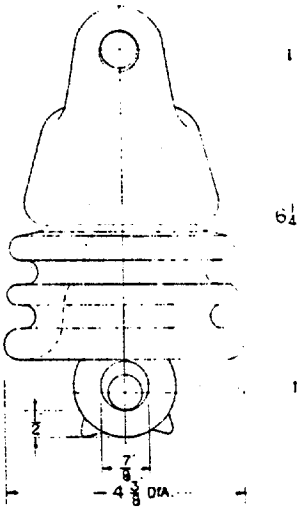




No. 86012

CLEVIS TYPE STEEL HARDWARE





No. 84300
Steel Hex Cotter Bolt Available

MECHANICAL & ELECTRICAL CHARACTERISTICS

CATALOG NO.	87512	†86012	†84300
ANSI CLASS	52-2	52-1	52-9
ANSI M & E Category	15,000 Pounds	10,000 Pounds	10,000 Pounds
Comb. M & E Strength	15,000 Pounds	10,000 Pounds	10,000 Pounds
Mechanical Impact Strength	50 In.-Lbs.	45 In.-Lbs.	45 In.-Lbs.
Routine Proof Test	7,500 Pounds	5,000 Pounds	5,000 Pounds
Time Load Test	10,000 Pounds	6,000 Pounds	6,000 Pounds
Low Frequency Flashover—Dry	65 KV	60 KV	60 KV
Low Frequency Flashover—Wet	35 KV	30 KV	30 KV
Impulse Flashover—Positive	115 KV	100 KV	100 KV
Impulse Flashover—Negative	115 KV	100 KV	90 KV
Low Frequency Puncture Voltage	90 KV	80 KV	80 KV
Low Frequency Test Voltage Rms to Ground	7.5 KV	7.5 KV	7.5 KV
Maximum R.I.V. Microvolts at 1000 KC	50 MCV	50 MCV	50 MCV
Leakage Distance	8.25 Inches	7 Inches	6.75 Inches
Dry Arcing Distance	5.5 Inches	4.5 Inches	4 Inches
Maximum Net Weight	9.1 Pounds	5.5 Pounds	5.2 Pounds
Packed Weight Per Unit	10.1 Pounds	6.0 Pounds	5.8 Pounds
Standard Package Quantity	8	12	12

Standard Glaze "Skyline" ANSI-70, Munsell 5 BG 7.0/0.4
†REA Accepted

ITEM 10

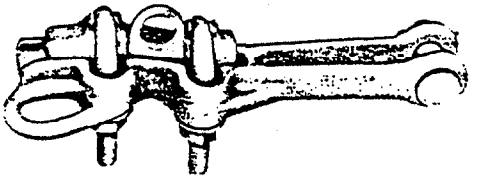
CLASS 3520

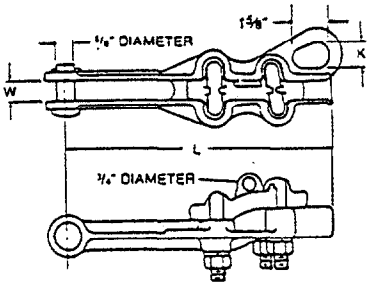
ALUMINUM STRAIGHT-LINE DEAD-END STRAIN CLAMP TYPE ADE (WAVE SEAT DESIGN)

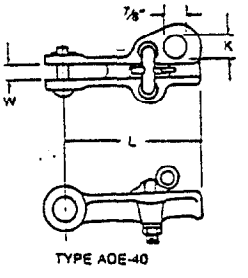
ALUMINUM
ADE

or distribution and light transmission construction with all aluminum, ACSR or aluminum alloy conductor.

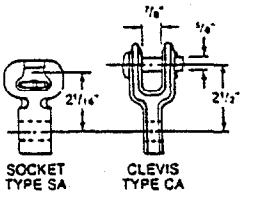
Material: Body and Keeper—356-T6 aluminum alloy
Hardware—hot-dip galvanized steel
Sockets and Clevises—ductile iron, hot-dip galvanized
Cotter Pin—#302 stainless steel







TYPE ADE-40



SOCKET TYPE SA
CLEVIS TYPE CA

clamps have prove
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clamping range. Th
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l strain clamps.

CATALOG NUMBER	FITTING TYPE	FITTING CAT. NO.	CLAMPING RANGE ACSR	CLAMPING RANGE ALUMINUM	CLAMPING RANGE INCHES (MM)	ULTIMATE BODY STRENGTH LBS. (KG)	U-BOLTS NO.	U-BOLTS SIZE INCHES (MM)	DIMENSIONS INCHES (MM) L	DIMENSIONS INCHES (MM) W	DIMENSIONS INCHES (MM) K	APPROX. WT. EACH LBS. (KG)
ADE-40-N	None	—	#6(6/1)	#6-7 Str.	.16-.40	5,000	1	1/2	5	11/16	7/8	1.2 (.54)
ADE-40-S	Socket	SA-04	To	To	(4.06-10.16)	(2,268)		(12.70)	(127)	(17.46)	(22.23)	2.4 (1.09)
ADE-40-C	Clevis	CA-04	1/0(6/1)	1/0-19 Str.								2.8 (1.27)
ADE-46-N	None	—	#6(6/1)	#6-7 Str.	.18-.46	6,000	2	3/8	7 1/2	3/4	7/8	1.6 (.72)
ADE-46-S	Socket	SA-04	To	To	(4.57-11.68)	(2,722)		(9.53)	(190.50)	(19.05)	(22.23)	2.8 (1.27)
ADE-46-C	Clevis	CA-04	2/0(6/1)	2/0-19 Str.								3.2 (1.45)
ADE-60-N	None	—	1/0(6/1)	1/0-7 Str.	.36-.60	8,000	2	1/2	8 15/16	3/4	7/8	2.5 (1.13)
ADE-60-S	Socket	SA-04	To	To	(9.14-15.24)	(3,629)		(12.70)	(227.01)	(19.05)	(22.23)	3.8 (1.72)
ADE-60-C	Clevis	CA-04	159(12/7)	266.8-19 Str.								4.1 (1.86)
ADE-70-N	None	—	101.81(12/7)	3/0-7 Str.	.46-.70	8,000	2	1/2	9 13/16	3/4	7/8	2.7 (1.22)
ADE-70-S	Socket	SA-04	To	To	(11.68-17.78)	(3,629)		(12.70)	(249.24)	(19.05)	(22.23)	4.0 (1.81)
ADE-70-C	Clevis	CA-04	336.4(18/1)	350-37 Str.								4.3 (1.95)
ADE-86-N	None	—	101.8(12/7)	3/0-7 Str.	.46-.86	10,000	2	1/2	10 1/16	15/16	1 1/8	3.0 (1.36)
ADE-86-S	Socket	SA-06	To	To	(11.68-21.84)	(4,536)		(12.70)	(255.59)	(23.81)	(28.58)	4.3 (1.95)
ADE-86-C	Clevis	CA-06	477(26/7)	556.5-37 Str.								4.7 (2.13)
ADE-98-N	None	—	300(26/7)	350-37 Str.	.68-1.03	9,000	2	1/2	11 5/8	1 1/16	15/16	3.0 (1.36)
ADE-98-S	Socket	SA-07	To	To	(17.27-26.16)	(4,082)		(12.70)	(295.28)	(26.99)	(23.81)	4.6 (2.09)
ADE-98-C	Clevis	CA-06	636(30/19)	795-61 Str.								5.0 (2.27)
ADE-130-N	None	—	556.5(36/1)	600-37 Str.	.86-1.30	12,000	2	1/2	13 3/4	1 1/16	1 1/8	5.1 (2.31)
ADE-130-S	Socket	SA-07	To	To	(21.84-33.02)	(5,443)		(12.70)	(349.25)	(26.99)	(28.58)	6.4 (2.90)
ADE-130-C	Clevis	CA-06	1,113(54/19)	1,272-61 Str.								6.8 (3.08)
ADE-155-N	None	—	666.6(24/7)	750-61 Str.	.98-1.55	14,000	2	5/8	14 1/2	1 1/16	15/16	6.2 (2.81)
ADE-155-S	Socket	SA-07	To	To	(24.89-39.37)	(6,350)		(15.88)	(368.30)	(26.99)	(23.81)	7.6 (3.45)
ADE-155-C	Clevis	CA-06	1590(54/19)	1,800-127 Str.								7.9 (3.58)

NOTES: (1) Recommended torque on U-bolts: ⅜"—240 in.-lbs., ½"—480 in. -lbs., ⅝"—720 in.-lbs.
(2) Lifting eye is standard on keeper for hot line work.

Seal Wire Company Item 11

Shelby, North Carolina 28150

P. O. Box 165

GALVANIZED STEEL STRAND SPECIFICATION

No. of Wires	Nominal Strand Diameter (Inches)	Wire Diameter (Inches)	Wt./M*	Minimum Breaking Strength (Pounds)				Minimum Weight of Coat (Oz./Sq. Ft.)		
				Siemens Martin Grade	High Strength Grade	Extra High Strength Grade	Utilities or Specification Grade	A	B	C
3	1/4	.120	116.7	—	—	—	3150	.85	1.7	2.55
3	1/4	.120	116.7	—	—	—	4500	.85	1.7	2.55
3	5/16	.145	170.6	—	—	—	6500	.9	1.8	2.7
3	3/8	.165	220.3	—	—	—	8500	.9	1.8	2.7
7	3/16	.065	80	—	—	—	2400 (2.2M) *	.5	1	1.5
7	1/4	.080	121	3150	4750	6650	6650 (6.6M) *	.6	1.2	1.8
7	5/16	.104	205	5350	8000	11200	—	.8	1.6	2.4
7	5/16	.109	225	—	—	—	6000 (6M) *	.8	1.6	2.4
7	3/8	.120	273	6950	10800	15400	11500 (10M) *	.85	1.7	2.55
7	7/16	.145	399	9350	14500	20800	18000 (16M) *	.9	1.8	2.7
7	1/2	.165	517	12100	18800	26900	25000 (25M) *	.9	1.8	2.7

*The utilities grade used principally by communication and telephone industries

chnical Data—Galvanized Steel Strand

TM Specification A-475 is for guy wires and messenger cable. Welds in individual wires are allowed.

TM Specification A-363 is for zinc-coated steel overhead ground (static) wire. No welds are allowed in the individual wires.

ALVANIZED STEEL STRAND AVAILABLE IN 3 WEIGHTS OF ZINC COATING

LASS "A"—Standard Weight of Zinc Coating

LASS "B"—Twice the Zinc as Class "A"

LASS "C"—Three times the Zinc as Class "A"

lass A "Extra Galvanized" and "Double Galvanized" are Equivalent Terms

The Following Information required when ordering strand

) ENSION
ength
Diameter

(2) CONSTUCTION
Number of Wire per Strand
(3 or 7 Wires)

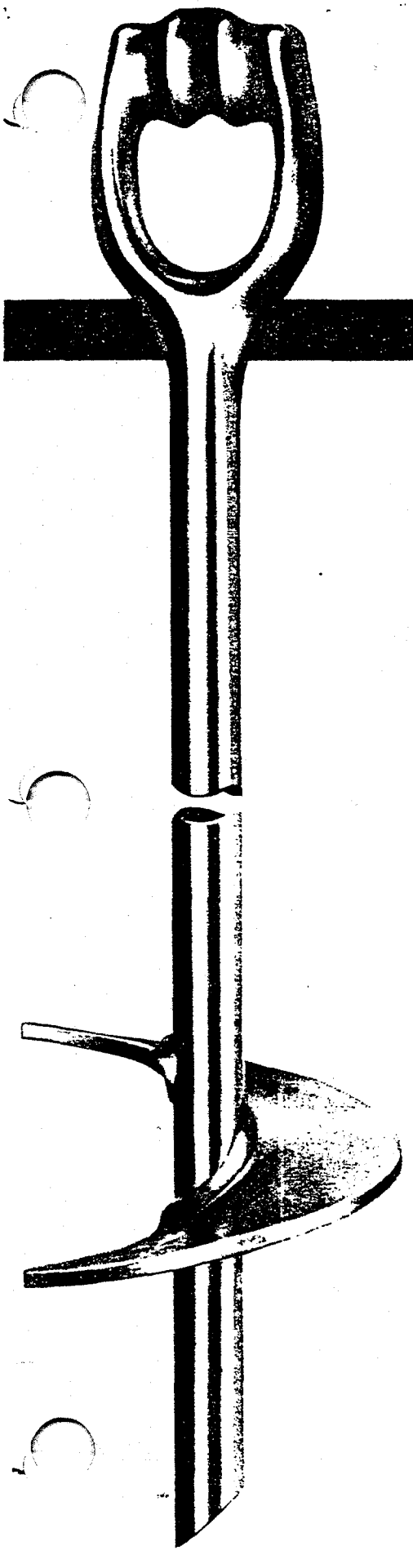
(3) TENSILE GRADE OF STRAND
Minimum Breaking Strength
Required

) ZINC COATING
Class "A", "B" or "C"

(5) PACKING
Coils or Reels
(Length)

(6) SPECIFICATION
ASTM Spec 475 or 363

ITEM 12



NO-WRENCH SCREW ANCHORS

Carolina Galvanizing Corp. No-Wrench Screw Anchors (type GSA), consisting of a single helix with triple-strand eye rod, are manufactured from high-strength steel to resist deformation of the rod due to torque. The large triple-strand eye opening accepts a turning bar for manual installation, or the anchor may be power driven using most available adapters.

Each anchor consists of a forged triple-strand eye with a single helix welded to the rod. Entire assembly is then hot-dip galvanized for corrosion resistance.

CATALOG NUMBER	ROD DIA. (IN.)	HELIX DIA. (IN.)	OVERALL LENGTH (IN.)	HELIX THICKNESS (IN.)	WT. LBS. PER 100
GSA 3454-4	¾	4	54	¼	800
GSA 3466-6	¾	6	66	¼	1,090
GSA 4466-8	1	8	66	¼	1,900
GSA 5466-10	1¼	10	66	¼	3,000
GSA 5496-10	1¼	10	96	¼	4,100
GSA 5496	1¼	14	96	⅜	5,200

ITEM # _____

SECTION _____

PARAGRAPH _____

CAROLINA GALVANIZING UTILITY PRODUCTS DIVISION

P.O. Box 487 • Aberdeen, NC 28315
Call Toll Free 1-800-476-2156. In NC 919-944-2171.
FAX Number 919-944-2511 ..... Telex 802804.

ITEM 12

ERITECH®, INC.

A SUBSIDIARY OF ERICO INTERNATIONAL CORP.

Post-it™ brand fax transmittal memo 7671	# of pages ▸
To James	From GEORGE
Co. ERI	Co. Rigby
Dept.	Phone #
Fax #	Fax #

April 27, 1994

Mr. George Robbins
Rigby Electric
117 Coeco Circle
P.O. Box 2068
Rocky Mount, N.C. 27804-2068

Re: Soil anchor holding strength for Eritech anchors

Dear George:

Enclosed is the application information on our screw anchor system. If I can be of service please call me at 910-944-4147.

Sincerely,

Jarvis Daniel

cc: L. Fisher
C. O'Mahoney
J. Schabel

Carolina Industrial Park, P.O. Box 487, Aberdeen, NC 28315 • 1-800-476-2156 / 910-944-3355 / Fax: 910-944-2511

ITEM 12

ERITECH®, INC.

SUBSIDIARY OF ERICO INTERNATIONAL CORP.

APPLICATION INFORMATION

Anchor Size Dia.	Rod Dia. and Overall Length	Soil-Anchor Holding Strength — Lbs.* Over 600 In.-Lbs. (Class 2)	500-600 In.-Lbs. (Class 3)	400-500 In.-Lbs. (Class 4)	300-400 In.-Lbs. (Class 5)	200-300 In.-Lbs. (Class 6)	← Soil Test Probe Value ← Soil Class
8"	½" x 7'	7,800†	7,800†	7,800†	7,800†	7,800†	
8"	⅝" x 7'	12,000†	12,000†	12,000†	12,000†	12,000†	
8"	¾" x 7'	20,000†	20,000†	19,000	16,000	13,000	
8"	1" x 7'	25,000	22,000	19,000	16,000	13,000	NOTE
10"	½" x 7'	7,800†	7,800†	7,800†	7,800†	7,800†	See Page 4-3
10"	⅝" x 7'	12,000†	12,000†	12,000†	12,000†	12,000†	For Soil
10"	¾" x 7'	20,000†	20,000†	20,000†	18,000	14,000	Class De-
10"	1" x 7'	28,000	25,000	21,000	18,000	14,000	scription
11¼"	½" x 7'	7,800†	7,800†	7,800†	7,800†	7,800†	and Relationship
11¼"	⅝" x 7'	12,000†	12,000†	12,000†	12,000†	12,000†	to Soil
11¼"	¾" x 7'	20,000†	20,000†	20,000†	20,000†	18,000	Test Probe
11¼"	1" x 7'	32,000	28,000	24,000	21,000	18,000	Values
2 - 8"	¾" x 7'	20,000†	20,000†	20,000†	20,000†	20,000†	
2 - 8"	1" x 7'	36,000†	32,000	30,000	25,000	21,000	
2 - 10"	1" x 7'	36,000†	36,000†	32,000	29,000	23,000	

Carolina Industrial Park, P.O. Box 487, Aberdeen, NC 28315 • 1-800-476-2156 / 919-944-3355 / Fax: 919-944-2511

Item 12

ERITECH®, INC.
A SUBSIDIARY OF ERICO INTERNATIONAL CORP.

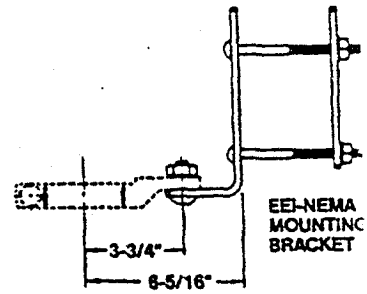
SOIL CLASSIFICATION DATA

CLASS	DESCRIPTION OF SOIL	PROBE VALUE
1	Solid Bed Rock	------
2	Dense Clay; Compact Gravel; Dense Fine Sand; Laminated Rock; Slate; Schist; Sandstone	Over 600 in.-lbs.
3	Shale; Broken Bed Rock; Hardpan; Compact, Clay-Gravel Mixtures	500-600 in.-lbs.
4	Gravel, Compact Gravel and Sand; Claypan	400-500 in.-lbs.
5	Medium-Firm Clay; Loose Sand and Gravel; Compact Coarse Sand	300-400 in.-lbs.
6*	Soft-Plastic Clay; Loose Coarse Sand; Clayey Silt; Compact Fine Sand	200-300 in.-lbs.
7	Fill; Loose Fine Sand; Wet Clays; Silt	100-200 in.-lbs.
8**	Swamp; Marsh; Saturated Silt; Humus	Under 100 in.- lbs.

*Includes areas only seasonally wet with slow drain as in fairly flat terrain.
**Install anchors deep enough, by the use of extensions, to penetrate a Class 5, 6, or 7 underlying the Class 8 Soil.

Carolina Industrial Park, P.O. Box 487, Aberdeen, NC 28315 • 1-800-476-2156 / 919-944-3355 / Fax: 919-944-2511

"Q" Series Normal Duty Distribution Class Surge Arresters 3–27kV (continued)



MOUNTING BRACKETS

"Q" arresters are shipped complete with a standard NEMA Type "A" bracket for crossarm or pole mounting. A wide variety of transformer mounting brackets are also available.

PROTECTIVE CHARACTERISTICS

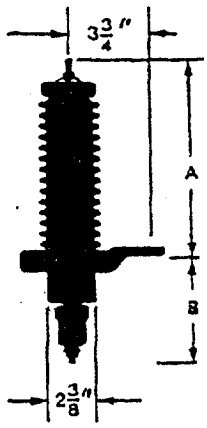
kv Rating	Maximum Impulse Sparkover Voltage (kV)				Maximum Discharge Voltage (kV)†					
	Front-of-Wave*		Full Wave (1.2/50μs)		1.5kA	3kA	5kA	10kA	20kA	65kA
	Direct Connected	Externally Gapped	Direct Connected	Externally Gapped						
3	20	38	19	37	9.7	11	12	13	14.6	18
6	35	57	33	55	19.5	22	24	26	29.5	36
9/10	45	76	43	63	29	33	36	39	44	54
12	60	96	57	85	39	44	48	52	59	72
15	70	115	65	100	48.5	55	60	65	73.5	90
18	85	133	76	118	58	66	72	78	88	108
21	90	139	78	123	68	75	80.5	90	103	126
24	92	142	82	127	64	72	78	86	97	118
27	108	158	95	136	72	80	85	96	107	132

*Obtained as per ANSI C62.1-1981, wave rising at 25kV/microsecond per 3kV rating.
†8/20 microsecond current impulse.

DIRECT CONNECTED (QL* AND QS TYPE)

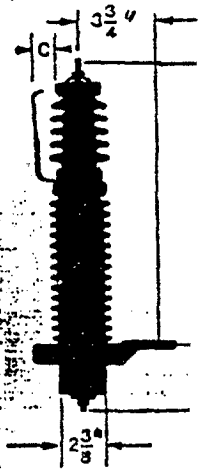
Catalog Number	kV Rating	Dimensions (Inches)			Nominal Strike (Inches)	Nominal Creepage (Inches)	Approx. Shipping Weight (Lbs.)
		A	B	Length (A+B)			
J9211-QS or QL	3	4.06	4.81	8.88	1.88	3.03	6.5
J9221-QS or QL	6	6.06	5.56	11.63	3.88	6.18	8.5
J9231-QS or QL	9/10	8.06	6.19	14.25	6.88	10.89	9
J9241-QS or QL	12	10.56	6.56	17.13	8.38	13.24	10
J9251-QS or QL	15	12.56	7.31	19.88	10.38	16.38	11
J9261-QS or QL	18	14.13	7.94	22.06	11.88	18.74	13
J9271-QS or QL	21	16.56	7.88	24.44	14.38	22.67	14
J9273-QS24 or QL24	24	17.94	8.38	26.31	16.38	25.81	15
J9273-QS27 or QL27	27	17.94	8.38	26.31	16.38	25.81	15.4

*"QL" type arresters include line side wildlife protection and an 18" insulated line lead, No. 6 AWG 19 strand copper.

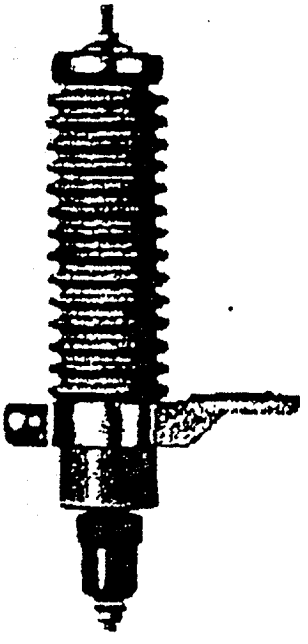


EXTERNALLY GAPPED (QG TYPE)

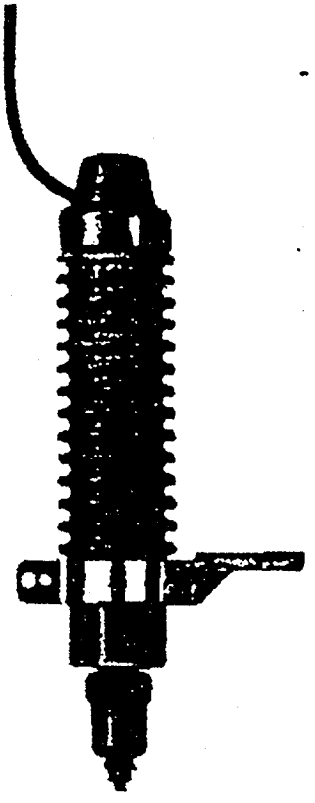
Catalog Number	kV Rating	Dimensions (Inches)				Strike (Inches)	External Creepage (Inches)	Approx. Shipping Weight (Lbs.)
		A	B	C	Length (A+B)			
J9211-QG	3	7.56	3.06	.25	10.62	4.50	8.03	8
J9221-QG	6	9.56	3.81	.38	13.38	6.88	11.18	9.5
J9231-QG	9/10	12.81	3.50	.50	16.31	10.75	19.08	11
J9241-QG	12	15.31	4.81	.63	20.12	12.25	21.36	14
J9251-QG	15	17.93	5.56	.75	23.50	14.88	27.38	15.5
J9261-QG	18	19.50	6.19	.88	25.70	16.38	28.93	16
J9271-QG	21	21.93	6.13	1	28.06	18.88	32.67	17



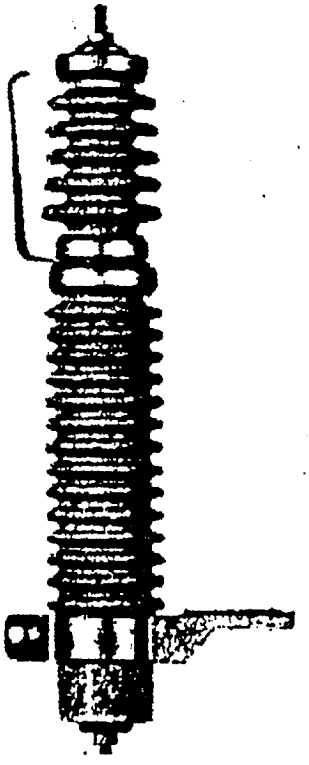
DESIGN TEST DATA AND CERTIFICATION FOR THE JOSLYN Q-TYPE DISTRIBUTION CLASS SURGE ARRESTER



J9231-QS
Stud Type "QS"



J9231-QL
Line Lead "QL"



J9231-QG
Externally Gapped "Q"

9/10kV "Q" TYPE ARRESTERS

The tests and recorded data presented herein were obtained in accordance with the following applicable Standards:

ANSI	C62.1 - 1981
IEEE	Std. 28 - 1981
NEMA	LA1 - 1976
ANSI	C68.1 - 1968
ANSI	C62.2 - 1981

Certified by:

Richard D. Noble
R.D. Noble
Project Engineer

Joseph C. Osterhout
J. C. Osterhout
Engineering Manager

Joslyn Mfg. and Supply Co.
Electrical Apparatus Division
969 West 37th Place
Chicago, Illinois 60609

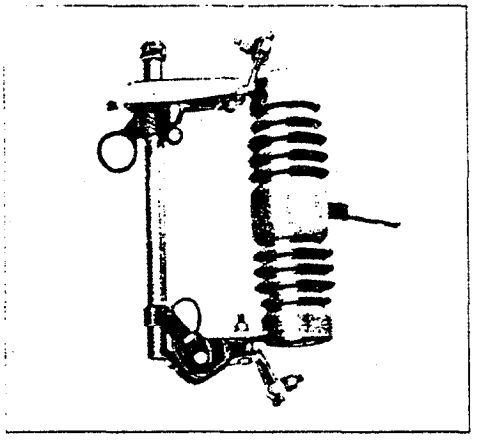
Revised November, 1984

Item 14

ABB
ASEA BROWN BOVERI

Type NCX Non-Loadbreak

7.8/15 kV Through 38 kV
100, 200 and 300 Amperes Up to 20,000 Amps Interrupting Capacity (ASYM)



Application

The NCX is designed to provide overcurrent protection for equipment that may be damaged by system overload or fault conditions. This cutout meets or exceeds all applicable EEI, NEMA, and ANSI standards.

In addition, the NCX offers the user a long list of features which result in:

- Application flexibility
- Outstanding performance
- Ease of installation
- Trouble-free operation
- Long life

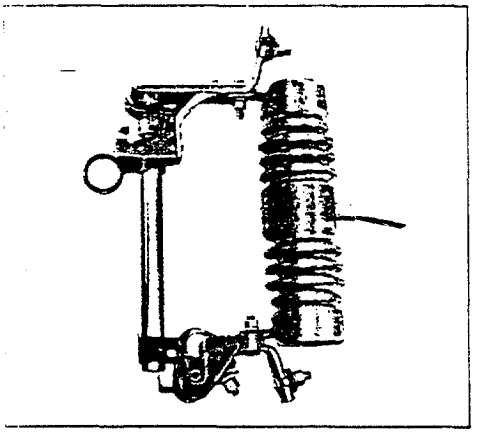
The NCX is offered in several frame sizes to properly match each system BIL.

Each fuse support has "universal" contacts that accommodate a 100A fuseholder, a 200A fuseholder or a 300A disconnect blade.

Each NCX cutout is also equipped with hooks for use with a portable loadbreak tool. This allows the NCX to be used as a loadbreak switch with the tool should there be the need to open the circuit with load current flowing.

Type ICX Interchangeable

15 kV Through 38 kV
100, 200, and 300 Amperes Up to 16,000 Amps Interrupting Capacity (ASYM)



Application

The ICX interchangeable cutout is designed for use on the overhead distribution system. It may be used to provide overcurrent protection, to provide visible indication of fuse operation, to provide a visible break sectionalizing point for maintenance personnel, and as a loadbreak switch when used in conjunction with a portable loadbreak tool.

The ICX cutout is offered in three frame (BIL) sizes. Each of these frames accommodate fuseholders with various ratings. The ICX fusetube is made of a fiber liner with a high strength filament wound outer wrap. All ratings are accomplished by expelling gases during interruption from the bottom of the fusetube. For the highest interrupting rating a link extender rod is attached to the fusetube cap to improve the efficiency of gas expulsion and arc interruption. Fusetubes with more than one rating are clearly labeled to indicate each interrupting capability. This minimizes the number of styles that must be stocked by providing the broadest range of application flexibility.

Interchangeability
The ICX cutout is designed to be electrically and mechanically interchangeable with the S&C Type "XS" and A.B. Chance Type "C" cutouts. Testing has confirmed the performance of the ICX fuseholder and fuse support with these cutouts.

Standards and Design Testing
The ICX cutout meets or exceeds all applicable requirements of EEI, NEMA, and ANSI standards.

Type LBU-II Loadbreak

7.8/15 kV Through 34.5 kV
100, 200 and 3000 Amperes Up to 20,000 Amps Interrupting Capacity (ASYM)

Application

The LBU-II performs as an outdoor loadbreak switch as well as a fused cutout for distribution systems. Loadbreak interruption is accomplished by means of a self-contained loadbreak arc chute which confines the arc and provides a deionizing action.

The LBU-II can successfully switch currents as high as 300 amps at 15 kV and 50 amps at 27 kV. It has fault interrupting capacities as high as 20,000 amps RMS asymmetrical.

The self-contained loadbreak concept enables the lineman to interrupt load current by means of a simple hookstick operation. Very little training is required to insure proper operating technique and no special tools are required.

Capacitor Banks
The LBU-II provides overcurrent protection for capacitor banks and gives visible indication that the equipment is energized. It also provides a convenient and inexpensive switch capable of interrupting capacitor currents.

Transformer Bank Switching
The LBU-II can be used for switching the magnetizing currents of transformer banks both single and three phase.

Sectionalizing
The LBU-II provides a convenient method of sectionalizing single and three phase, loop or lateral lines during maintenance or under contingency conditions.

Transition Pole
The LBU-II provides a way to switch the capacitive currents associated with the underground feeder cables at the transition pole.

Description

Standard Features

Cutout fuse supports have:

- Jointless current path – one piece copper current path from fuseholder contacts to terminal connectors.
- Silver-to-silver contacts (top and botton) – all contacts are silver plated.
- Painted glass filament wound fusetubes are used at all rating.
- Copper alloy castings are used on fusetubes and bottom supports.
- Interchangeable fusetubes with other manufacturers. The ABB ICX fusetube design is mechanically interchangeable with the S&C Type XS cutout, along with the Chance Type C cutout (within the same voltage class).
- Choice of terminal connectors – tin plated for use with aluminum or copper cable.
  Parallel Groove – cable size from No. 8 to 4/0 ACSR or 250 MCM.
  Large Eyebolt – cable size from No. 6 to 4/0 ACSR or 250 MCM.
  Small Eyebolt – cable size from No. 8 to 2/0 Stranded.
- Solid porcelain insulators with cemented (potted) steel rods on top, bottom and back.

Four Sizes Are Offered:

BIL	Creepage Distance	
110	9.1 inches	231 millimeters
125	12.8 inches	323 millimeters
150	18.0 inches	457 millimeters
170	26.2 inches	666 millimeters

- Common fuse support used at each voltage rating allowing complete interchangeability of 100 amp and 200 amp fuseholders; and 300 Amp disconnect blade.

Voltage Rating

Both slant rated and full rated cutouts are offered.

Slant Rated; Example: 7.8/15 kV

Used for applications on single phase circuits having maximum line-to-ground voltage not in excess of the value shown to the left of the diagonal line. For three phase grounded WYE circuits the maximum line-to-line voltage should not exceed the value shown to the right of the diagonal line.

Full Rated; Example: 15 kV

Used on all three phase systems having system maximum operating voltage (line-to-line) less than or equal to the cutout maximum design voltage.

Interrupting Rating

All cutout interrupting ratings are listed in amperes, RMS asymmetrical and substantiated in accordance with ANSI standard C37.41-1981 and NEMA SG-2-1986.

The interrupting rating on slant rated cutouts is established at the voltage listed to the left of the diagonal. Interrupting rating on full rated cutouts is established at the maximum design voltage of the cutout.

Selector Guide

Type NCX

Loadbreak design with hooks as standard feature for use with portable loadbreak tool.

Ratings				Type Cap on Fuseholder	Style Numbers			
Voltage		Current			Parallel Groove Terminal		Eyebolt Terminal	Replacement Fuseholder Style Number
Nominal kV	BIL kV	Cont. Amps	Interrupting RMS Asym.		With NEMA Bracket	Without NEMA Bracket	With NEMA Bracket	
7.8/15	110	100	12,000	Solid	279C601A03	279C601A28	279C602A03	279C606A03
7.8/15	110	100	20,000	Exp.	279C601A04	279C601A29	279C602A04	279C606A04
7.8/15	110	200	12,000	Solid	279C601A05	279C601A30	279C602A05	279C606A05
7.8/15	110	200	20,000	Barrel Exp.	279C601A06	279C601A31	279C602A06	279C606A06
15	110	100	10,000	Solid	279C601A10	279C601A35	279C602A10	279C606A10
15	110	100	16,000	Exp.	279C601A11	279C601A36	279C602A11	279C606A11
15	110	200	8,000	Solid	279C601A12	279C601A37	279C602A12	279C606A12
15	110	200	10,000	Link Ext.	499C151A23	4991C51A24	4991C51A30	279C606A30
15	110	200	12,000	Barrel Exp.	279C601A13	279C601A38	279C602A13	279C606A13
15	110	300	Disconnect	.....	279C601A14	279C601A39	279C602A14	279C606A14
15/27	125	100	10,000	Solid	279C601A17	279C601A42	279C602A17	279C606A17
15/27	125	100	16,000	Exp.	279C601A18	279C601A43	279C602A18	279C606A18
15/27	125	200	10,000	Solid	279C601A19	279C601A44	279C602A19	279C606A19
20/34.5	150	100	6,000	Solid	279C601A22	4986C51A35	4986C51A37	279C606A22
20/34.5	150	100	12,000	Exp.	279C601A23	279C601A48	279C602A23	279C606A23
20/34.5	150	100	12,000	Link Ext.	4991C51A25	4991C51A32	4991C51A34	279C606A31
20/34.5	170	100	12,000	Link Ext.	4991C51A26	4991C51A33	4991C51A35	279C606A32
27	125	100	6,000	Solid	279C601A24	279C601A50	279C602A24	279C606A24
27	125	100	12,000	Exp.	5482C66A20	5482C66A21	5482C66A22	279C606A53
27	125	100	12,000	Link Ext.	4991C51A02	4991C51A04	4991C51A05	279C606A25
27	170	100	12,000	Link Ext.	4991C51A20	4991C51A37	4991C51A38	279C606A35
27	125	300	Disconnect		279C601A58	4986C51A58	4986C51A34	279C606A21
38	150	100	2,000	Solid	279C601A56	4986C51A33	4986C51A31	279C606A40
[illegible]	150	100	10,000①	Link Ext.	7191C90A55	7191C90A56	.....	.....
	150	300	Disconnect	.....	279C601A59	4986C51A59	4986C51A32	268C606A21

① Passed 38 kV single shot rating of 12,000 amperes RMS asymmetrical.

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Selector Guide (Cont.)

Type LBU-II

Self contained loadbreak design operated with standard hookstick.

Ratings				Type Cap on Fuse-holder	Style Numbers			
Voltage		Current			Parallel Groove Terminal		Eyebolt Terminal	Replacement Fuseholder Style Number
Nominal kV	BIL kV	Continuous and Loadbreak Amps	Interrupting RMS Asym.		With NEMA Bracket	Without NEMA Bracket	With NEMA Bracket	
7.8/15	110	100	12,000	Solid	279C790A03	279C790A38	279C789A03	278C310A03
7.8/15	110	100	20,000	Barrel Exp.	279C790A04	279C790A32	279C789A04	278C310A04
7.8/15	110	200	12,000	Solid	279C790A05	279C790A07	279C789A05	278C310A05
7.8/15	110	200	20,000	Barrel Exp.	279C790A06	279C790A39	279C789A06	278C310A06
15	110	100	10,000	Solid	279C790A10	279C789A48	279C789A10	278C310A10
15	110	100	16,000	Barrel Exp.	279C790A11	279C790A34	279C789A11	278C310A11
15	110	200	8,000	Solid	279C790A12	279C789A49	279C789A12	278C310A12
15	110	200	10,000	Link Ext.	4992C85A23	4992C85A24	4992C85A25	278C310A30
15	110	200	12,000	Barrel Exp.	279C790A13	279C790A43	279C789A13	278C310A13
15	110	300	Disconnect	.....	279C790A14	279C790A53	279C789A14	278C310A14
15/27	125	100	10,000	Solid	279C790A17	279C790A35	279C789A17	278C310A17
15/27	125	100	16,000	Barrel Exp.	279C790A18	279C790A36	279C789A18	278C310A18
15/27	125	200	10,000	Solid	279C790A19	279C789A46	279C789A19	278C310A19
15/27	125	300	Disconnect	.....	279C790A21	279C789A47	279C789A21	278C310A21
20/34.5	150	100	6,000	Solid	279C790A22	279C789A44	279C789A22	278C310A22
20/34.5	150	100	12,000	Barrel Exp.	279C790A23	279C790A49	279C789A23	278C310A23
20/34.5	150	100	12,000	Link Ext.	4992C85A27	4992C85A29	4992C85A31	278C310A31
20/34.5	170	100	12,000	Link Ext.	4992C85A28	4992C85A30	4992C85A32	278C310A32
20/34.5	150	300/100②	Disconnect	.....	279C790A27	279C789A45	279C789A27	278C310A33
27	125	100/50①	6,000	Solid	279C790A24	279C790A63	279C789A24	278C310A24
27	125	100/50①	12,000	Barrel Exp.	4986C49A07	4986C49A08	4986C49A09	278C310A53
27	125	100/50①	12,000	Link Ext.	4992C85A02	4992C85A04	4992C85A05	278C310A26
27	170	100/50①	12,000	Link Ext.	4992C85A33	4992C85A34	4992C85A35	278C310A27
27	125	300/50①	Disconnect	.....	279C790A26	279C790A64	279C789A26	278C310A34

① 50 amp loadbreak rating on LBU-II fuseholder rated 27 kV.
② 100 amp loadbreak rating on LBU-II fuseholder rated 20/34.5 kV.

Type ICX

Non loadbreak interchangeable design.

Ratings				Type Cap on Fuse-holder	Style Numbers		
Voltage		Current			With NEMA Bracket	Replacement Fuseholder W/Cap	Cap or Link Extender Sold Separately
Nominal kV	BIL kV	Cont. Amps	Interrupting RMS Asym.			Style Number	Style Number
15	110	100	10,000	Solid	X1NCANAA11	7194C60G01	9858A70H01
15	110	100	16,000	Link Ext.	X1NCBNLA11	7194C60G02	9861A62G01
7.8①③	110	200	12,000	Link Ext.	X1NCBNPA21	7194C60G03	9861A62G03
15	110	300	Disconnect	.....	X1NCANCA31	7194C60G04	.....
27②	125	100	8,000	Solid	X2NCBNAA12	7194C60G05	9858A70H01
27②④	125	100	12,000	Link Ext.	X2NCBNMA12	7194C60G06	9861A62G02
15①	125	200	10,000	Solid	X2NCBNBA22	7194C60G07	9858A71H01
27	125	300	Disconnect	.....	X2NCBNDA32	7194C60G08	.....
27②	150	100	8,000	Solid	X5NCBNAA12	7194C60G05	9858A70H01
27②④	150	100	12,000	Link Ext.	X5NCBNMA12	7194C60G06	9861A62G02
15①	150	200	10,000	Solid	X5NCBNBA22	7194C60G07	9858A71H01
38	150	300	Disconnect	.....	X5NCBNDA32	7194C60G08	.....
27②	170	100	12,000	Link Ext.	X7NCBNMA12	7194C60G09	9861A62G04
38	170	300	Disconnect	.....	X7NCBNDA32	7194C60G10	.....

① For application on systems where phase-to-phase voltage does not exceed design voltage or on grounded systems where phase-to-neutral voltage does not exceed design voltage.
② May also be applied on 38 kV grounded systems at the same ratings.
③ Passed 7.8 kV single shot rating of 16,000 Amperes RMS Asymmetrical.
④ Passed 27 kV single shot rating of 16,000 Amperes RMS Asymmetrical and 7.8 kV single shot rating of 20,000 Amperes RMS Asymmetrical.

Standard style number includes standard NEMA cross-arm bracket and tin plated parallel groove connectors for use with aluminum or copper cable. To order cutout without bracket, change the 5th digit of the style number to an "N". To order cutout with large eyebolt terminal (#6 SOL through 250 MCM), change the 4th digit of the style number to an "E". To order cutout with small eyebolt terminal (#8 SOL through 2/0 STND), change the 4th digit of the style number to a "G". To order cutout packed in a combination carton suitable for the addition of a lightning arrester, change the 6th digit to a "W".

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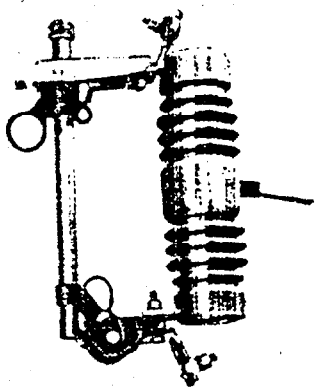
Type NCX Non-Loadbreak

7.8/15 kV Through 38 kV
100, 200 and 300 Amperes Up to 20,000 Amps Interrupting Capacity (ASYM)



Application

The NCX is designed to provide overcurrent protection for equipment that may be damaged by system overload or fault conditions. This cutout meets or exceeds all applicable EEI, NEMA, and ANSI standards.

In addition, the NCX offers the user a long list of features which result in:
- Application flexibility
- Outstanding performance
- Ease of installation
- Trouble-free operation
- Long life

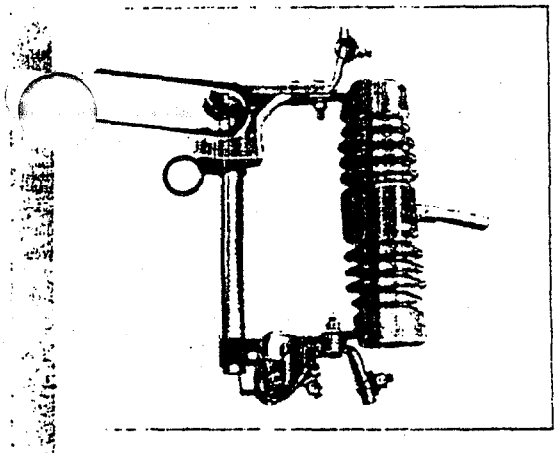
The NCX is offered in several frame sizes to properly match each system BIL.

Each fuse support has "universal" contacts that accommodate a 100A fuseholder, a 200A fuseholder or a 300A disconnect blade.

Each NCX cutout is also equipped with hooks for use with a portable loadbreak tool. This allows the NCX to be used as a loadbreak switch with the tool should there be the need to open the circuit with load current flowing.

Type ICX Interchangeable

15 kV Through 38 kV
100, 200, and 300 Amperes Up to 16,000 Amps Interrupting Capacity (ASYM)



Application

The ICX interchangeable cutout is designed for use on the overhead distribution system. It may be used to provide overcurrent protection, to provide visible indication of fuse operation, to provide a visible break sectionalizing point for maintenance personnel, and as a loadbreak switch when used in conjunction with a portable loadbreak tool.

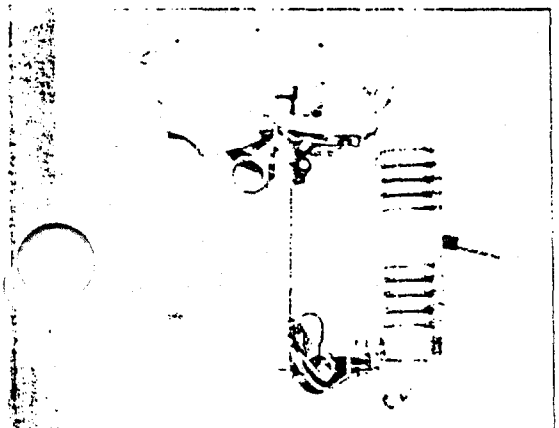
The ICX cutout is offered in three frame (BIL) sizes. Each of these frames accommodate fuseholders with various ratings. The ICX fusetube is made of a fiber liner with a high strength filament wound outer wrap. All ratings are accomplished by expelling gases during interruption from the bottom of the fusetube. For the highest interrupting rating a link extender rod is attached to the fusetube cap to improve the efficiency of gas expulsion and arc interruption. Fusetubes with more than one rating are clearly labeled to indicate each interrupting capability. This minimizes the number of styles that must be stocked by providing the broadest range of application flexibility.

Interchangeability
The ICX cutout is designed to be electrically and mechanically interchangeable with the S&C Type "XS" and A.B. Chance Type "C" cutouts. Testing has confirmed the performance of the ICX fuseholder and fuse support with these cutouts.

Standards and Design Testing
The ICX cutout meets or exceeds all applicable requirements of EEI, NEMA, and ANSI standards.

Type LBU-II Loadbreak

7.8/15 kV Through 34.5 kV
100, 200 and 3000 Amperes Up to 20,000 Amps Interrupting Capacity (ASYM)



Application

The LBU-II performs as an outdoor loadbreak switch as well as a fused cutout for distribution systems. Loadbreak interruption is accomplished by means of a self-contained loadbreak arc chute which confines the arc and provides a deionizing action.

The LBU-II can successfully switch currents as high as 300 amps at 15 kV and 50 amps at 27 kV. It has fault interrupting capacities as high as 20,000 amps RMS asymmetrical.

The self-contained loadbreak concept enables the lineman to interrupt load current by means of a simple hookstick operation. Very little training is required to insure proper operating technique and no special tools are required.

Capacitor Banks
The LBU-II provides overcurrent protection for capacitor banks and gives visible indication that the equipment is energized. It also provides a convenient and inexpensive switch capable of interrupting capacitor currents.

Transformer Bank Switching
The LBU-II can be used for switching the magnetizing currents of transformer banks both single and three phase.

Sectionalizing
The LBU-II provides a convenient method of sectionalizing single and three phase, loop or lateral lines during maintenance or under contingency conditions.

Transition Pole
The LBU-II provides a way to switch the capacitive currents associated with the underground feeder cables at the transition pole.

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Description

Standard Features

Cutout fuse supports have:

- Jointless current path – one piece copper current path from fuseholder contacts to terminal connectors.
- Silver-to-silver contacts (top and botton) – all contacts are silver plated.
- Painted glass filament wound fusetubes are used at all rating.
- Copper alloy castings are used on fusetubes and bottom supports.
- Interchangeable fusetubes with other manufacturers. The ABB ICX fusetube design is mechanically interchangeable with the S&C Type XS cutout, along with the Chance Type C cutout (within the same voltage class).
- Choice of terminal connectors – tin plated for use with aluminum or copper cable.
  Parallel Groove – cable size from No. 8 to 4/0 ACSR or 250 MCM.
  Large Eyebolt – cable size from No. 6 to 4/0 ACSR or 250 MCM.
  Small Eyebolt – cable size from No. 8 to 2/0 Stranded.
- Solid porcelain insulators with cemented (potted) steel rods on top, bottom and back.

Four Sizes Are Offered:

BIL	Creepage Distance	
110	9.1 inches	231 millimeters
125	12.8 inches	323 millimeters
150	18.0 inches	457 millimeters
170	26.2 inches	666 millimeters

- Common fuse support used at each voltage rating allowing complete interchangeability of 100 amp and 200 amp fuseholders; and 300 Amp disconnect blade.

Voltage Rating

Both slant rated and full rated cutouts are offered.

Slant Rated; Example: 7.8/15 kV

Used for applications on single phase circuits having maximum line-to-ground voltage not in excess of the value shown to the left of the diagonal line. For three phase grounded WYE circuits the maximum line-to-line voltage should not exceed the value shown to the right of the diagonal line.

Full Rated; Example: 15 kV

Used on all three phase systems having system maximum operating voltage (line-to-line) less than or equal to the cutout maximum design voltage.

Interrupting Rating

All cutout interrupting ratings are listed in amperes, RMS asymmetrical and substantiated in accordance with ANSI standard C37.41-1981 and NEMA SG-2-1986.

The interrupting rating on slant rated cutouts is established at the voltage listed to the left of the diagonal. Interrupting rating on full rated cutouts is established at the maximum design voltage of the cutout.

Selector Guide

Type NCX

Loadbreak design with hooks as standard feature for use with portable loadbreak tool.

Ratings				Type Cap on Fuseholder	Style Numbers			
Voltage		Current			Parallel Groove Terminal		Eyebolt Terminal	Replacement Fuseholder Style Number
Nominal kV	BIL kV	Cont. Amps	Interrupting RMS Asym.		With NEMA Bracket	Without NEMA Bracket	With NEMA Bracket	
7.8/15	110	100	12,000	Solid	279C601A03	279C601A28	279C602A03	279C606A03
7.8/15	110	100	20,000	Exp.	279C601A04	279C601A29	279C602A04	279C606A04
7.8/15	110	200	12,000	Solid	279C601A05	279C601A30	279C602A05	279C606A05
7.8/15	110	200	20,000	Barrel Exp.	279C601A06	279C601A31	279C602A06	279C606A06
15	110	100	10,000	Solid	279C601A10	279C601A35	279C602A10	279C606A10
15	110	100	16,000	Exp.	279C601A11	279C601A36	279C602A11	279C606A11
15	110	200	8,000	Solid	279C601A12	279C601A37	279C602A12	279C606A12
15	110	200	10,000	Link Ext.	499C151A23	4991C51A24	4991C51A30	279C606A30
15	110	200	12,000	Barrel Exp.	279C601A13	279C601A38	279C602A13	279C606A13
15	110	300	Disconnect	.....	279C601A14	279C601A39	279C602A14	279C606A14
15/27	125	100	10,000	Solid	279C601A17	279C601A42	279C602A17	279C606A17
15/27	125	100	16,000	Exp.	279C601A18	279C601A43	279C602A18	279C606A18
15/27	125	200	10,000	Solid	279C601A19	279C601A44	279C602A19	279C606A19
20/34.5	150	100	6,000	Solid	279C601A22	4986C51A35	4986C51A37	279C606A22
20/34.5	150	100	12,000	Exp.	279C601A23	279C601A48	279C602A23	279C606A23
20/34.5	150	100	12,000	Link Ext.	4991C51A25	4991C51A32	4991C51A34	279C606A31
20/34.5	170	100	12,000	Link Ext.	4991C51A26	4991C51A33	4991C51A35	279C606A32
27	125	100	6,000	Solid	279C601A24	279C601A50	279C602A24	279C606A24
27	125	100	12,000	Exp.	5482C66A20	5482C66A21	5482C66A22	279C606A53
27	125	100	12,000	Link Ext.	4991C51A02	4991C51A04	4991C51A05	279C606A25
27	170	100	12,000	Link Ext.	4991C51A20	4991C51A37	4991C51A38	279C606A35
27	125	300	Disconnect		279C601A58	4986C51A58	4986C51A34	279C606A21
38	150	100	2,000	Solid	279C601A56	4986C51A33	4986C51A31	279C606A40
38	150	100	10,000①	Link Ext.	7191C90A55	7191C90A56	.....	.....
	150	300	Disconnect	.....	279C601A59	4986C51A59	4986C51A32	268C606A21

①ssed 38 kV single shot rating of 12,000 amperes RMS asymmetrical.

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ASEA BROWN BOVERI

Selector Guide (Cont.)

Type LBU-II

Oil contained loadbreak design operated with standard hookstick.

Ratings				Type Cap on Fuse-holder	Style Numbers			
Voltage		Current			Parallel Groove Terminal		Eyebolt Terminal	Replacement Fuseholder Style Number
Nominal kV	BIL kV	Continuous and Loadbreak Amps	Interrupting RMS Asym.		With NEMA Bracket	Without NEMA Bracket	With NEMA Bracket	
7.8/15	110	100	12,000	Solid	279C790A03	279C790A38	279C789A03	278C310A03
7.8/15	110	100	20,000	Barrel Exp.	279C790A04	279C790A32	279C789A04	278C310A04
7.8/15	110	200	12,000	Solid	279C790A05	279C790A07	279C789A05	278C310A05
7.8/15	110	200	20,000	Barrel Exp.	279C790A06	279C790A39	279C789A06	278C310A06
15	110	100	10,000	Solid	279C790A10	279C789A48	279C789A10	278C310A10
15	110	100	16,000	Barrel Exp.	279C790A11	279C790A34	279C789A11	278C310A11
15	110	200	8,000	Solid	279C790A12	279C789A49	279C789A12	278C310A12
15	110	200	10,000	Link Ext.	4992C85A23	4992C85A24	4992C85A25	278C310A30
15	110	200	12,000	Barrel Exp.	279C790A13	279C790A43	279C789A13	278C310A13
15	110	300	Disconnect	.....	279C790A14	279C790A53	279C789A14	278C310A14
15/27	125	100	10,000	Solid	279C790A17	279C790A35	279C789A17	278C310A17
15/27	125	100	16,000	Barrel Exp.	279C790A18	279C790A36	279C789A18	278C310A18
15/27	125	200	10,000	Solid	279C790A19	279C789A46	279C789A19	278C310A19
15/27	125	300	Disconnect	.....	279C790A21	279C789A47	279C789A21	278C310A21
20/34.5	150	100	6,000	Solid	279C790A22	279C789A44	279C789A22	278C310A22
20/34.5	150	100	12,000	Barrel Exp.	279C790A23	279C790A49	279C789A23	278C310A23
20/34.5	150	100	12,000	Link Ext.	4992C85A27	4992C85A29	4992C85A31	278C310A31
20/34.5	170	100	12,000	Link Ext.	4992C85A28	4992C85A30	4992C85A32	278C310A32
20/34.5	150	300/100②	Disconnect	.....	279C790A27	279C789A45	279C789A27	278C310A33
27	125	100/50①	6,000	Solid	279C790A24	279C790A63	279C789A24	278C310A24
27	125	100/50①	12,000	Barrel Exp.	4986C49A07	4986C49A08	4986C49A09	278C310A53
27	125	100/50①	12,000	Link Ext.	4992C85A02	4992C85A04	4992C85A05	278C310A26
27	170	100/50①	12,000	Link Ext.	4992C85A33	4992C85A34	4992C85A35	278C310A27
27	125	300/50①	Disconnect	.....	279C790A26	279C790A64	279C789A26	278C310A34

① 50 amp loadbreak rating on LBU-II fuseholder rated 27 kV.
② 100 amp loadbreak rating on LBU-II fuseholder rated 20/34.5 kV.

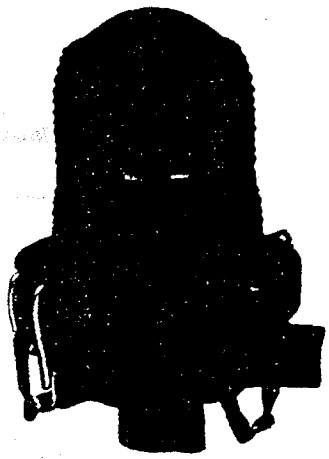
Type ICX

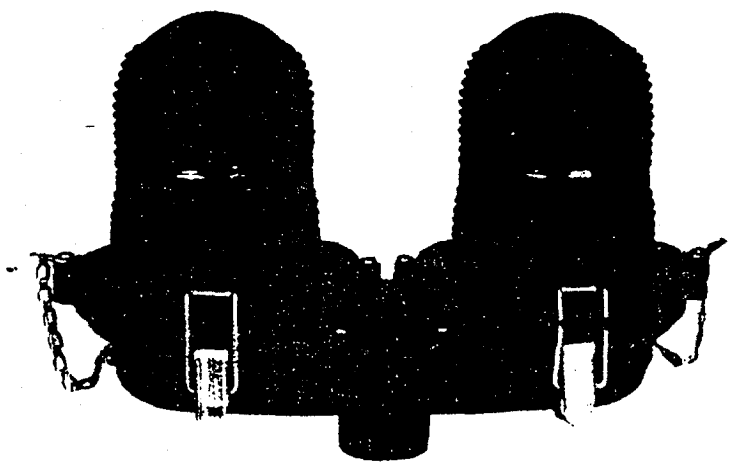
Non loadbreak interchangeable design.

Ratings				Type Cap on Fuse-holder	Style Numbers		
Voltage		Current			With NEMA Bracket	Replacement Fuseholder W/Cap	Cap or Link Extender Sold Separately
Nominal kV	BIL kV	Cont. Amps	Interrupting RMS Asym.			Style Number	Style Number
15	110	100	10,000	Solid	X1NCANAA11	7194C60G01	9858A70H01
15	110	100	16,000	Link Ext.	X1NCBNLA11	7194C60G02	9861A62G01
7.8①③	110	200	12,000	Link Ext.	X1NCBNPA21	7194C60G03	9861A62G03
15	110	300	Disconnect	.....	X1NCANCA31	7194C60G04	.....
27②	125	100	8,000	Solid	X2NCBNAA12	7194C60G05	9858A70H01
27②④	125	100	12,000	Link Ext.	X2NCBNMA12	7194C60G06	9861A62G02
15①	125	200	10,000	Solid	X2NCBNBA22	7194C60G07	9858A71H01
27	125	300	Disconnect	.....	X2NCBNDA32	7194C60G08	.....
27②	150	100	8,000	Solid	X5NCBNAA12	7194C60G05	9858A70H01
27②④	150	100	12,000	Link Ext.	X5NCBNMA12	7194C60G06	9861A62G02
15①	150	200	10,000	Solid	X5NCBNBA22	7194C60G07	9858A71H01
38	150	300	Disconnect	.....	X5NCBNDA32	7194C60G08	.....
27③	170	100	12,000	Link Ext.	X7NCBNMA12	7194C60G09	9861A62G04
38	170	300	Disconnect	.....	X7NCBNDA32	7194C60G10	.....

① For application on systems where phase-to-phase voltage does not exceed design voltage or on grounded systems where phase-to-neutral voltage does not exceed design voltage.
② May also be applied on 38 kV grounded systems at the same ratings.
③ Passed 7.8 kV single shot rating of 16,000 Amperes RMS Asymmetrical.
④ Passed 27 kV single shot rating of 16,000 Amperes RMS Asymmetrical and 7.8 kV single shot rating of 20,000 Amperes RMS Asymmetrical.

Standard style number includes standard NEMA cross-arm bracket and tin plated parallel groove connectors for use with aluminum or copper cable. To order cutout without bracket, change the 5th digit of the style number to an "N". To order cutout with large eyebolt terminal (#6 SOL through 250 MCM), change the 4th digit of the style number to an "E". To order cutout with small eyebolt terminal (#8 SOL through 2/0 STND), change the 4th digit of the style number to a "G". To order cutout packed in a combination carton suitable for the addition of a lightning arrester, change the 6th digit to a "W".





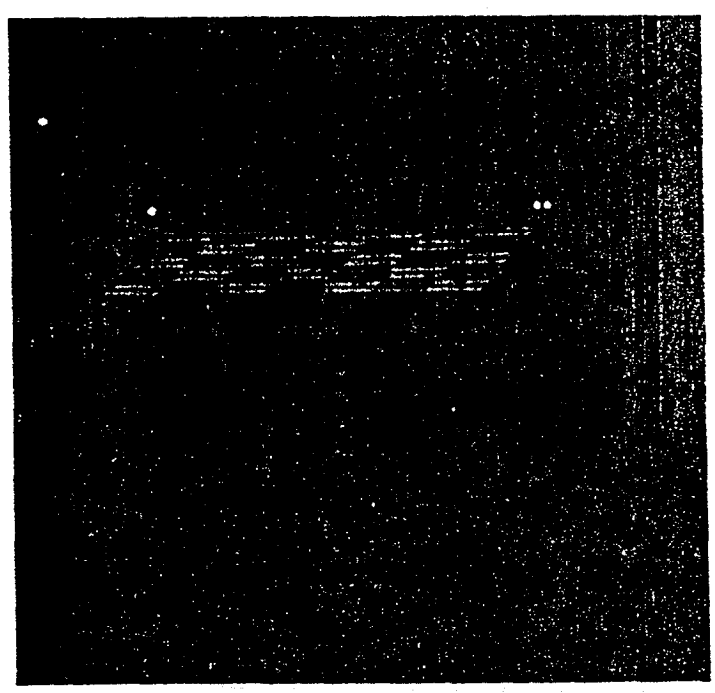
L-810

Obstruction Lights

The ADB-ALNACO, Inc. L-810 (FAA approved single and dual) steady burning red obstruction lights are used at airports to mark navigational boundaries and are also used in critical airways where obstructions present hazards to air navigation. The dual L-810 units are used along the edges of extended obstructions in conjunction with single L-810 units on the top of narrow obstructions.

The single or dual L-810 obstruction light fixtures can be equipped with a screw socket for use with a long-life 69W Class 1 or 100W/116W Class 2 lamp for use on parallel-powered 120 V ac lighting circuits, while for series lighting circuits the fixture can be supplied with a prefocused socket for a 45W/6.6 amp Class 1 lamp. An optional lamp-out relay is available for the dual 120 V ac fixture. The lamp-out relay switches power to the auxiliary lamp whenever the normally operating lamp fails.

The L-810 base and lens collar are constructed of light weight cast aluminum and painted International Orange. Two gaskets are used between the lens cap and the fixture base to insure a moisture-proof seal. Rapid lamp changes are facilitated by two spring latches which allow easy removal of the red lens cap from the base of the fixture. A brass safety chain is attached to the lens cap and the base of the fixture to prevent loss or breakage of the lens cap during relamping.



Technical Features and Characteristics

- Approved per FAA specification AC 150/5345-43, L-810
- All parts are corrosion resistant
- Optional lamp-out relay switches power to reserve lamp if the normally operating lamp fails—available only on dual 120 VAC fixtures.
- Units with lamp-out relay have an alarm terminal which can activate an alarm (user supplied) in case of a lamp failure.
- Mounting Hub:
  Three optional mounting ports are available for the dual L-810 with the lamp-out relay option:
  - standard bottom port (1-11½" normal pipe thread)
  - side port (1-11½" normal pipe thread)
  - side port (3/4-14" normal pipe thread)

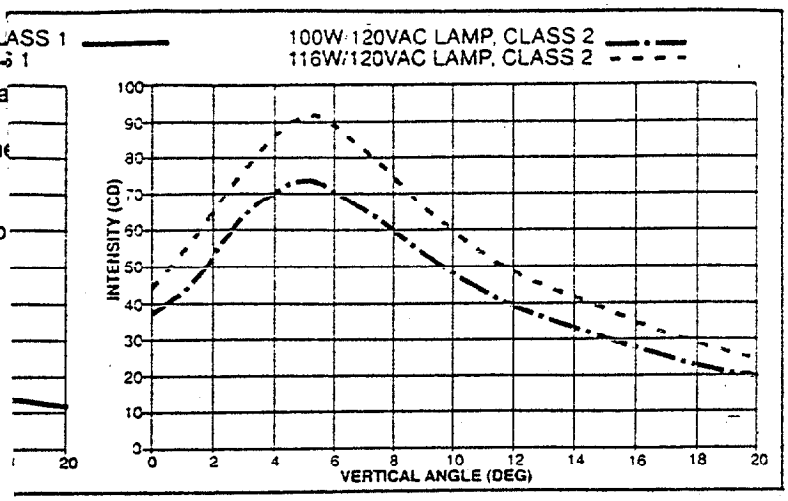
  Units without lamp-out relay option:
  - standard bottom port (1-11½" normal pipe thread)
- Optional Lamps: 45W, 6.6A Class 1
  69W, 120VAC Class 1
  100W, 120VAC Class 2
  116W, 120VAC Class 2
  100W, 220VAC Class 2
- Class 1 lamps have a peak intensity of 30-70 candelas. Class 2 lamps have a peak intensity of 71-150 candelas.
- Rated Lamp Life:
  120VAC lamps have a rated lamp life of 8000 h
  6.6A lamps have a rated lamp life of 1000 h
- Double gasket seal between lens cap and fixture base prevents moisture penetration.
- Two spring latches allow fast removal of the red lens cap from the base of the fixture for relamping—provides easy maintenance.

ADB ALNACO
ADB-ALNACO, INC.
A Siemens Company
977 Gahanna Parkway, Columbus Ohio 43230
TELEPHONE 614-861-1304 FAX 614-864-2069

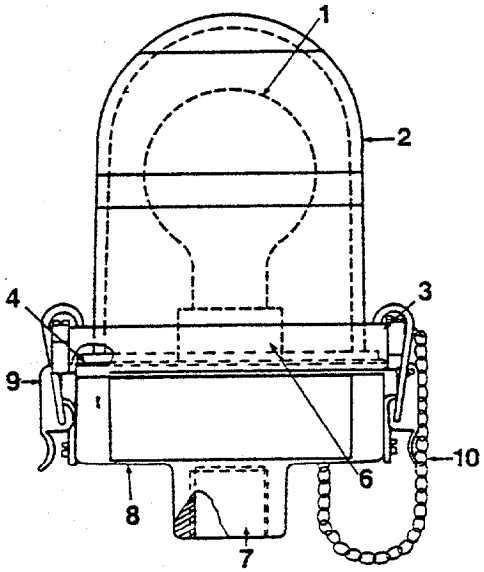
ITEM 15

Technical Features and Characteristics (continu

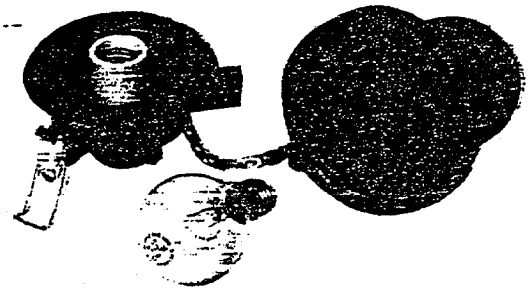
- A brass safety chain attached to the lens cap permits ha rapid lamp changes.
- Both single or dual units are available for use with eithe ac parallel-powered or 6.6 amp series lighting circuits.
- Environmental Operating Conditions:
  Temperature Extremes: −55°C to +55°C (−67°F to +130°F)
  Humidity: up to 95%
  Windspeeds: up to 150 mph (240 kph)



SINGLE L-810



1 Lamp (120 s)
2 Red Lens
3 Lens Colla
4 Gaskets
5 Lid
6 Socket
7 1" NPT Rel
8 Base
9 Lens Clam
10 Safety Cha



Beam Spread		Peak Intensity (candelas)
al s)	Vertical (degrees)	
	10 minimum 10 minimum	30-70 71-150

PART NUMBERS

L-810 Single/Dual Fixture Without Lamp-Out Relay

44C100X-X

- 1 = 120VAC Fixture With 69W Lamp (Class 1)
- 2 = 6.6A Fixture With 45W Lamp (Class 1)
- 3 = 120VAC Fixture Only (No Lamp(s))
- 4 = 6.6A Fixture Only (No Lamp(s))
- 5 = 120VAC Fixture With 100W Lamp (Class 2)
- 6 = 120VAC Fixture With 116W Lamp (Class 2)
- 8 = 220VAC Fixture With 100W Lamp (Class 2)

- 5 = Single Light Fixture
- 7 = Dual Light Fixture

L-810 Dual Light Fixture With Lamp-Out Relay

44C1532-X X 1 X

Port Size/Location*
1 = 1-11½" NPT Bottom Port (Standard)
2 = 1-11½" NPT Side Port (Special Order)
3 = 3/4-14" NPT Side Port (Special Order)

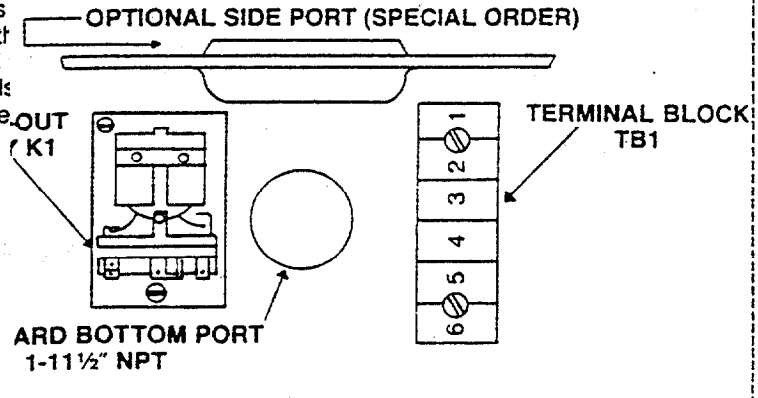
Includes Lamp?
0 = Fixture Without Lamps
1 = Fixture With Lamps

Lamp Wattage
1 = 69W/120VAC (Class 1)
2 = 100W/120VAC (Class 2)
3 = 116W/120VAC (Class 2)

* See figure below for port size/location

LAMP-OUT RELAY OPERATION:

120 V ac input power to the dual L-810 fixture energizes relay and the normally operating lamp #1. If lamp #1 fails, th relay is deenergized causing the 120 V ac to be switched the back-up lamp #2. At the same time, 120 V ac power is als switched to the alarm terminal which can be used to activate user-supplied alarm.



IOR CUTOUT VIEW OF BASE OF DUAL L-810 FIXTURE WITH LAMP-OUT RELAY

GENERAL ELECTRIC

3101 A2101H900F109

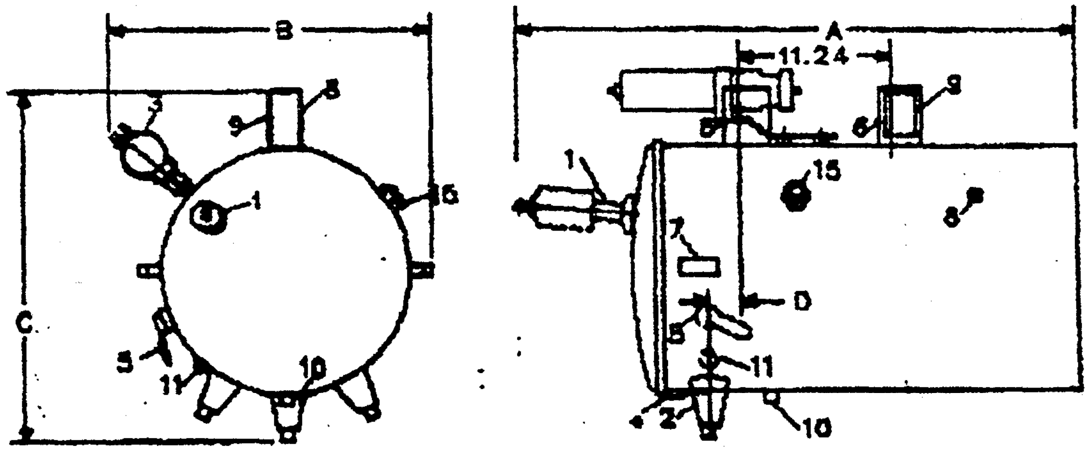
COST ON SH SH NO.

TITLE OUTLINE

DISTRIBUTION TRANSFORMER

FIRST MADE FOR DTBD

REV



1. HIGH VOLTAGE BUSHING WITH CLAMP TYPE TERMINAL FOR #8 TO #2 CABLE
2. LOW VOLTAGE BUSHING WITH CLAMP TYPE TERMINAL FOR #8 TO 4/0 CABLE
3. LIGHTNING ARRESTER.

5. CIRCUIT BREAKER HANDLE WITH EMERGENCY OVERLOAD DEVICE.
6. HANGER BRACKET.
7. LIFTING LUG.
8. TANK GROUND – .500–13 TAPPED HOLE (.56 DEEP)
9. NAMEPLATE.
10. LOW VOLTAGE GROUND.
11. SIGNAL LIGHT.

15. TAP CHANGER OPERATING CAP.

• COVER GROUND STRAP

A = 32.50
B = 22.00
C = 21.00
D = 2±.25

KVA – 10
BIL – 95

H5
RED
COPIES

MADE CALMA 01/20/93	APPROVALS	HICKORY	3101 A2101H900F109
ISSUED INTERACTIVE			COST ON SH SH NO.

DRW MODE | RPT REQD | ACT LAST | MODEL ON | PROJ ON | COMPUTING

Appendix E

Materials Approval

OHM Remediation
Services Corp.
A Subsidiary of OHM Corporation

January 19, 1996

Lt. Cheryl Hansen, AROICC
ROICC Jacksonville
1005 Michael Road
Camp Lejeune, N.C. 28542-2521

Re: Submission of Construction Materials for Approval
Delivery Order 87, Site 69 Power Line Construction
MCB Camp Lejeune - Contract N62470-93-D-3032

Dear Lt. Hansen:

Attached hereto please find four (4) copies of materials specifications for equipment proposed for the construction of permanent overhead power to Site 69. Our subcontractor, E & R, Inc., would like to start construction immediately following our pre-construction meeting tentatively scheduled for 1300 hours Wednesday, January 24, 1996.

OHM would sincerely appreciate your efforts in expediting the approval process to enable construction to proceed as planned. Thank you for your cooperation.

Yours truly,
OHM Remediation Services Corp.

James A. Dunn, Jr., P.E.
Senior Project Manager

PROPOSED PRODUCTS
ARE ACCEPTABLE

CODE 404
01/26/96

Appvd: C Hansen, LT, CEC, USN 1/30/96
NTR JAX NC AREA

5335 Triangle Parkway, Suite 450 ■ Norcross, Georgia 30092 ■ 404-729-3900

CONTRACTOR'S SUBMITTAL TRANSMITTAL

LANTDIV NORFOLK 4-4355/3 (Rev. 11-80)

CONTRACT NO.	TRANSMITTAL NO.	DATE
[illegible]	07	[illegible]

FROM CONTRACTOR: [illegible]

TO: [illegible] ROICC

PROJECT TITLE AND LOCATION: [illegible]

CONTRACTOR USE ONLY

**List only one specification division per form.*

List only one of the following categories on each transmittal form, and indicate which is being submitted

☐ Contractor Approved ☒ OICC Approval ☐ Deviation/Substitution For OICC Approval

REVIEWER USE ONLY

***ACTION CODES*
A-Approved
D-Disapproved
AN-Approved as noted
RA-Receipt acknowledged.
C-Comments
R-Resubmit

ITEM NO	PROJ. SPEC. SECT. *& PARA. and/or PROJ. DWG. NO. *	ITEM IDENTIFICATION (Type, size, model no., Mfg. name, dwg. or brochure number)	NO. OF COPIES	ACTION CODES **	REVIEWER'S INITIALS CODE AND DATE
1	[illegible]	WATTHOUR METER AND BASE	4	A	A [illegible] 2/29/96

CONTRACTOR'S COMMENTS

SEE ATTACHED MEMO - METER IN STOCK IN ROCKY-MOUNT ELECTRONIC DEMAND REGISTER CAN BE PROGRAMMED @ SHOP PLEASE ADVISE INFORMATION REQUIRED

COPY OF TRANSMITTAL AND SUBMITTALS TO ROICC

CONTRACTOR REPRESENTATIVE *(Signature)* [signature]

DATE RECEIVED BY REVIEWER	FROM (Reviewer)	TO

☐ Submittals are returned with action indicated. Approval of an item does not include approval of any deviation from the contract requirements unless the contractor calls attention to and supports the deviation.

☐ Submittals are forwarded to LANTDIV with A-E recommendations indicated in REVIEWER USE ONLY Section and in comments below on **ONE COPY** of the transmittal form.

REVIEWER'S COMMENTS

DEMAND INTERVAL OF 15 MINUTES

FOUR PULSES PER ONE REVOLUTION

COPIES TO: ROICC (2) LANTDIV (1) A-E (1)	DATE 3/1/96	SIGNATURE [signature]