



Waldemar S. Nelson and Company, Incorporated
Engineers

Electrical Utility Experience

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WALDEMAR S. NELSON *and* COMPANY, INC.

WALDEMAR S. NELSON AND COMPANY, INC. is a full-service engineering, project management, and architectural firm with offices in New Orleans, Louisiana, and Houston, Texas. NELSON has served industry and the public sector on a broad range of projects worldwide since 1945.

Electrical Utility Engineering Expertise

Generation

- Feasibility studies
- Siting and permitting
- MCC/Switchgear engineering and design
- Plant upgrades and retrofits
- Project management services
- Root cause failure analysis (RCFA)

Transmission Line Service

- Structure design and analysis
- Line modeling using PLS-CADD software
- Plan and profile drawings
- Sag and tension calculations
- Structure loads report
- Stringing charts
- Structure foundation design

Substation Engineering

- Concept design and planning
- Substation design and layout, including gas-insulated switchgear and air-insulated switchgear
- Substation modeling using SKM, EasyPower, or ETAP modeling software
- Optimized layout for equipment access with use of roads and fences
- Control building design and layout
- Battery sizing and load analysis
- Bus design analysis
- Substation grounding design using soil resistivity measurements
- Shielding design per IEEE Std 998
- Civil design and structure analysis
- Transformer foundation design with oil containment
- Storm water drainage in accordance with wetland regulations
- Written specifications for all equipment
- Protective relaying system design and coordination using modeling software
- SCADA systems
- Load flow and fault studies with arc flash calculations, providing labels and remediation
- Control wiring & schematic drawing

Distribution Line Engineering

- Pole line routing and strength calculations
- Line modeling using PLS-CADD
- Optimized pole span distance calculations
- Plan and profile drawings
- Sag and tension calculations
- Structure loads report
- Stringing charts
- Lightning protection
- Structure foundation design

Departments

- Electrical Engineering
- Instrumentation & Controls Engineering
- Chemical & Process Engineering
- Mechanical Engineering
- Civil & Structural Engineering
- Architecture
- Project Management
- Construction Management

Areas of Expertise

- Transmission
- Power plants
- Distribution
- Substations
- River crossings
- Cogeneration
- Relaying
- Short circuit analysis
- Load flow studies
- Right of way acquisition
- Surveying
- Coal handling & storage
- Fuel oil storage
- Natural gas supply

Featured Projects



High Voltage Transmission Lines Under Navigable Waterways

Overhead transmission lines installed across the Mississippi River in the 1960s were the only vessel height restriction between the city of New Orleans and the Gulf of Mexico. Around 2000, the overhead power lines started to affect the expanding cruising industry by limiting access to the city by the larger ships.

NELSON provided a screening study to determine if Horizontal Directional Drilling (HDD) could be used to install transmission lines

under the Mississippi River and eliminate all overhead limitations between the city and the Gulf of Mexico. NELSON's study determined that the project was technically feasible and practical and that the regulatory agencies could provide the required permits to meet our client's schedule and maintain reliable electrical service.

This was the first time such a long HDD-installed transmission line (3495 ft.) of this voltage (230 kV) and high capacity had been attempted. The crossing was successfully energized May 1st, 2004 ahead of schedule and under budget.

The above highly successful HDD-installed underground transmission line and similar future projects proved these installations are feasible and practical, that they can minimize weather-related hazards, and eliminate overhead obstructions.



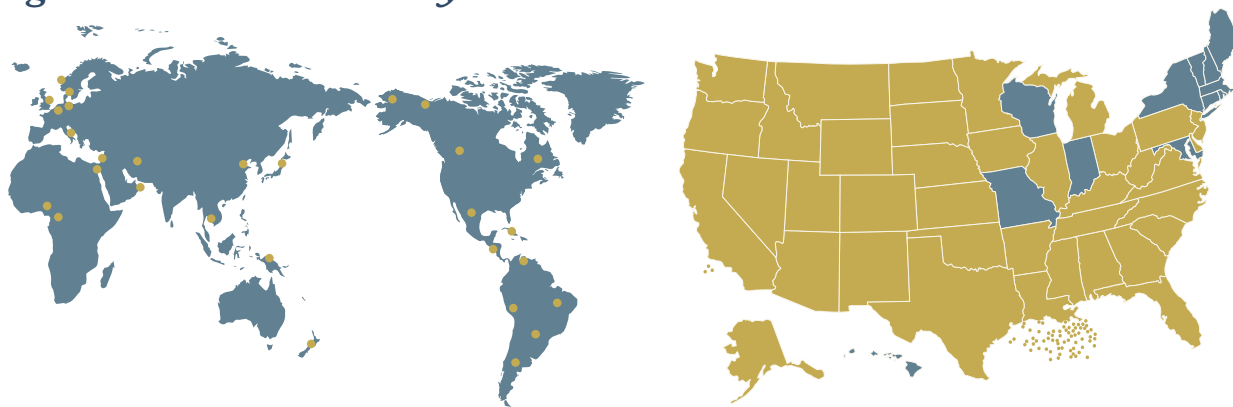
115kV HDD Installed Underground Transmission Line Feeding Orange Beach, AL

In 2008, NELSON executed a screening study to determine if Horizontal Directional Drilling (HDD) could be successfully applied to install High Voltage (HV) transmission lines under the Intracoastal Canal and Wolf Bay to Orange Beach, Alabama. This underground crossing was particularly challenging due to its 6,131-foot length and extremely high ampacity requirements, which greatly exceeded all previous installations.

NELSON determined that the project was technically feasible and practical and that regulatory agencies could agree with the design and installation concepts and issue the required permits.

The completed installation supplies 115kV electrical service from the Alabama mainland to the city of Orange Beach and surrounding island communities, helping to maintain critical electrical service to the area. Overhead lines that cross navigable waterways create unique challenges: they are exposed to hurricane force winds and they are also vulnerable to damage from shipping traffic passing underneath. The new underground transmission line eliminates all height restrictions above the Intracoastal Waterway crossing and eliminates storm wind exposure to which an overhead transmission line would be subjected.

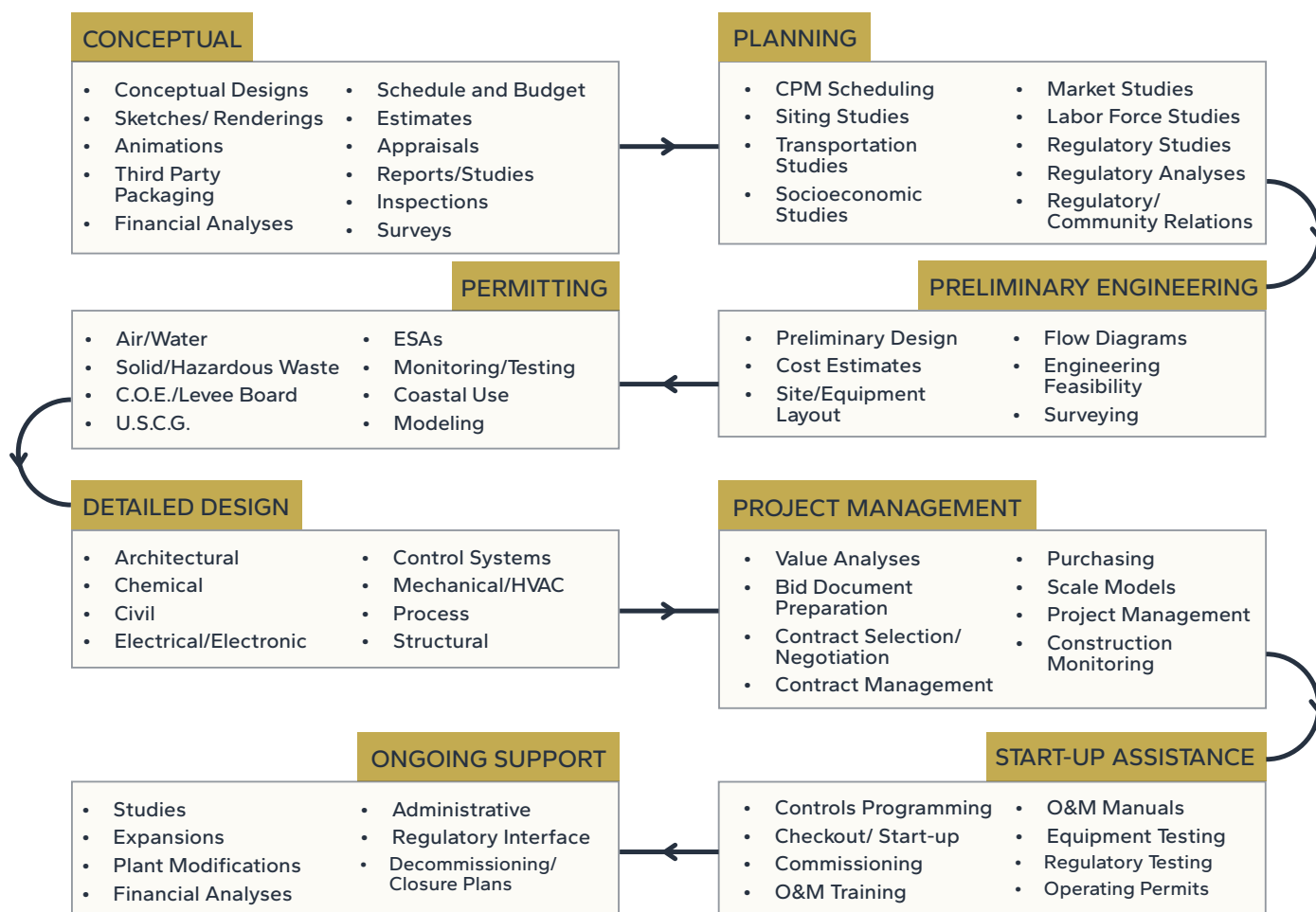
Serving our Clients Nationally and Worldwide since 1945



NELSON has provided professional services in more than 40 states and 60 countries.

All services are provided by locally registered engineers.

Our Process



2025 ENR Rankings

- #357 of Top 500 Design Firms
- #134 of Top 225 International Design Firms
- #49 of Top 50 in Oil and Gas
- #16 of Top 25 in Refineries and Petrochemical Plants
- #5 of Top 5 in Offshore and Underwater Facilities
- #5 of Top 10 in Mining



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