



True North Consulting, LLC

***The Next Level for
Engineering Services***

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Company Profile

Engineering Services

True North Consulting is an Engineering Services company specializing in support for the electric power industry. Founded in 1999, True North has provided engineering-based consulting services to the majority of US utilities and to several abroad. Our services cover a wide range within the power generation sector ranging from ASME/OM Code or regulatory-based requirements within the nuclear power industry to modeling and optimization issues associated with Plant Thermal Performance across the entire electrical generation spectrum. Additional areas of expertise include a complete array of Power Services associated with secondary plant equipment and a highly experienced Information Technology staff supporting our line of customized software products.

It is our goal and ongoing commitment to optimize these services with respect to cost, technical adequacy, and overall value to our clients. Towards this goal we continue to refine and update our staff and services through incorporation of technology and experience-based advancements.

Presented in this brochure is an overview of services offered by True North Consulting along with an experience profile and client listing. Also included is general information concerning our office locations and contact information.

We sincerely hope this provides a clear representation of our company and how True North Consulting might benefit performance at your facility. We look forward to hearing from you and the opportunity to propose our services.



Company Divisions

Engineering Programs

Plant Thermal Performance

Power Services

Engineering Support Services

Software Services



ENGINEERING PROGRAMS

True North is an industry leader regarding Engineering Programs with extensive experience associated with the following areas:

ASME Code/Regulatory Based Programs

Services

Program Assessment
Outage Scope Review / Assessment
Basis Documentation
Interval Update
Program Implementation
Procedure Development / Upgrade
Training
Site Based Support
Offsite Consulting Support
Customized Software Solutions
 PV-Plus, Pump Curve, APPJ, CVCM
Industry Owner's Group Facilitation Services

Program Areas

- Program Management
- Inservice Testing
- Risk Based Initiatives
- 10CFR50.69 Development
- Appendix J
- IWE/IWL
- Pressure Testing
- Snubber Programs
- Boric Acid Control
- Heat Exchangers/89-13
- Equipment Qualification
- Appendix R / Fire Protection
- Buried Piping
- Check Valve Programs
- Relief Valve Programs
- AOV/MOV (OMN-1/OMN-12)
- Inservice Inspection
- Repair / Replacement
- Welding Programs
- Flow Accelerated Corrosion (FAC)

Maintenance Based Programs

- Reliability Centered Maintenance
Review, update, and/or refinement of the RCM process
- Maintenance Rule Reconstitution
Development, analysis, and implementation of 10CFR50.65 requirements.
- Planned Maintenance Optimization
Development of Maintenance Activities (Preventive and Predictive) in accordance with INPO AP-913 Requirements
- Work Control/Work Management
Assessing Work Control Practices and the Development of Condition Directed Maintenance Management



PLANT THERMAL PERFORMANCE

Thermal Performance is the overall evaluation of a power plant's electrical production with respect to its fuel consumption expressed in heat rate (BTU/KWH). Typically, in a nuclear power facility, an improved heat rate results in more electricity being provided to the grid and resulting increased plant revenue. In the case of fossil fired plants, savings are predominantly found in fuel costs and will vary based on plant application, (e.g. peak or base load), and the particular fuel arrangements. The primary goal of True North's Thermal Performance group is to optimize existing investments through increased plant efficiencies, coupled with lower fuel or operational based expenses. True North utilizes various tools along with significant thermal performance experience to analyze a power plant's total ability to produce electricity reliably and efficiently. Specific areas of expertise include:

Program Assessment/Evaluation

- Thermal Performance Modeling
- Plant/Component Evaluations
- MWe Improvement Recommendations
- Monitoring Practices
- Instrument Modifications
- Procedural Support/Development
- PTC-6 Testing Support

Thermal Component Analysis

- Feedwater Heaters
- Turbines
- Cooling Towers
- Pumps
- Moisture Separators/Re-heaters
- Condensers
- Secondary Valve Leakage
- Power Calculation Evaluation

Heat Balance Analysis

- Power Uprate Turbine Cycle Evaluation
- Model Development & Improvements
- Plant Condition Evaluation
- Plant Modification Studies
- Environmental Heat Rejection Studies
- Megawatt Loss Evaluations
- Steam Generator Replacement Studies
- Turbine Retrofit Evaluations
- Primary Temperature Changes
- Major Component Warranty Validations

Thermal Performance Monitoring

- Develop/Enhance On-line Monitoring Capability
- Provide Software to Evaluate Plant Performance
- Provide Remote Monitoring of Plant Performance

Additionally, True North Consulting has developed a set calculation-based Thermal Performance software tool. We refer to it as *TP-Plus* – details are provided in the Software Services section of this brochure and on our website.



POWER SERVICES

The True North Consulting Power Services Division offers a complete line of engineering services with strong emphasis on secondary plant equipment. Services offered include the following:

Turbine Generator/Balance of Plant

- Engineering Liaison Services (Utility – OEM)
- Technical Specification/Bid Specification Development
- Grading Criteria and Associated Support
 - Contract Negotiations/Bid Evaluations
 - Vendor Selection
 - Kepner-Tregoe Analyses
- Multi-Discipline Contractor Oversight
 - Turbine Generator Retrofit/Major Modification
 - Design Change or Modification Package Development
 - Outage Planning
 - Material Receipt Inspection and Test
 - Technical Oversight – Installation
 - Integrated & Component-Based Test Plan Development
 - Test Engineer Services
- Problem Resolution/Operational Expertise
- Manufacturing Facility Oversight
 - Design Deviations
 - Manufacturing Processes
 - Quality Review, Data Analysis, and Client Witness Services



ENGINEERING SUPPORT SERVICES

Multi-Discipline Engineering Support

True North Consulting is well versed in assembling project teams staffed with specific discipline requirements and scope-related experience. We are comfortable with all phases of the engineering support cycle including specification development, design services, modification packages, field service support, and verification/validation activities. Our services range from engineering oversight or task based deliverables to full turn-key project performance. Examples of areas in which we have specific expertise are listed below:

Major Plant Initiatives

- Power Uprate (Stretch and EPU)
- License Renewal
- Plant Life Extension
- Station Security System Upgrades
- Outage Optimization (Programs)
- Steam Generator Replacement
- Power/Train Equipment Replacement and Upgrades
 - HP/LP Turbine Rotors
 - Main Generator/Excitation Equipment
 - Turbine Generator Support Systems

Project Support Services

Additionally, True North Consulting provides a complete array of project support services inclusive of the following:

- Computer Aided Drafting /Drawing Upgrade Services
 - Auto Cad/Intergraph
- Database Management Services
 - Oracle/Sequel/Access
- Configuration Control Management
 - Plant Documentation/Design Basis/Q-List



SOFTWARE SERVICES

True North Consulting has developed numerous custom software products supporting industry-related needs in both the Engineering Programs and Plant Thermal Performance areas. True North Consulting and Endeavor have aligned to provide web-based engineering programs software running on the Endeavor Engage platform.

Engineering Programs Software EP-Plus+ Suite

The True North Consulting | Endeavor web-based Engineering Programs Software Suite EP-Plus+® runs on the Endeavor Engage® platform and includes electronic import of the clients' test history and custom configuration. The software contains, for example, links to the Program documents, allows for data entry and trend analysis, assists with outage scope identification and has user configurable reports that are fully compliant with guidance and regulatory requirements.

EP-PLUS+

IST ASME OM Code Pump & Valve Inservice Testing	RELIEF DEVICE Mandatory Appendix I Relief Device Management	CHECK VALVE Mandatory Appendix II Check Valve Condition Monitoring
CLRT (Appendix J) 10 CFR 50 Appendix J Containment Leakage Rate Testing	SNUBBER ASME OM Code ISTD Dynamic Restraint Examination & Testing	MOV Mandatory Appendix III Motor-Operated Valve Testing
AOV Mandatory Appendix IV Air-Operated Valve Testing	ISI ASME Section XI Code Inservice Inspection	HTEX Heat Exchanger Testing and Monitoring
PST (For New Reactors) ASME OM Code Pump & Valve Preservice Testing	PSI (For New Reactors) ASME Section XI Code Preservice Inspection	ENGAGE Expand all of your engineering software

<http://www.epplusengage.com>

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Plant Thermal Performance Software TP-Plus+ Suite

The True North Consulting Thermal Performance software (**TP-Plus+**) is a thermal performance engineering tool kit consisting of several powerful and unique calculation modules for use in the electric power industry to simplify and provide time-saving convenient methods of tracking thermal performance. These modules both evaluate and predict performance using industry accepted standards such as ASME, HEI, etc.

TP-PLUS helps solve day-to-day performance problems rapidly and in a cost-effective manner. Many times, plant personnel want to know the outcome of changes before they are made. **TP-PLUS** provides a user interface into this family of calculation modules. Modules can be purchased as needed and added to the **TP-PLUS** package at any time.

There are many applications for **TP-PLUS** modules such as:

- Assisting in testing of plant components and analyzing test data to pinpoint problems
- Evaluation of equipment condition and potential failures
- Evaluation of vendor claims
- Power uprate studies
- Analyzing boundary condition changes
- Heat exchanger heat transfer problems
- Quantifying flow and energy losses in plants
- Determining the cost impacts of component or system problems
- Dozens of plant engineering studies

TP-PLUS Family of Thermal Performance Modules

- Air Heater Module (AIM)
- Boiler Efficiency Module (BOIL)
- Condenser Module (COND)
- Cooling Tower Design Module (CTD)
- Cooling Tower Testing Module (CTEST)
- Cycle Isolation Module (CIM)
- Feedwater Heater Module (FM)
- Gas Turbine Module (GEM)
- Heat Rate Module (HRM)
- Heat Recovery Steam Generator Module (HRSG)
- Moisture Separator/Reheater Module (MSR)
- Pump Module (PMP)
- Steam Turbine Efficiency Module (STEM)
- Steam Turbine Testing Module (STEST)
- Thermal Power Module (TPM)
- Uncertainty Analysis Module (UAM)



Experience Profile & Client List

Experience Profile

True North Consulting provides a wide spectrum of engineering based consulting services. Our primary expertise is focused in the electric power industry with particular emphasis in the area of nuclear power generation. We have performed services for over 40 Utility clients supporting more than 75 client facilities both domestic and abroad. A representative listing of these clients is provided below. Detailed experience profile information sorted by client inclusive of client reference and contact information can be provided upon request.

Client List

- American Electric Power
- Altran Energy Solutions
- AMAG
- Ameren Energy Corporation
- APOG (Appendix J Owners Group)
- Arizona Public Service
- Bruce Power
- Constellation Nuclear
- Dominion Energy
- DTE Energy
- Duke Energy Company
- EDF (Electricity of France)
- Energy Northwest
- Entergy Nuclear Northeast
- Entergy Nuclear South
- EPRI
- Exelon Corporation
- First Energy Nuclear Operating Company
- Florida Power & Light
- Iepson Consulting/Krsko Station
- Institute of Nuclear Energy Research (Taiwan)
- ISTOG (IST Owners Group)
- Midwest Generation
- Nebraska Public Power District
- NextEra Energy
- NRG Energy
- North America Energy Services
- Nuclear Management Company
- Omaha Public Power District
- Pennsylvania Power & Light
- Progress Energy
- Public Service Enterprise Group
- Reliant
- Rochester Gas & Electric
- Salt River Project
- SaskPower
- Siemens Energy, Inc.
- South Carolina Electric & Gas
- Southern California Edison
- Southern Nuclear Operating Company
- South Texas Project
- Tennessee Valley Authority
- Texas Utilities (Luminant/SHAW)
- Utilities Service Alliance Co.
- Westinghouse
- Wisconsin Electric Power
- Wolf Creek Nuclear
- Xcel Energy



General Information

Address/Contact Information

True North Consulting is headquartered in Montrose, Colorado with satellite offices in, Nebraska, New York, New Jersey, and Alabama. Address and contact information for our offices are listed below:

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Thermal Performance

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Power Services

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