
Process Optimization

ENVIRONMENTAL SYSTEMS CONSULTING,
ENGINEERING AND FIELD SERVICE

*Partnering with power utilities and industrial plants
for environmental regulation compliance and improved
efficiency at the lowest possible cost*



NEUNDORFER
PARTICULATE KNOWLEDGE

Service First

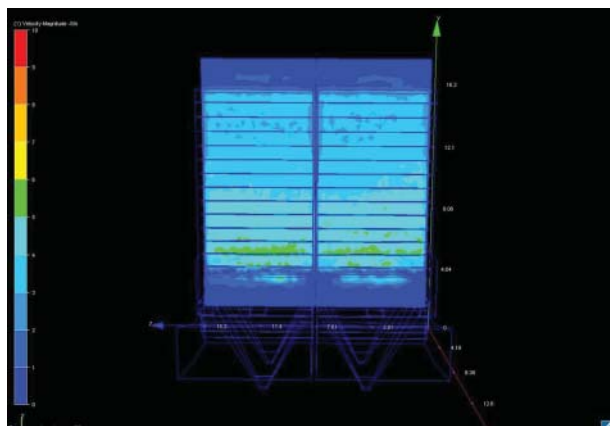
Process optimization consulting and engineering are the foundation of Neundorfer onsite environmental systems technical and field services for power utilities and industrial plants. We begin with a broad-based performance assessment of plant equipment and processes. Then, we identify and analyze root causes of performance issues. Finally, we offer technical direction and engineered solutions for reducing hazardous air pollutant emissions, saving house power, reducing maintenance and operating costs, enhancing process and production performance, and improving efficiency, safety and quality.

Performance Modeling

Performance modeling forms the basis of Neundorfer's approach to helping customers comply with emission regulations. We have an informal partnership with several other companies that specialize in combustion and front-of-plant equipment. We coordinate with this knowledgebase to link the outputs of upstream models to the inputs of downstream models to better understand and predict how systems impact one another. This modeling approach enables scenario planning with reliably predicted emission reductions and efficiency improvements. Combining these improvement estimates with cost and risk factors, we work with customers to realistically prioritize where investments should be made.

Data Analysis and Reporting

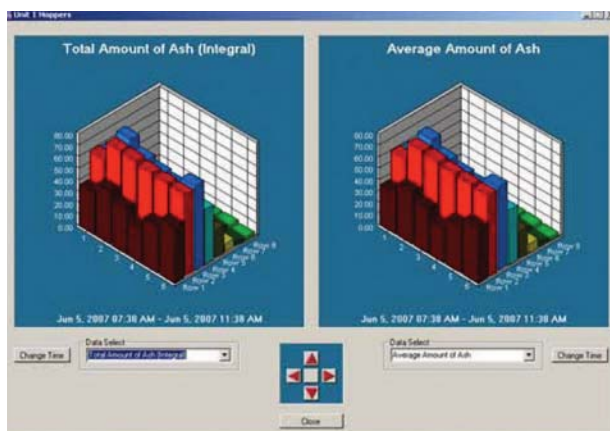
Neundorfer offers Minerva, an analysis and reporting program that uses real-time equipment operation and process data, interpreted through applied algorithms. Daily and weekly reports keep customers informed about collection efficiency, cost and energy savings, and avoided pollution. Neundorfer engineers augment this automatic reporting with personal contact focused on customer-specific analysis, interpretations and recommended actions.



Troubleshooting and Diagnostics

Neundorfer has decades of knowledge and hands-on experience that enables us to provide practical, industry-leading aftermarket design, engineering and consulting services for all types of controls systems and programmable logic controllers (PLCs) for just about any application. We provide mechanical and electrical diagnoses and troubleshooting for all brands of control systems for electrostatic precipitator (ESP) and baghouse (fabric filter) installations, and all brands of PLCs for any application, including fly ash, material handling and process control systems.

Neundorfer consultants provide hands-on experience and practical expertise.



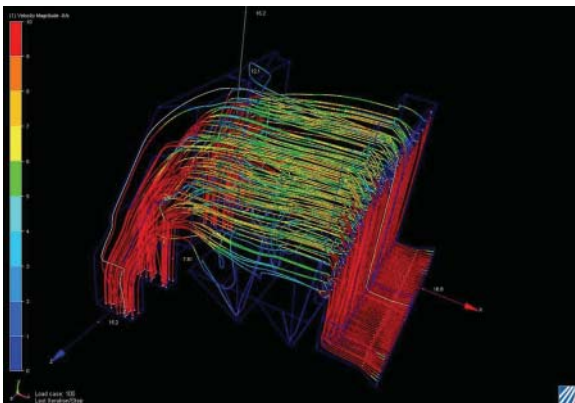


Flow Optimization

Often, improving flow distribution proves to be the most cost-effective opportunity for solving system performance issues—with multiple positive impacts throughout the plant. Neundorfer tests and analyzes existing flow conditions using in situ testing, computational fluid dynamics (CFD) and physical modeling. We also design, engineer, fabricate and install plant-specific flow improvement solutions, taking cost and other factors into consideration.

Neundorfer provides flow optimization for:

- All types of processes, including power generation, cement, pulp and paper, steel, non-ferrous metals, manufacturing, and combustion systems.
- All types of air pollution control equipment, including electrostatic precipitators, baghouses (fabric filters), scrubbers and SCRs.



Flue Gas Conditioning & Sorbent Injection

Neundorfer supports all brands of sorbent injection and flue gas conditioning systems, helping customers achieve fuel flexibility, optimized particle collection, reduced operating costs and multi-pollutant control objectives. Our consulting support includes a full complement of maintenance, inspections, upgrades and training as well as laboratory testing and analyses of fuel, ash and particle size. We also offer dispersion modeling and optimization for sorbent injection systems (e.g., activated carbon) and flue gas conditioning systems including SO_3 and NH_3 .



Process optimization for all types of applications.



Operating & Maintenance Performance Services

Neundorfer offers operating and maintenance consulting services for air pollution control and process-based systems to keep equipment in top condition and proactively identify issues before they become problems:

- Quarterly or as-needed inspections and maintenance checkups
- Customized on-site or remote equipment workshops
- Field project management
- Installations, conversions and turnkey construction
- Systems startup, troubleshooting and training



From inspections and project management to training and turnkey construction.



Consulting and Engineering Services Checklist

- Learning Events and Training
 - Regional workshops
 - On-site workshops & training
 - Custom troubleshooting sessions
- Mechanical and Electrical Inspections
 - Electrostatic precipitators (dry and wet)
 - Baghouses (fabric filters)
- Performance Enhancement
 - Performance analysis & computer model prediction
- Troubleshooting and Diagnostics for:
 - All brands of control systems for electrostatic precipitators or baghouses/fabric filters
 - All brands of PLCs for any application, including fly ash, process control and material handling systems
 - Systems startup
- Gas Flow Optimization:
 - Root cause analysis
 - Computational Fluid Dynamics (CFD)
 - Physical flow modeling
- Flue Gas Conditioning (e.g., SO₃, NH₃)
 - Automatic optimization algorithms
 - Operation and maintenance improvement analysis
 - Troubleshooting and diagnostic services
 - Training
- Sorbent Injection (e.g., activated carbon)
 - Operation and maintenance improvement analysis
 - Troubleshooting and diagnostic services
- Field Project Management
- Turnkey System Installations, Conversions and Upgrades

Technical Staff Biographies

Ignatius "Iggy" Alioto • Construction Superintendent

- With Neundorfer since 1985
- NORCAT Certified
- MSHA Certified

Specialties include:

- Mechanical inspections
- Construction supervision and project management
- Diagnostics of mechanical and structural problems



Marlin Anderson • Senior Consultant

- With Neundorfer since 2007; in the industry since 1978
- B.A., Physics & Mathematics, Huntingdon College
- M.S., Physics and Ph.D., Physics, Auburn University

Specialties include:

- Gas-flow modeling of pollution control equipment
- Modeling and evaluation of electrostatic precipitator performance
- *In situ* testing of gas-flow distributions
- *In situ* and laboratory resistivity measurements
- Process evaluation

Marlin has authored or co-authored papers and reports on the evaluation of new technologies and particulate control device performance.



Karl Artz • Senior Design & Development Engineer

- With Neundorfer since 1984
- B.S., Electrical Engineering, Case Western Reserve University (formerly Case Institute of Technology)

Specialties include:

- Design of control systems for electrostatic precipitators
- Microprocessor-based industrial control hardware and firmware design
- Patent #5,144,442 – Temperature Compensation of Lift Height of Electromagnetic Impact Rappers



Russ Bailey

Field Service Technician – Electrical & Mechanical

- Rejoined Neundorfer in 2006

Specialties include:

- Controls installation and startup
- Electrical/mechanical field service and supervision
- Precipitator controls
- Inspections and troubleshooting
- Electrical and mechanical rebuilds
- Pre-bid project evaluation

Brian Bedford • IT/Systems Administrator

- With Neundorfer since 2004

Specialties include:

- Network and systems communication expertise
- Precipitator Optimization System configuration, support and customer service



Kyle Campbell • Computer Engineer

- With Neundorfer since 2002
- B.S., Computer Engineering, Case Western Reserve University

Specialties include:

- Designing and implementing Precipitator Optimization System and SmartAsh software solutions
- Software product management and development
- Training and seminar support
- Fly ash evacuation system optimization
- PLC integration and support



Carlo Chico • Electrical Engineer

- With Neundorfer since 2004
- B.S., Electrical Engineering, University of Toledo

Specialties include:

- Programming and configuration of PLCs on Allen Bradley, Fanuc and Siemens platforms
- Integration of DCS, HMI, control panels and other PLCs
- Electrical design of hardware and software for process controls
- Integration of flue gas, purge and fly ash systems



Bob Custer • Field Service Technician – Electrical

- With Neundorfer since 2008
- Associate degree in Electronics Engineering Technology, ETI

Specialties include:

- Controls and MicroRap installations
- Troubleshooting
- Calibrations
- *In situ* resistivity testing



Kent Edrington • Field Service Engineer – Electrical

- With Neundorfer since 2008

Specialties include:

- Supervision of controls and software installations
- Training
- MicroRap and calibration consulting

Joshua Fitzhugh • *CAD Designer*

- With Neundorfer since 2009
- B.S., Engineering Graphics and Design, Murray State University
- Has 5 years experience with AutoCAD

Specialties include:

- Field and physical model drawings of mechanical parts
- AutoCAD and SolidWorks
- Resistivity tests
- *In situ* testing of gas-flow distributions
- Computational Fluid Dynamics (CFD) modeling

**Tony Fricke** • *Mechanical Engineer*

- With Neundorfer since 1997
- B.S., Mechanical Engineering, Cleveland State University

Specialties include:

- Project management and engineering
- Precipitator component design
- Field technical direction
- Mechanical inspections
- Flue gas conditioning system design and integration

**Patrick Horvath** • *Mechanical Engineer*

- With Neundorfer since 2007
- Master of Engineering Management, Case Western Reserve University
- B.S., Mechanical Engineering, Cleveland State University

Specialties include:

- Computational Fluid Dynamics (CFD) modeling
- Mechanical inspections and field technical direction
- Lab resistivity testing
- Project management
- Production engineering

**Bill Miller** • *Field Technical Services Consultant*

- With Neundorfer since 2011; more than 40 years of industry experience
- A.S., Engineering, Somerset County College
- B.S., Civil Engineering, Rutgers University
- M.B.A., Columbia University
- Registered Professional Civil Engineer, New Jersey
- Licensed Mechanical Contractor, New Jersey and California

Specialties include:

- Electrostatic precipitator and baghouse diagnostics & troubleshooting
- Electrical and mechanical inspections and field service
- Construction, repair and rebuild supervision
- Project management

Mike Neundorfer • *CEO & Owner*

- With Neundorfer since 1973
- B.S., Mechanical Engineering, University of Rochester
- M.B.A., Baldwin Wallace College

Specialties include:

Electrostatic precipitator expertise in process evaluation; rapping system acceleration testing; retrofits and upgrades; process controls; fly ash resistivity, evaluation and modification; and fly ash evacuation optimization
Mike has authored technical articles and papers related to electrostatic precipitator operation and troubleshooting.

**Dave Novotny** • *Construction Superintendent*

- With Neundorfer since 1996; has worked with precipitators since 1989
- Associate degrees in Civil Engineering, Marine Drafting, and Maritime Construction, Northeast Wisconsin Technical College GB Campus
- CAD-certified

Specialties include:

- Precipitator rebuilds
- Mechanical inspections
- Construction supervision and project management
- Diagnostics of mechanical and structural problems

**Steve Ostanek** • *President*

- With Neundorfer since 1982
- B.S., International Marketing, University of Akron

Specialties include:

- Process and equipment problem analysis
- Cost/benefit analysis
- Specification generation assistance
- Training

**Jim Parsons** • *Senior Engineering Consultant*

- With Neundorfer since 2007; more than 25 years of industry experience
- Civil Engineering degree, Idaho State University
- Advanced APC and business management classes

Specialties include:

- Field troubleshooting; design and process evaluation for electrostatic precipitators and baghouses
- Construction supervision
- New product development

Jim has authored, co-authored and presented numerous papers on the design, operation and maintenance of electrostatic precipitators and baghouses. He holds three patents on APC-related equipment, including the AH series of acoustic horns.

Jeff Preston • *Technical Application Consultant*

- With Neundorfer since 1993
- B.S., Electronic Engineering Technology, Cleveland State University
- M.B.A., Lake Erie College

Specialties include:

- Precipitator Optimization System field application and support
- Controls support
- New business and process development
- Training

**Dan Quirk** • *Senior Designer*

- With Neundorfer since 1996
- 20 years experience with AutoCAD

Specialties include:

- Field and fabrication drawings of mechanical parts
- Component design
- Design and layout of circuit boards for controls products
- CAD system management
- Product management

**Todd Redenshek** • *Field Service Technician – Electrical*

- With Neundorfer since 2000

Specialties include:

- Troubleshooting
- Repair of voltage controls and MicroRap boards
- Rapper and MicroRap programming
- Training

**William Shephard** • *Construction Superintendent*

- With Neundorfer since 2007

Specialties include:

- Physical flow modeling construction and analysis
- *In situ* testing of gas-flow distributions
- Performance testing
- Mechanical inspections
- Supervision of mechanical repairs
- *In situ* resistivity testing

**Chuck Stephens** • *Field Service Technician – Electrical*

- With Neundorfer since 2002
- More than 30 years experience with precipitators and electrical applications

Specialties include:

- Troubleshooting
- Controls installation and startup
- Precipitator Optimization System and controls support
- SO₂ systems support and installation
- PLC commissioning, debugging, troubleshooting and modification

Eric Sukalac • *Computer Engineer*

- With Neundorfer since 2008
- B.S., Computer Engineering, Case Western Reserve University

Specialties include:

- Software development – .NET, php/Zend, VTS, SQL
- Precipitator Optimization System development and configuration
- *In situ* testing of gas-flow distributions

**Jeremy Timmons** • *Vice President, Engineering*

- With Neundorfer since 1999
- B.S., Ohio University, Chemical Engineering major, General Business minor

Specialties include:

- Development of process and precipitator performance improvement programs
- Troubleshooting
- Research and development
- Computational fluid dynamics (CFD) and physical flow modeling
- Flue gas conditioning system design and integration

**Zsuzsanna Toth** • *Electrical Engineer*

- With Neundorfer since 1998
- B.S., Electrical Engineering, Kando College of Budapest

Specialties include:

- Production engineering
- AutoCAD
- Controls testing and support

**Edwin G. Zimmer** • *Field Service Technician – Electrical*

- With Neundorfer since 1989
- More than 40 years experience in the air pollution control industry
- Licensed maintenance electrician
- Associate degree, Applied Sciences, Mt. San Antonio College
- Certificate, Low Temperature Boilers, Parker Boiler School (California)
- Certificate, HVAC, Los Angeles Technical School
- U.S. Air Force – Hydraulics, Aerospace

Specialties include:

- Controls installation and startup
- Electrical field service and supervision
- Precipitator Optimization System and controls support



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