

# Process Optimization

ENVIRONMENTAL SYSTEMS ENGINEERING,  
CONSULTING & FIELD SERVICES

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*Reducing Energy Requirements, Costs & Emissions  
While Optimizing Performance*

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**NEUNDORFER**  
PARTICULATE KNOWLEDGE

# Process Optimization

## Environmental Systems Engineering, Consulting & Field Services

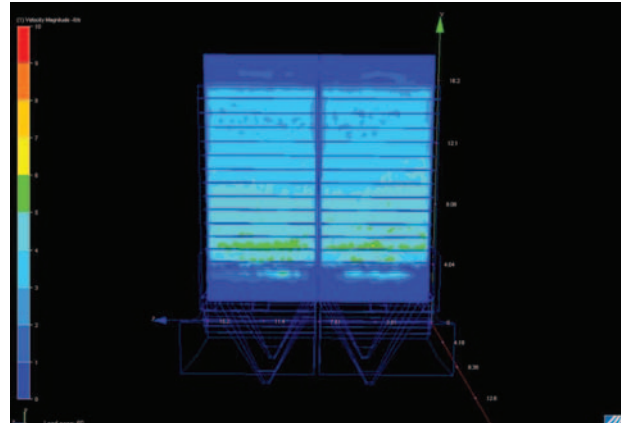
### Service First

Process optimization engineering and consulting are the foundation of Neundorfer onsite environmental systems technical and field services for power generation and process-based heavy industries. Our consultants begin with a broad-based performance assessment of plant equipment and processes; then we shift to troubleshooting and diagnostics to identify and analyze root cause; and finally, we offer technical direction and engineered solutions to:

- Reduce maintenance and operating costs
- Enhance process and production performance
- Reduce energy consumption and particulate emissions
- Improve efficiency, safety and quality



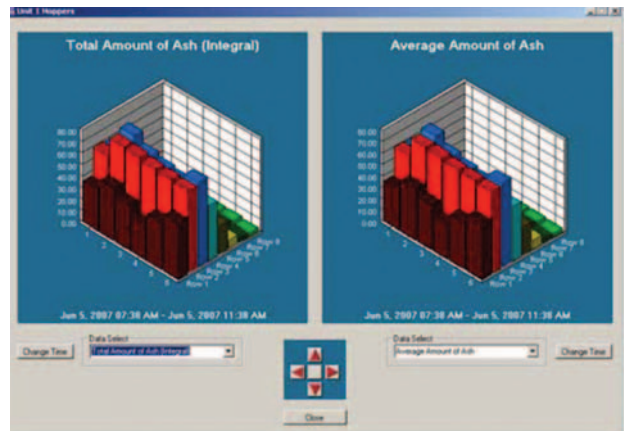
Neundorfer also offers Minerva, a state-of-the-art analysis and reporting tool based on real-time data from customers' equipment operation and processes, with applied Neundorfer algorithms to analyze and interpret the data. Daily and weekly reporting in a PDF format keeps subscribing customers continuously informed regarding collection efficiency, cost and energy savings and avoided pollution. In addition, Neundorfer engineers augment this automatic reporting with personal contact regarding customer-specific analysis, interpretations and recommended actions.



### Troubleshooting & 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 essentially any application. Neundorfer can provide mechanical and electrical **diagnoses** and **troubleshooting** for:

- **ALL** brands of control systems for electrostatic precipitators (ESPs) and fabric filter (FF) installations (e.g., GE/BHA, Forry/Solvera, AVC Specialists, NWL, etc.)
- **ALL** brands of PLCs for any application (e.g., fly ash systems, material handling systems, process control systems, etc.)



Neundorfer consultants bring hands-on experience and practical expertise to all types of processes and air pollution control equipment.

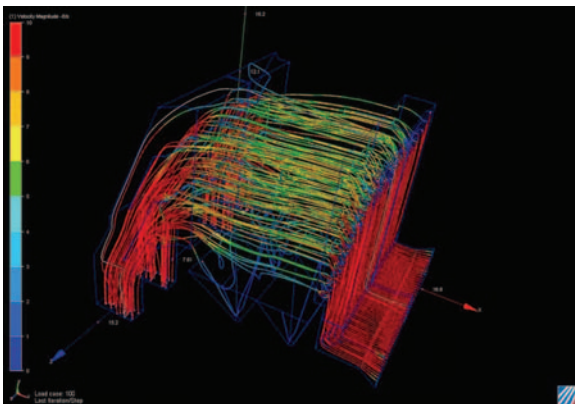
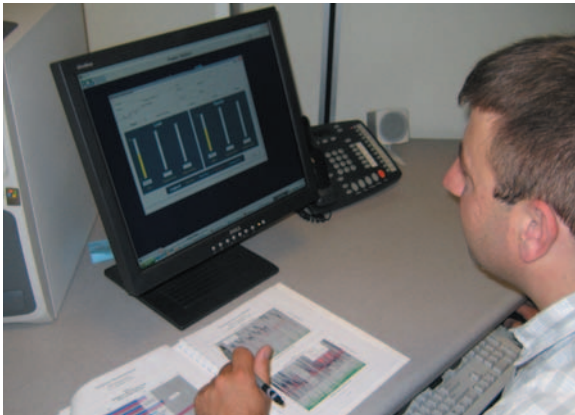


## Flow Optimization

Instead of treating symptoms, Neundorfer works to analyze and understand the root cause of system performance issues. Utilizing gas and air flow optimization testing and analyses, computational fluid dynamics (CFD) modeling and physical gas flow modeling (to validate and replicate the CFD model), Neundorfer provides:

- Flow optimization for all types of processes (i.e., power generation, cement, pulp & paper, steel, non-ferrous metals, manufacturing, combustion systems, etc.)
- Flow optimization for all types of pollution control equipment (e.g., ESP, FF, Scrubber, SCR)

Flow optimization reduces system pressure drop and increases energy efficiency.



## 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. Neundorfer 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. Neundorfer also offers dispersion modeling and optimization for sorbent injection systems (e.g., activated carbon) and flue gas conditioning systems (e.g.,  $\text{SO}_3$ ,  $\text{NH}_3$ ).



*For process optimization in all types of applications, Neundorfer consulting services, diagnostics and troubleshooting are second to none.*



## Operating & Maintenance Performance

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

- Quarterly or As-Needed Inspections and Maintenance Checkups
- Onsite or Remote Training (customized for operators, technicians and engineers)
- Field Project Management
- Installations, Conversions and Turnkey Construction
- Systems Startup, Troubleshooting and Training



*From inspections and project management to training and turnkey construction, Neundorfer provides a complete range of consulting services.*



## Consulting and Engineering Services Checklist

- Mechanical and Electrical Inspections
  - Dry and Wet Electrostatic Precipitators
  - Fabric Filters (Baghouses)
- Performance Enhancement
  - Performance analysis and computer model prediction
- Troubleshooting and Diagnostics for:
  - All brands of control systems for electrostatic precipitators or fabric filters/baghouses
  - All brands of PLCs for any application (i.e., fly ash systems, process control systems, material handling, etc.)
  - Systems Startup
- Air and Gas Flow Optimization:
  - Root Cause Analysis
  - Computational Fluid Dynamics (CFD)
  - Physical Flow Modeling
- Flue Gas Conditioning (i.e.,  $\text{SO}_3$ ,  $\text{NH}_3$ )
  - Automatic optimization algorithms
  - Operation and maintenance improvement analysis
  - Troubleshooting and diagnostic services
  - Training
- Sorbent Injection (i.e., activated carbon)
  - Operation and maintenance improvement analysis
  - Troubleshooting and diagnostic services
- Training
  - Onsite
  - Remote
- Field Project Management
- Turnkey System Installations, Conversions and Upgrades

# Technical Staff Biographies

## Mike Neundorfer • President & 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.*

## Steve Ostanek • VP Sales & Marketing

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

### Specialties include:

- Process and precipitator problem analysis
- Cost/benefit analysis
- Specification generation assistance

## Marlin Anderson • Consultant & APCO Services Manager

- With Neundorfer since 2007
- 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

### 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

## Jim Parsons • Senior Engineering Consultant

- With Neundorfer since 2007
- 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 • Electronic Engineer

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

### Specialties include:

- Software development for precipitator optimization systems
- Production engineering
- Controls support
- New business and process development

## 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

## Tony Fricke • Mechanical Engineer

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

### Specialties include:

- Mechanical inspections and field technical direction
- Production engineering
- Design
- Rapping systems acceleration testing
- Flue gas conditioning system design and integration
- Project management

**Jeremy Timmons** • *Chemical Engineer*

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

**Specialties include:**

- Consulting projects including inspections, modeling and process issues affecting precipitators and performance prediction
- Flue gas conditioning system design and integration
- Project management

**Dave Novotny** • *Construction Superintendent*

- With Neundorfer since 1996; has worked with precipitators since 1989
- Associate degree in Civil Engineering, Northwestern Technical College
- Associate degree in Marine Drafting
- CAD-certified

**Specialties include:**

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

**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
- 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

**Kyle Campbell** • *Computer Engineer*

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

**Specialties include:**

- Fly ash evacuation system optimization
- PLC integration and support
- New product development
- Precipitator Optimization System customer support

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

- With Neundorfer since 2002
- Has 23 years experience with precipitators and electrical applications

**Specialties include:**

- Troubleshooting
- Controls installation and startup
- Precipitator Optimization System and controls support
- SO<sub>3</sub> support and installation
- PLC commissioning, debugging, troubleshooting and modification

**Carlo Chico** • *Electrical Engineer*

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

**Specialties include:**

- Program PLCs on Allen Bradley, Fanuc, and Siemens platforms
- DCS, HMI, control panel and PLC integration
- Electrical design of hardware and software for process controls
- PLC integration including fly ash evacuation (SmartAsh) and flue gas conditioning systems (SO<sub>3</sub>/NH<sub>3</sub>)

**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

**Kelly Chapin** • *Electrical Engineer*

- With Neundorfer since 2007
- B.S., Electrical Engineering, University of Wisconsin, Milwaukee

**Specialties include:**

- SmartAsh hopper evacuation optimization installation and service
- PLC programming
- Precipitator Optimization System configuration

**Russ Bailey**

*Field Service Technician – Electrical and Mechanical*

- Rejoined Neundorfer in 2006

**Specialties include:**

- Controls installation and startup
- Electrical/mechanical field service and supervision
- Precipitator controls
- Inspections and troubleshooting

**Brian Bedford** • *IT/Systems Administrator*

- With Neundorfer since 2004

**Specialties include:**

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

**Edgar Wilson** • *Field Applications*

- With Neundorfer since 2008
- Master of Engineering and Management; Weatherhead School of Management & Case School of Engineering
- Bachelor of Science in Engineering; Case Western Reserve University

**Specialties include:**

- Training
- Software demonstration
- Mechanical inspections
- Consulting

**Bob Custer** • *Field Service Technician – Electrical*

- With Neundorfer since 2008

**Specialties include:**

- Controls and MicroRap installations
- Troubleshooting
- Calibrations

**Brian Malloy** • *Field Applications*

- With Neundorfer since 2008
- B.S. Business Management; Baldwin Wallace College

**Specialties include:**

- Mechanical inspections
- Training
- Consulting

**Matt Quirk** • *Field Applications*

- With Neundorfer since 2007
- BS Business Administration; Lake Erie College

**Specialties include:**

- Mechanical inspections
- Training
- Consulting

**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

**Patrick Horvath** • *Mechanical Engineer*

- With Neundorfer since 2007
- Master of Engineering and Management; Weatherhead School of Management & Case School of Engineering
- Bachelor of Science in Engineering; Cleveland State University

**Specialties include:**

- Computational Fluid Dynamics (CFD) modeling
- Supervision of mechanical repairs
- Mechanical inspections
- Laboratory services

**Kent Edrington** • *Field Service Engineer – Electrical*

- With Neundorfer since 2008

**Specialties include:**

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

**William Shephard** • *Construction Superintendent*

- With Neundorfer since 2007

**Specialties include:**

- Physical flow modeling construction and analysis
- Performance testing
- Mechanical inspections
- Supervision of mechanical repairs



**NEUNDORFER**  
PARTICULATE KNOWLEDGE

**NEUNDORFER, INC.**

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