



### EPSCO Can Help You

- Analyze and define your emission problems
- Inspect and report on the condition of your existing pollution control equipment
- Engineer, specify equipment, evaluate suppliers and manage your project through startup

### Turn Key Consulting:

**Phase 1** - Online Assessment

**Phase 2** - Offline Investigation

**Phase 3** - Analyses &  
Recommendations



### 3-Phase Approach to Consulting

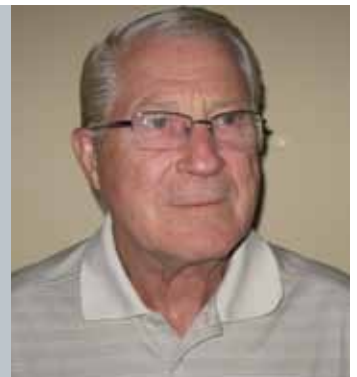
**Online Assessment: EPSCO** gathers data on allowable emissions, operation of boiler, ESP, FF, FGD, material balances, fuel/ash sources, ash removal systems, historical operation, inspection & test data, etc... to compare real-time performance of APC equipment against design or theoretical performance expected.

**Offline Assessment: EPSCO**, whenever outage time allows, will perform mechanical, electrical, structural or piping inspections of equipment, internals, and auxiliaries of ESP, FF, FGD systems to evaluate their physical conditions, looking for flaws which may be responsible for deviations from design or “theoretical” performance.

**Analyses & Recommendations: EPSCO** will then analyze all data collected and identify, evaluate, cost and make recommendations to upgrade the ESP, FF, or FGD to meet the User’s particulate emissions objectives.

### *Keith Bradburn*

Keith M. Bradburn has a 48 year career in the air pollution control industry. He spent 21 years with Lodge-Cottrell in England and USA and served in numerous engineering and technical positions and was for many years the US technical manager for precipitators. He later spent 27 years with Flakt/Alstom as product and technology manager for dry and wet precipitators and fabric filters. Responsibilities included equipment sizing and design, proposals, product engineering interfacing, equipment performance, troubleshooting and testing. He retired from his position of Director of Technology Management at Alstom in 2010. Keith is the author of numerous papers on precipitators and fabric filters and co-author of one book on electrostatic precipitators. Keith is general manager of EPSCO.



# EPSCO consultants are committed to solving problems economically by working together effectively with minimum overhead

### Diversified Services Turn Key Consulting

- ① Inspections and performance analyses
- ② Design specifications and bid packages
- ③ Project budgets and schedules
- ④ Feasibility studies
- ⑤ Structural analyses and recommendations
- ⑥ Fuel and fuel switching analyses
- ⑦ ESP modeling: physical and mathematical
- ⑧ Fabric testing and recommendations
- ⑨ Project management and quality assurance

### Consulting Experience

- ✓ 25+ years **EPSCO** consulting experience
- ✓ 300+ projects completed
- ✓ Coal-fired utilities, cement plants, pulp & paper
- ✓ Staff of 10 technical consultants and associates

### Responsive

**EPSCO** understands client's requirements and assigns properly qualified engineers on site to accommodate the project schedule. **EPSCO** has worked in 40 states and on 5 continents, responding to the client's needs on a 24/7 basis.

### Over 300 projects including:

- PacifiCorp: Phase I, II, III studies at Hunter 1 & 2, Huntington 1 & 2, Naughton 3 and Phase I & II at Carbon 2
- ProgressEnergy: Structural inspections; Evaluations of ESPs at Mayo 1, Roxboro 2, and Asheville 2
- DukePower: Structural inspections; Evaluations of ESPs at Belews Creek, Cliffside, Marshall and Riverbend
- Wisconsin Public Service: Phase I, II, III upgrades of ESPs with panel plates and RDEs at Pulliam 5 & 8
- Arkansas P & L: Hot/Cold conversions of ESPs at White Bluff 1 & 2, Independence 1 & 2
- San Antonio PS: Hot/Cold conversions of ESPs at J.T. Deely 1 & 2
- TVA: Colbert 1, 2, 3 & 4, coal switching with Phase I, II, III projects
- Niagra Mohawk: Phase I, II, III studied for upgrade of Huntley 66
- IPALCO: Phase I, II, III work at Perry K, Stout 5, 6 & 7
- TransAlta: Centrailia Units 1 & 2, Evaluation of upgrades to ESP and Scrubbers

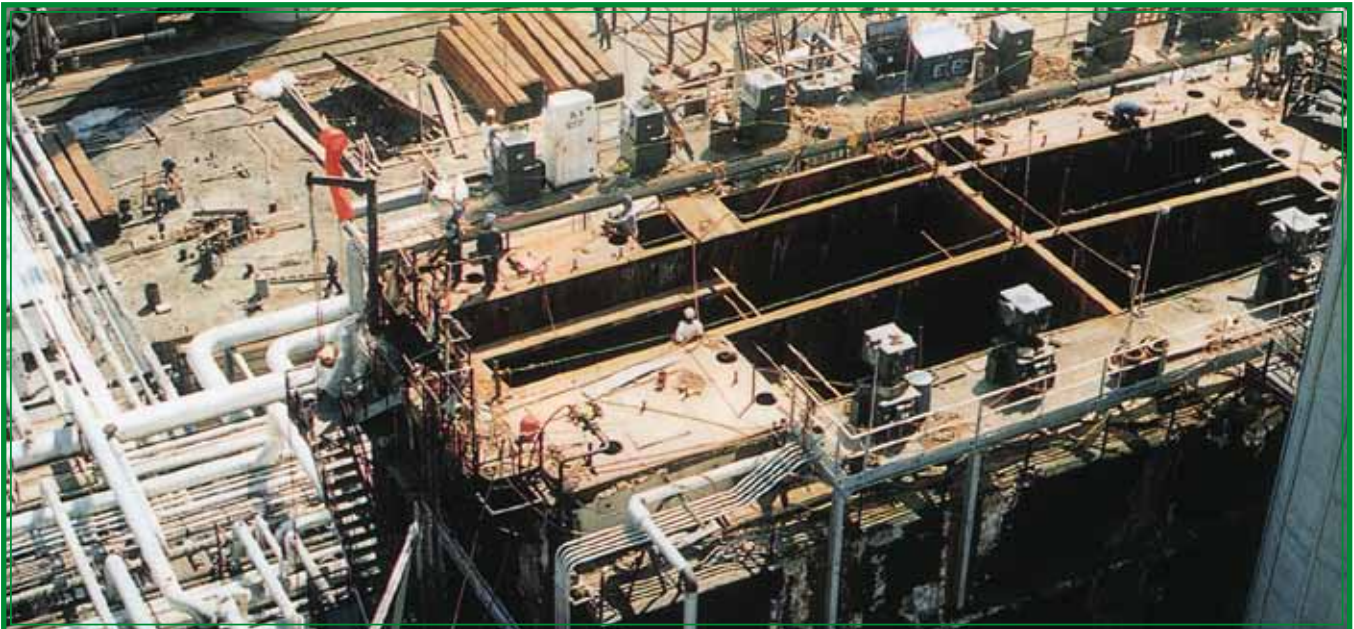
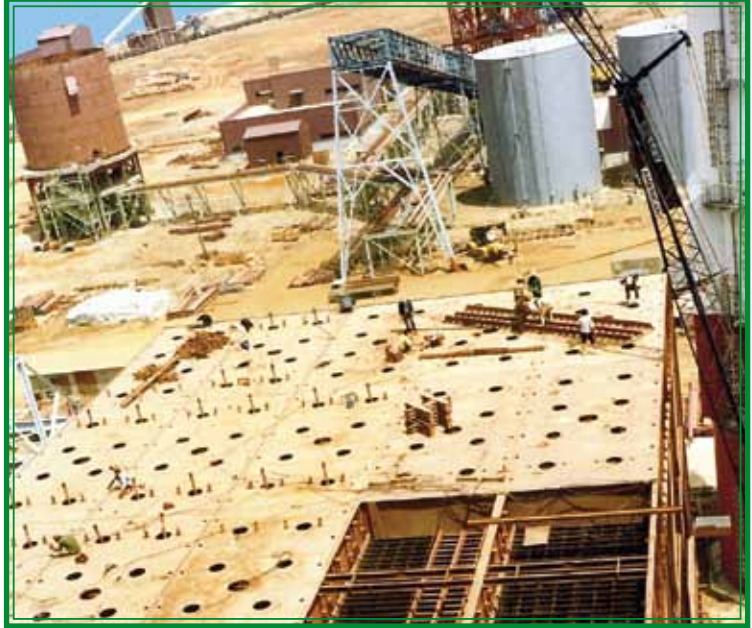


### *Ken Aken*

Kenneth J. Aken has over 40 years experience in the air pollution control business. Employed by The Fuller Co., The Carborundum Co., Flakt, Inc., and ALSTOM Power Inc., Ken's experience has been with fabric filters, electrostatic precipitators, scrubbers, and flue gas desulfurization products and EPC contracts. Ken's career includes positions in administration, engineering, customer service, project management and operations.

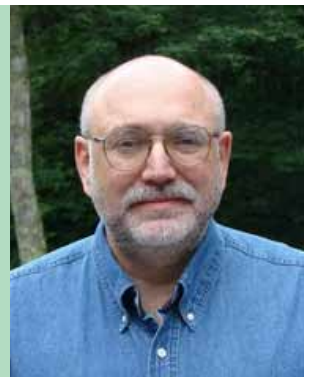
### EPSCO Troubleshoots

- Solves problems thoroughly and cost effectively
- Determines root causes of problems
- Provides long-term corrections and benefits
- Utilizes equipment and process knowledge gained from combined team of international experts.



### *Tom Keeler*

Thomas R. Keeler is the President of both EPSCO International, Inc, and TRK Engineering Services Inc. Tom is an electrical engineer with over 30 years experience in the particulate removal field including 5 years as a field service engineer for Environmental Elements Corporation. He is manager and principle lecturer of Precipitator Seminars, conducting nationwide seminars in electrostatic precipitation. Tom was the editor and one of the authors of the FMAC EPRI "ESP Maintenance Guide" completed in December 2002. In 2008 he received the International Fellow Award from the International Society of Electrostatic Precipitation.



### EPSCO can...

### Conduct engineering services in three phases to define project scope, budget, and schedule.

#### Phase 1: Engineering Evaluation & Reports

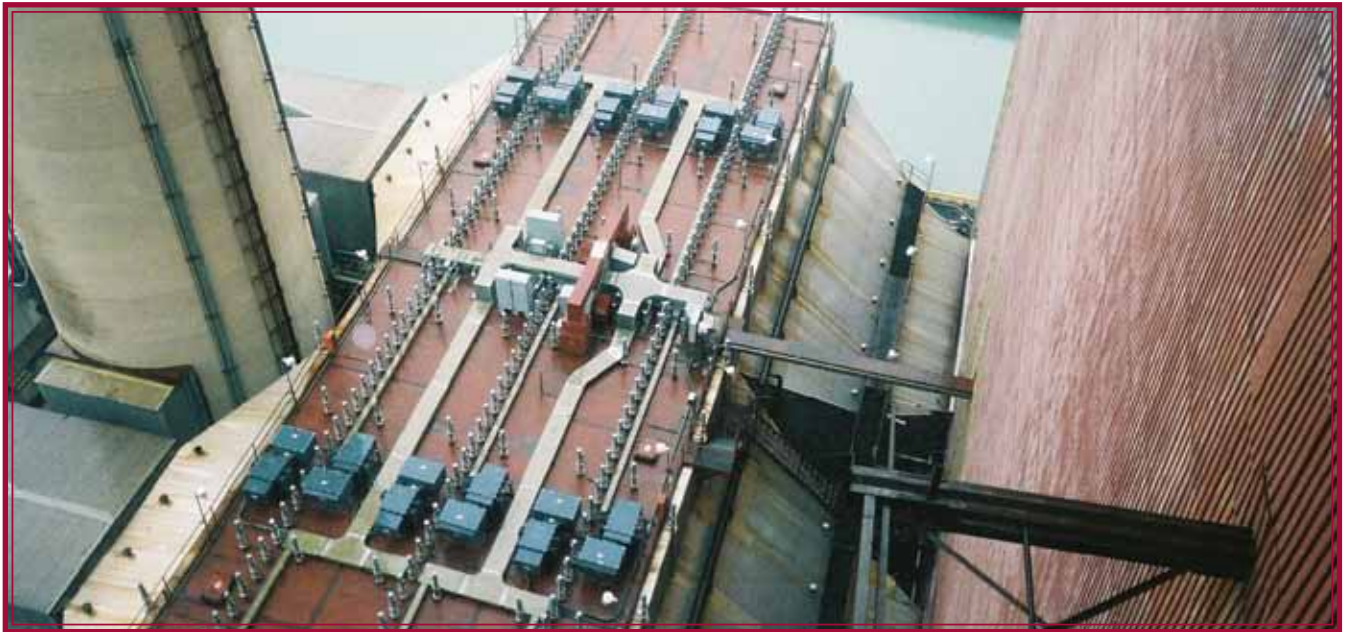
Engineering evaluations define project requirements and site constraints. Options are evaluated, and final recommendations are presented to the client.

#### Phase 2: Detailed Engineering & Design

Fast-track projects including engineering, detailing, procurement, erection and startup require adherence to the agreed upon scope, budget, schedule, codes and design criteria. Good communications is EPSCO's key to successful project management.

#### Phase 3: Post Construction Services

For continuity of services, the design professionals will perform job site reviews, provide engineering support during construction and conduct an overall project evaluation.



### *Larry Boyer*

Larry K. Boyer has 30 years in the air pollution control field. His experience while employed at Wheelabrator Air Pollution Control included applications, engineering, field service, and research and development. Larry has extensive experience with electrostatic precipitators on hot-side and cold-side utility applications, and a variety of industrial applications. Construction checkout, startup, training, testing, troubleshooting, and customer maintenance planning are some of Larry's areas of expertise. Other experience includes fabric filter dust collectors, mechanical collectors and dry FGD installations.

### EPSCO's Approach...

**EPSCO Consultants and Associates have personal experience with wet scrubbers from both the user and supplier side.**

Many of the now aging FGDs need upgrading and maintenance.

**EPSCO** helps their clients meet particulate and gaseous emissions reduction requirements, particularly when operations and maintenance is critical to scrubber compliance. Just as with ESPs and FFs, **EPSCO** Consultants and Associates encourage our Turn Key Approach:

- Online Assessment to gather data and study the systems performance
- Offline Assessment to inspect components for problems and flaws
- Analysis & Recommendations to analyze data & minimize costs



### *Richard Gentile*

Richard L. Gentile, P.E., is a structural engineer, registered to practice in 21 states. He is the co-founder and past President of Multitech Associates, an engineering design company specializing in air pollution control equipment. Richard has over 40 years of structural design experience and is familiar with the mechanical and structural design of most ESP suppliers. Richard's recent activities include coordinating the engineering activities with clients and evaluating the structural effects on ESPs resulting from the addition of SCRs.



### EPSCO's Approach...

### EPSCO can place a team at the site to work with the plant personnel to solve ESP and FF problems.

**EPSCO**, working independently or with the client's A&E firm, can provide recommendations for the user's air pollution control system. **EPSCO** can be involved not only with the FF or ESP, but also with the required modeling, the ash handling system or supporting emission testing.

Other areas **EPSCO** can assist plant personnel with include:

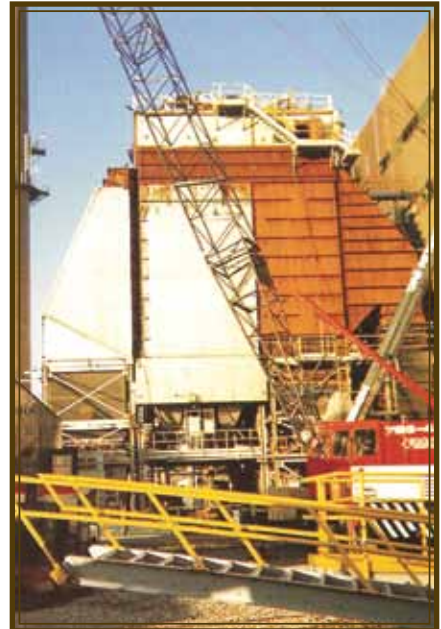
- CEMs Testing
- Electrical Capacity Requirements
- ID Fan & Boiler Issues
- Ash Removal Issues
- Footprint & Space Availability
- Outage Planning
- SCR or FGD installation
- CAMS Plans & Title V Compliance
- Gas Conditioning Requirements
- Personnel Training
- Structural Evaluations
- Startup & Shutdown Requirements

#### Fabric Filters

**EPSCO** provides clients a wide range of Fabric Filter (FF) consulting including solutions to problems involved in ESP to FF conversions. If the gas flow rate exceeds the capacity of the existing ESP box or the structural integrity of the ESP and duct is in question, **EPSCO** can design a new Fabric Filter.

#### ESPs

**EPSCO** consultants have over three hundred years combined experience with ESPs including both theoretical and practical hands-on field work. **EPSCO** can meet their client's most simple or most complicated ESP requirements. The expertise of their consultants overlap and any single consultant can draw upon the experience of the group to solve particularly difficult problems.



### *Charles Barranger*

Charles B. Barranger has over 43 years of experience in the Air Pollution Control Field as an Equipment Designer, Project Engineer, Application Engineer, Project Manager, Proposal Manager, Fabric Filter Project Manager and Manager of Application Engineering for ALSTOM. Was ALSTOM's Fabric Filter representative at ICAC and EPRI. Other areas of expertise include electrostatic precipitator conversions to fabric filters, dry/semi dry injection systems for control of SO<sub>2</sub>, SO<sub>3</sub>, and Hg, wet flue gas desulphurization and combinations of these products to perform as multi-pollutant control plants. The major projects covered Coal Fired Boilers, Iron & Steel, Cement and Waste-to-Energy plants. He has also worked in Republic of South Africa and Brazil.

# **EPSCO** International, Inc.

**EPSCO has provided services to over three hundred clients in the utility and industrial markets over the past twenty five years. Some of these clients are:**

PacifiCorp	EPRI
Dominion/Virginia Electric	Keystone Cement
Duke Energy	SRI
Progress Energy	Alstom Power
Cinergy	WorleyParsons
Alliant Energy	Entergy
LGE/KU	ESKOM
TVA	Occidental Petroleum
Transalta	Iowa Public Service
AEP	Nebraska Public Power District
Ameren UE	Consumers Energy
NIPSCO, LLC	Pennsylvania Electric
Midwest Generation	Northeast Utilities
Ontario Power Generation	Gulf Power
PP&L	Duquesne Light
Orion Power Midwest	Mississippi Power
Madison Gas & Electric	International Paper Company
Syncrude Canada	China Steel
Southern Company	Illinois Power
Dynegy Midwest Generation	Dairyland Power
Dupont	Associated Electric
Alcoa World Alumina & Chemicals	Weyerhaeuser Company
Wisconsin Public Service	PPG Industries
IPALCO	Potomac Electric Power
Arkansas Power & Light	Detroit Edison
San Antonio Public Service	Tampa Electric
Niagara Mohawk	Lurgi

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