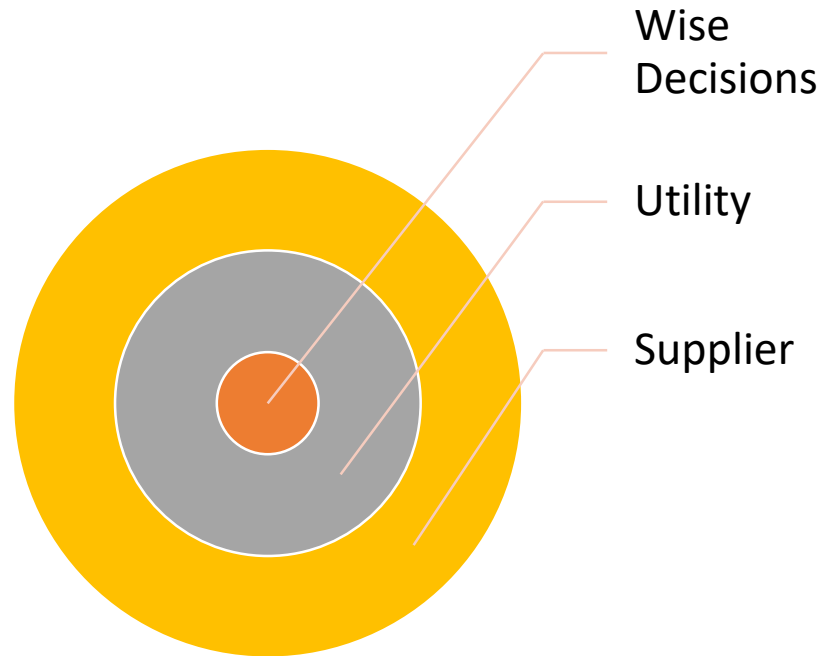


Supplier and Utility Connect

BHE



McIlvaine's Supplier and Utility Connect Facilitates Decisions on Purchases and Operations



The *Supplier and Utility Connect* systems provide an interconnection between supplier and utility which enables better purchasing and operation decision making.

Supplier and Utility Connect - BHE

Berkshire Hathaway Energy (BHE) includes **PacifiCorp**, **NV Energy**, **Mid-American**, **BHE Renewables**, **Northern** and **Kern River Pipeline**. The two pipeline companies transport 7 percent of the natural gas in the U.S. The power companies operate coal, gas, hydro, solar, geothermal, biomass, wind and other renewables generators.

McIlvaine now has Berkshire Hathaway Energy *Supplier and Utility Connect* to be used by suppliers as well as BHE personnel. It has details on every one of the hundreds of power generators within the system. It fulfills the 4 knowledge needs: Alerts, Answers, Analysis and Advancement. It combines [441 Power Plant Air Quality Decisions](#) (Power Plant Decisions Orchard), [59D Gas Turbine and Reciprocating Engine Decisions](#) and [53DI OEM Networking Directory](#) with the custom BHE program. This includes interfacing with hundreds of BHE people indirectly through the Alerts, case histories, etc. and directly through large and small webinars.



Supplier and Utility Connect - BHE makes Multiple Interconnections Possible



Berkshire Hathaway Energy Supplier and Utility Connect

Home | Contact Us | Alerts | People

Monday November 7, 2016

<p>Energy Overview <i>McIlvaine overview and published integrated resource plans</i></p> <p>Coal Fired Plants <i>Continually updated database with components installed and planned at each coal fired plant owned by BHE</i></p> <p>Gas Turbine Plants <i>Continually updated database with components installed and planned at each gas turbine plant owned by BHE</i></p> <p>Gas Turbine Projects <i>Continually updated database of all planned and canceled gas turbine projects in each state served.</i></p> <p>Wind Facilities <i>Details on all wind turbines and components in each State served</i></p> <p>Other Renewables <i>Projects in operation or in planning listed by each technology and each served state for: biomass, geothermal, hydro, methane, solar and wave.</i></p> <p>BHE Pipeline <i>Northern and Kern River pipelines and storage</i></p> <p>Industrial Power Generators <i>Industrial plants generating their own heat and power</i></p> <p>Recorded Webinars</p>	<p>Power Plant Air Quality Decisions</p> <p><i>This continually updated decision system includes guidance for decisions on all power plant combustion, flow control and treatment products and services. The intelligence system has both a rigid keyword and global search engine. If you click on "title" you see the latest postings first.</i></p> <p><i>A global search under PacifiCorp is another useful approach.</i></p> <p><i>The presentations made in the 5 webinars for Pacific Corp are accessed through the intelligence system. Hundreds of previous webinars on the range of power plant subjects can be accessed through the listing of recordings.</i></p> <p><i>4 newsletters are included (Fabric Filter, FGD & DeNOx, Precipitator, and Monitoring-Sampling). The search option at the top of the home page allows retrieval of articles since 1999.</i></p> <p><i>There are subsidiary websites on CCR, Power Plant Valves and other subjects which are linked from the home page.</i></p> <p>Power Plant Air Quality Decisions</p>	<p>GTRE Decisions</p> <p><i>Gas turbine and reciprocating engine components and services are covered in this decision guide. The format is the same as the PPAQD which is described in the first column.</i></p> <p><i>Some of the subsidiary websites e.g. power plant valves, cover both fuel types. One of the subsidiary sites covers gas turbine intake air treatment. There a number of webinars and power point displays in this child web. Another site covers emission control.</i></p> <p><i>Coverage of the control systems for gas turbine plants also provides useful information for the coal fired plant operators. ACC is used in plants with both fuel types. So the information from ACC users is of general interest.</i></p> <p><i>PacifiCorp is predicting only a small amount of gas engine private power. However the tomato experience at Currant Creek followed by the use of gas engines in California and BC support the conclusions of some of the experts that gas engines with CHP along with indoor agriculture and CO2 fertilization will be important in the future.</i></p> <p>Gas Turbine and Reciprocating Engine Decisions</p>
---	---	--

Supplier Networking Directory

This directory includes suppliers of power plant and gas transmission products and services. It also includes flow control, and treatment of gases and liquids as well as treatment of solid waste for all industries. There is a precise and decisive identification of products. For example a new technology classified as "catalytic filter" has been discussed relative to the Huntington and Hunter plants. Suppliers of this new technology can be quickly identified under this product listing. Emails and phone numbers of individuals are included along with their titles and specific orientation e.g. FGD, ultrapure water. The companies are identified by financial entity number as well the generation types served; e.g. coal, gas, and each of the renewables. the products available from each divisional location are listed separately. So, a company such as GE or AECOM

Many Individuals in a Supplier Company Interact with BHE (valve example)

Function	Product	Customer Plant Locations	Industry		Process		
Sales	Control	WA, OR, UT, WY	Coal	Gas	Water Intake	Steam	Fire Protection
Service	On/Off	NV	Wind	Hydro	Cooling	Comb. Air	Lubrication
Engineering and Manufacturing		IA	Biomass	Geothermal	Ultrapure Water	Waste Water	Process e.g. FGD/Geothermal etc.

Alerts

Answers

Analysis

Advancements

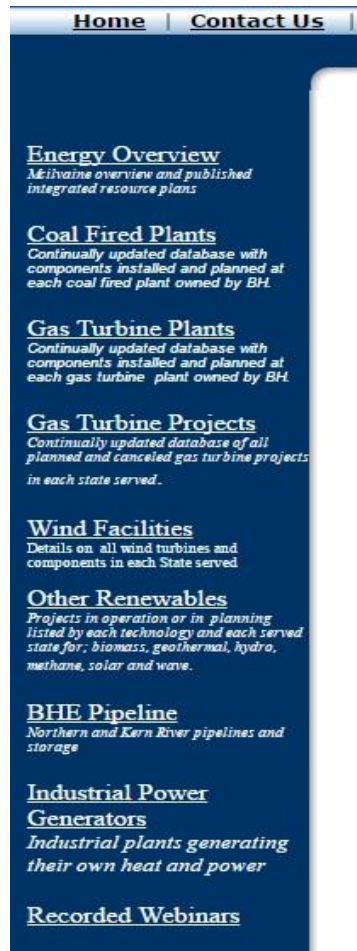


Many Individuals at BHE Interact with the Suppliers (valve example)



Multi Plant Utility Job Categories									
Function	Product	Plant Locations	Industry		Process				
Procurement	Control	WA, OR, UT, WY	Coal	Gas	Water Intake	Steam	Fire Protection		
Maintenance and Operations	On/Off	NV	Wind	Hydro	Cooling	Comb. Air	Lubrication		
Engineering and Planning	Services	IA	Biomass	Geothermal	Ultrapure Water	Waste Water	Process e.g. FGD/Geotherma l Etc.		

Supplier and Utility Connect - BHE has Detailed Information on all the Power Generators and Pipeline Systems



The website has constantly updated data on each power generation, energy recovery and gas storage and transmission system operated by BHE. It also has details on all the larger industrial facilities in Iowa and the western states where BHE has electricity delivery. It includes all the facilities owned by BHE Renewables. Information on the compressor stations and power generators also includes the air permits with detailed regulatory information.

The coal plant information includes details on the furnaces, burners, coal size reduction, ID fans, heat recovery steam generators, SCR, particulate control, FGD, wastewater, ash disposal, and instrumentation.

The gas turbine data includes details on the gas and steam turbines, inlet air systems, emission control systems, HRSGs and water and wastewater treatment.

Details on all the large industrial boilers in each of the served States is also included

Subscribers have Access to Power Plant Air Quality Decisions

Power Plant Air Quality Decisions

This continually updated decision system includes guidance for decisions on all power plant combustion, flow control and treatment products and services. The intelligence system has both a rigid keyword and global search engine. If you click on "title" you see the latest postings first.

A global search under PacifiCorp is another useful approach.

The presentations made in the 5 webinars for Pacific Corp are accessed through the intelligence system. Hundreds of previous webinars on the range of power plant subjects can be accessed through the listing of recordings.

4 newsletters are included (Fabric Filter, FGD & DeNOx, Precipitator, and Monitoring-Sampling). The search option at the top of the home page allows retrieval of articles since 1999.

There are subsidiary websites on CCR, Power Plant Valves and other subjects which are linked from the home page.

[Power Plant Air Quality Decisions](#)

This service is accessed through the Interconnect BHE home page but is also a standalone service available free of charge to any power plant in the world. The system delivers the 4 Knowledge needs: Alerts, Answers, Analysis and Advancement

Alerts: the bi weekly Power Alert, supplemented by 4 monthly newsletters, : Fabric Filter, Monitoring, FGD and Precipitator

Answers: the intelligence system with papers, case histories and recorded presentations is arranged to decisively classify the options available

Analysis: Webinars and recorded interviews with niche experts allow you to properly the classified options

Advancement: This organized system is ideal for in depth or broad training programs. The cultivation of niche experts creates a new resource

The subject matter includes all aspects of coal fired power plant combustion , flow control and treatment. There are separate child websites on wastewater, steam cycle, valves, pumps, NOx control , FGD, monitoring, and particulate control [44I Power Plant Air Quality Decisions](#) (Power Plant Decisions Orchard)



Subscribers have Access to Gas Turbine Reciprocating Engine Decisions

GTRE Decisions

Gas turbine and reciprocating engine components and services are covered in this decision guide. The format is the same as the PPAQD which is described in the first column.

Some of the subsidiary websites e.g. power plant valves, cover both fuel types. One of the subsidiary sites covers gas turbine intake air treatment. There a number of webinars and power point displays in this child web. Another site covers emission control.

Coverage of the control systems for gas turbine plants also provides useful information for the coal fired plant operators. ACC is used in plants with both fuel types. So the information from ACC users is of general interest.

PacifiCorp is predicting only a small amount of gas engine private power. However the tomato experience at Currant Creek followed by the use of gas engines in California and BC support the conclusions of some of the experts that gas engines with CHP along with indoor agriculture and CO2 fertilization will be important in the future.

[Gas Turbine and Reciprocating Engine Decisions](#)

This service is accessed through the Interconnect BHE home page but is also a standalone service available free of charge to any power plant in the world. The system delivers the 4 Knowledge needs: Alerts, Answers, Analysis and Advancement

Alerts: the bi weekly Power Alert supplies the latest information on gas turbines and stationary internal combustion engines,

Answers: the intelligence system with papers, case histories and recorded presentations is arranged to decisively classify the options available

Analysis: Webinars and recorded interviews with niche experts allow you to properly the classified options

Advancement: This organized system is ideal for in depth or broad training programs. The cultivation of niche experts creates a new resource

The subject matter includes all aspects of turbine and engine combustion , flow control and treatment. There are separate child websites on wastewater, steam cycle, valves, pumps, NOx control , and, monitoring,

Custom Intelligence on Renewables and Gas Pipelines

- Alerts cover the range of BHE activities such as hydro, energy recovery, gas pipelines, wind, solar, geothermal, biomass, and distributed generation
- Custom analyses on the renewables and gas pipelines supplement the coal, gas turbine-engine Decision Systems.
- These analyses include extracts from other Mcilvaine Services such as *Oil, Gas, Refining* where all the pipeline compressor station information on BHE Pipeline is extracted and posted to the BHE site.
- Details on planned BHE fossil, renewable and gas transmission projects are also included
- There is special coordination on subjects which relate to all the operations e.g. valves, pumps, water use, wild life protection and a unique [Sustainability Universal Rating System](#)
- The system to further distributed generation goals for BHE includes the identification of potential generators and the identification of uses e.g. tomato growing at the Currant Creek plant

Networking Directories

- There are three categories of directories included
 - BHE Directory
 - Sponsor Directory
 - Global OEM Networking Directory
- BHE Directory: This directory is only available to BHE people and sponsors of 4S01. Nearly all BHE personnel using this system or involved with flow and treat decision making have posted profiles on LinkedIn. Specific links are provided along with other details on their involvement in flow and treat.
- Sponsor directory: Includes contacts for the personnel participating in the interconnection at the sponsor companies. It also includes descriptions of the relevant products offered by sponsor companies
- The OEM Networking Directory includes 40,000 companies with the whole range of products purchased by the Power industry. This directory has a number of unique and valuable features for both BHE and for suppliers who purchase components or services. It is s accessible by product, company, division, zip code and other ways. Individual contact information has email, phone, title and interest area



Features of Networking Directories

- Financial entity number to identify all the subsidiaries.
 - Pentair just sold Tyco Valves to Emerson. All the many Tyco addresses and people will now be identified with the Emerson entity number. Multiple Chinese names are linked to the true financial entity.
- Phone numbers and email addresses of individuals who can answer the questions about the use of their products in the power and gas transmission industries
- Decisive Classification of many thousands of products.
 - Spray driers, circulating dry scrubbers and dry sorbent injection are all distinctly different products and are listed separately
 - A company such as Emerson has many subsidiaries and locations which sell only certain of the products. Each product is linked to the locations where information is available
- Excerpted information on all 40,000 companies is displayed at [View and Correct Your Product Listings](#) (also accessed through Free News at www.mcilvanecompany.com)

Webinars Provide the Analysis by Linking Suppliers and Experts to the BHE Decision Makers- Hunter, Huntington NOx Example

- Five webinars conducted for PacifiCorp relative to reducing NOx at the Huntington and Hunter plants demonstrate the power of what PacifiCorp labeled as the input of the “wise crowd”
- 20 people from PacifiCorp and 60 suppliers, consultants, and universities reviewed both front end and back end NOx options.
- Novel technologies never before used in large coal plants were reviewed (catalytic filters, H₂O₂/urea reductants, H₂O₂/ozone oxidants, in-duct SCR, optimization and reburn.
- The consensus was that some combination other than full size SCR with large vessels is not only possible but probable.
- The savings could be several hundred million dollars
- Additional insights are being published in the Alerts and intelligence system

Example of BHE Connect Supplier Directory – Product Descriptions for Nederman

Nederman MikroPul, Nederman Pneumafil, and LCI Engineered solutions

Nederman provides advanced engineered solutions and large systems for industrial air filtration and pollution control through our sub brands Nederman MikroPul and Pneumafil.

Nederman MikroPul is a leading manufacturer of dust control and resource recovery systems for industrial applications worldwide. Our depth of expertise and broad scope of technologies and global resources allow us to meet practically any filtration or gas cleaning requirement.

MikroPul invented the pulse-jet dust collector in 1956 and has since installed more than 200,000 systems world wide. Our experience and technology has become well known in the industry for addressing detailed projects involving complex engineering and custom fabrication. Application knowledge and attention to detail has elevated us to one of the world's engineering and fabrication leaders for air pollution control and dust collection products.

Nederman MikroPul will integrate all elements from the source to the stack to provide your company with a complete solution. This relieves you of the burden of selecting, integrating, and installing all the items comprising a complex system, while you gain the benefit of working with air quality professionals who understand your process.



Nederman Personnel - Waters, Robert

Subject	Descriptor
Name	Robert Waters
Title	Global Technical Director, Product Management
Phone	803 392 1202
Mobile	706 421 0510
Email	Robert. Waters@nederman.com
LinkedIn Groups	Dry Scrubbing
LinkedIn	https://www.linkedin.com/in/robert-waters-8221ab33?authType=NAME_SEARCH&authToken=8D11&locale=en_US&srchid=43309668147777593250&srchindex=1&srchtot=1&trk=v srp_people_res_name&trkInfo=VSRPs earchId%3A43309668147777593250%2CVSRPtargetId%3A116929754%2CVSRPcmt%3Aprimary%2CVSRPnm%3Atrue%2CauthType%3ANAME_SEARCH

Niche Expertise

- Filter media for dust collectors and filter cloths for filter presses and drum filters

Connection role for BHE

- Will coordinate sales and technical activities relative to media selection for dust collectors operated by BHE
- Will coordinate the selection of replacement filter elements for the gas turbines
- Will advise as to media selection for BHE biomass projects

Background

- He has been with Menardi which is part of Nederman since 2006
- long career involving applications of filter fabrics for wet and dry applications
- **Vice President Technical Services**
- Southern Felt Company, Inc. , and Bondex Inc (Andrew Industries Ltd.)
- February 1984 – June 1994 (10 years 4 months) and Sept. 1995-August 2007 (10 years 11 months) Responsible for R&D of new products, Quality Control/Quality Assurance, and manufacturing techniques for needlepunched nonwovens filtration felt manufacturer in South Carolina. Also responsible for setting up needlefelt manufacturing facility in Shanghai, China, as well as coordinating manufacturing techniques for needlefelt manufacturing facilities in the UK.

Recorded Webinars Facilitate Wise Crowd Decisions

September 8, 2016	PacifiCorp Webinar #5 on Front End NOx Reduction	91 minutes
September 1, 2016	PacifiCorp Webinar #4 on Back End NOx Removal	84 minutes
August 25, 2016	Oil, Gas, Refining	60 minutes
August 2, 2016	NOx Control for PacifiCorp: Back end NOx Control	99 minutes
July 19, 2016	NOx Control for PacifiCorp: Combustion Modifications and Neural Networks	97 minutes
July 14, 2016	NOx Control for PacifiCorp: Overview and Summary of Low NOx Options	69 minutes
July 14, 2016	Desalination	42 minutes
June 16, 2016	FGD and Acid Gas Separation MORE	104 minutes
April 21, 2016	Hot Gas Filtration MORE	65 minutes
April 7, 2016	Power Generation Technologies MORE	53 minutes
March 24, 2016	NOx Control MORE	85 minutes
March 10, 2016	Gas Turbine MORE	58 minutes

LinkedIn Discussion Groups and Niche Experts

- There are LinkedIn discussion groups which are integral to the *44I Coal Fired Power Plant Decisions* and *59D GTRE Decisions*.
- These discussion groups are weighted toward coverage of BHE issues.
- Additional discussion groups will be created to address wind, solar, geothermal, gas transmission and energy recovery.
- Each discussion group functions as a bridge starting with the intelligence system and then to the Alerts and then to updated intelligence system.
- Niche experts from BHE and the suppliers will guide the discussion groups.
- The discussion groups are designed to maximize interconnection on the very specific topics..
- The content of the discussion groups is organized and reproduced in the Alerts for the broader benefit of the subscribers.



Intelligence System Reflects 40 Years of Information Gathering

- Case histories, white papers and articles are all posted for
 - quick retrieval
 - organization to facilitate better decision making through decisive classification
- Titles reflect the value
- Summaries indicate the decision options and also provide the words for global searches
- A decisive classification system facilitates retrieval of all and only relevant documents
 - Applications coded by industry and process
 - Products coded by decades of interaction with suppliers, associations, and users
 - Geographies in precise hierarchical system
- Advantages over on line search engines are much more relevant information retrieved in less time and without extraneous documents.
- Recordings and individual power point presentations from webinars are also included.

Powerful New Potential to Reduce Costs and Improve Operations

- The system identifies all the potential uses of specific products.
- Global sourcing is now a reality because both the supplier and BHE have the understanding of the individual plant needs.
 - Performance and maintenance history. In *Alert 1* Mcilvaine identifies an approved bidders list for Currant Creek with only one approved condensate filter supplier. A presentation by another plant shows that this product has been replaced by that of another vendor due to the need for higher efficiency
 - Global specifying. The potential to purchase in large quantities justifies the analysis of lowest total cost of ownership
 - Mcilvaine is setting up systems for suppliers to demonstrate lowest total cost of ownership through evaluations by niche experts along with the intelligence system background data.
 - Global purchasing can reduce the cost of the products and the cost of administration while improving operations and maintenance.
- The Huntington and Hunter NOx webinars demonstrate the potential for identifying new and better technology. Jeffrey Immelt of GE says that the power industry needs to develop the “hurry up” pace demonstrated in Silicon Valley. With this system there is instant decision making potential.
- From the supplier perspective the evaluation based on total cost of ownership promises higher margins while global purchasing offers the opportunity for large contracts and the ability to provide service for the fleet.

Price and Availability of 4S01 Supplier and Utility Connect - BHE

Service	First Subscriber Price	Additional Users	Notes
4S01 Utility and Supplier Connect-BHE	\$5000	\$300	Includes 44I, 59D and 53DI
Individual Services			
44I Power Plant Air Quality Decisions	\$1600	\$120	Additional users to the individual services can be added at the additional user price. 44I and 59D would be particularly valuable for research, engineering and training. The OEM networking directory covers all applications not just utilities.
53DI OEM Networking Directory	\$1900	\$100	
59D Gas Turbine and Reciprocating Engine Decisions	\$1600	\$120	

44I, 53DI and 59D are useful for suppliers dealing with any utility. Since the individual prices exceed the package price, the best option is the selection of a package with one utility. Additional utility packages can be added at \$3000 each. The goal is to create 100 packages covering all the world's major utilities