

U.S. DEPARTMENT OF STATE
Foreign Service Institute



FOREIGN & CIVIL
SERVICE OFFICER
ENERGY: POWER GENERATION
TRAINING COURSE

Organized by



U.S. Department of Energy
Office of Fossil Energy
National Energy Technology Laboratory
Pittsburgh, PA
July 14-18, 2014
Draft as of July 1, 2014

MONDAY, JULY 14, 2014

(Participants: Please wear business casual attire.)

- 8:00 AM **Registration Opens**
The Ritz Carlton – Pentagon City
1250 South Hayes Street; Arlington, VA 22202; P 703.415.5000
- 8:30 AM **Welcome, Orientation, and Course Overview**
Venkat Venkataraman, Senior Advisor & Project Manager, Project Financing &
Technology Deployment Division, Office of Major Demonstrations, Strategic
Center for Coal, NETL
- 9:00 AM **Opening Address**
Christopher Smith, Principal Deputy Assistant Secretary of Fossil Energy, Office
of Fossil Energy, U.S. Department of Energy (DOE)

9:30 AM **Welcoming Remarks**
Ambassador Carlos Pascual, Special Envoy and Coordinator for International Energy Affairs, U.S. Department of State (DOS)

9:45 AM **Break and Group Photo**

Coal Panel Discussion

10:15 AM Fossil Fuel Formation and Coal Preparation
Mark Klima, Associate Professor, Mineral Processing and Geo-Environmental Engineering, Pennsylvania State University

10:40 AM Mining Overview
Lou Boltik, Director of Global Communications, Joy Global Inc.

11:05 AM Mining Environmental Issues: Reclamation of Mineland Hazards
Barry Scheetz, Professor of Materials, Civil and Nuclear Engineering, Pennsylvania State University

11:30 AM Coal Bed and Coal Mine Methane
Morgan Mosser, Project Manager, Capture Division, Office of Coal and Power R&D, Strategic Center for Coal, NETL

11:55 AM Questions & Answers

12:15 PM **Lunch** (*Mall Food Court located nearby*)

1:00 PM **Electricity 101 & an Introduction to Advanced Power Generation**
Thomas Sarkus, Division Director, Project Financing & Technology Deployment Division, Office of Major Demonstrations, Strategic Center for Coal, NETL

1:30 PM **PC and Fluidized-Bed Combustion**
Steve Moorman, Manager, Business Development and Advanced Technologies, Babcock & Wilcox Company (B&W)

2:00 PM **PJM Markets and Operations**
John Gdowik, Senior Lead Trainer, State and Member Training, PJM

2:30 PM **Shale Gas Fundamentals**
John Duda, Senior Management and Technical Advisor, Office of the Director, NETL

3:00 PM **Liquefied Natural Gas**
William Allen, Manager of Commercial Activities, Dominion Transmission, Inc.

International Fossil Fuel Panel Discussion

3:25 PM International Energy Challenges
Kevin Book, Managing Director, Research, ClearView Energy Partners, LLC

- 3:50 PM *International Shale Plays*
TBD
- 4:15 PM *Worldwide Carbon, Capture, Utilization, and Storage*
Elizabeth Burton, General Manager – The Americas, Global CCS Institute
- 4:40 PM *International Coal Trade*
Matt Preston, Principal Analyst, Global Coal Market Research, Wood Mackenzie
- 5:05 PM *International Oil and Gas Market*
James Burkhard, Managing Director, Global Oil Group, IHS Cambridge Energy Research Associates (CERA)
- 5:30 PM *Questions & Answers*

(Open Evening)

TUESDAY, JULY 15, 2014

(Participants: Please wear casual attire, long pants, flat soled shoes, no high heels or open toed shoes.)

- 7:30 AM Bus departs The Ritz Carlton – Pentagon City *(Please be punctual.)*
- 9:15 AM Arrive in Front Royal, VA
- 9:30 AM **Welcome; Orientation; Tour**
Dominion Virginia Power’s Warren County Power Station
Host: Mike Wood, Dominion Virginia Power
Warren Industrial Park; 508 Kendrick Ln, Front Royal, VA 22630

Dominion Virginia Power officially broke ground on May 31, 2012, for the Warren County Power Station. The station will be powered solely by natural gas and will be among the cleanest fossil-fuel fired facilities in the nation. The station will have three combustion turbines and a steam turbine. It will generate 1,329 megawatts of electricity, or enough energy to power approximately 325,000 homes. Commercial operation is scheduled for late 2014 or early 2015.

- 11:00 AM Depart for Cumberland, MD
- 1:00 PM Arrive Cumberland, MD
Lunch (provided on bus)
- 1:15 PM Depart for Vindex Energy Corporation’s Cabin Run Mine
- 1:45 PM Arrive Vindex Energy Corporation’s Cabin Run Mine
18710 Cabin Run Rd, SW, Frostburg, MD 21532

Tour Vindex Energy Corporation’s Cabin Run Mine
Host: Ron Hamric, Arch Coal, Inc.

Vindex Energy Corporation is an operating subsidiary of Arch Coal, Inc.

2:45 PM Depart for Pittsburgh

5:00 PM Arrive at the Sheraton Station Square Hotel
300 West Station Square Drive; Pittsburgh, PA 15219; P 412.261.2000
(Open Evening)

WEDNESDAY, JULY 16, 2014

(Participants: Casual attire is recommended, as there is a lot of coal dust at this facility which can get on your clothes and is difficult to remove. Please wear long pants, flat soled shoes, no high heels or open toed shoes. No back packs, oversized bags, or cameras are permitted in the plant.)

8:00 AM Depart Sheraton Station Square Hotel

9:30 AM Arrive at FirstEnergy Company's Bruce Mansfield Power Plant
Host: Christopher Cox
FirstEnergy
128 Ferry Hill Road; Shippingport, PA 15077

Welcome and Orientation

Christopher Cox, Outage Team, Bruce Mansfield Plant, FirstEnergy

10:00 AM **Environmental Issues 101:
Carbon Dioxide (CO₂), Nitrogen Oxides (NO_x), Sulfur Dioxide
(SO₂) and Particulates**

Lynn Brickett, Division Director, Capture Division, Office of Coal & Power
R&D, Strategic Center for Coal, NETL

11:00 AM **Overview and Tour of Bruce Mansfield Power Plant**

(Discussion Topics: Electric Power Generation, U.S. Utility Deregulation, Pulverized Coal Combustion Technology, Environmental Control, and By-Product Utilization)

FirstEnergy's 2742-MW_e Bruce Mansfield Power Plant has one of the largest wet sulfur dioxide (SO₂) scrubbers in the United States. The plant features three 914-MW_e pulverized coal-fired boilers manufactured by Foster Wheeler, which are equipped with Babcock & Wilcox low-NO_x burners. The plant has also installed a \$300 million selective catalytic reduction (SCR) system. FirstEnergy is the holding company for Ohio Edison, Cleveland Electric Illuminating Company, Toledo Edison, and Pennsylvania Power. FirstEnergy also operates an on-site Forced Oxidation Gypsum (FOG) facility to produce wallboard quality gypsum – an innovative productive use of a former waste material. Gypsum from scrubber by-products is a cheaper, better quality material with which to manufacture wallboard than naturally occurring gypsum. Scrubber wastes from the plant are sent to an adjacent wallboard manufacturing plant operated by the National Gypsum Company.

The process reduces the amount of scrubber sludge transported from Bruce Mansfield Station to its Little Blue Run disposal site, significantly extending the disposal site's life and reducing costs. The National Gypsum Company facility, one of the largest, single-line gypsum wallboard plants in the world, produces over 600 million square feet of wallboard annually. Use of these scrubber materials eliminates solid wastes that would otherwise have to be landfilled and further

benefits the environment by avoiding operation of a gypsum mine elsewhere. This visit highlights some of the environmental advances achieved in today's coal-fired power plants, including the positive economic and environmental benefits achievable through by-product utilization.

1:00 PM **Lunch**

2:00 PM Depart for Westinghouse International Headquarters

3:00 PM **Tour Westinghouse International Headquarters and Nuclear Control Room Simulator**

Host: Ron Lewis, Vice President of New Plant Product Strategy & Development
1000 Westinghouse Dr; Cranberry Twp, PA 16066

Westinghouse Nuclear Power Plants focus of control is at Westinghouse headquarters in Cranberry Township, Pennsylvania, with project management, contract administration, new plant marketing and development, and product engineering.

5:15 PM Depart Westinghouse International Headquarters

6:00 PM Arrive Sheraton Station Square Hotel
(Open Evening)

THURSDAY, JULY 17, 2014

(Participants: Please wear casual attire and comfortable walking shoes.)

8:00 AM Depart for Alcoa Corporate Center

8:30 AM **Breakfast**

Overview of Alcoa Global Energy Operations

Host: Hanz Heinrichs, Director, Government Affairs
Operating Company: Alcoa, Inc.
201 Isabella Street; Pittsburgh, PA 15212

Alcoa Inc. is the world's third largest producer of aluminum, behind Rio Tinto Alcan and Rusal. From its operational headquarters in Pittsburgh, Pennsylvania, Alcoa conducts operations in 31 countries. Alcoa is a world leader in the production and management of primary aluminum, fabricated aluminum, and alumina combined, through its active and growing participation in all major aspects of the industry: technology, mining, refining, smelting, fabricating, and recycling. Alcoa's products are used worldwide in aircraft, automobiles, commercial transportation, packaging, building and construction, oil and gas, defense, and industrial applications. Alcoa Power Generating, Inc. is a subsidiary of Alcoa, Inc., headquartered in Pittsburgh with projects producing hydroelectric power.

9:50 AM Depart for Range Resources' Marcellus Shale Pad

10:20 AM **Tour of Range Resources' Marcellus Shale Pad**

Host: Michael Mackin
Operating Company: Range Resources

3000 Town Center Boulevard; Canonsburg, PA 15317

Range Resources is an independent oil and gas company operating in the Southwestern and Appalachian regions of the United States. In 2004, Range pioneered the Marcellus Shale, which is now believed to be among the largest known natural gas fields in the world.

Depending on operation schedules, the site visit to Range will include an active drilling location, active hydraulic fracturing location, or a completed and producing well pad - sites are located in Washington County, Pennsylvania.

12:20 PM Depart for Consol Energy's Headquarters

12:30 PM **Lunch**

1:00 PM **Overview of CONSOL Energy's Natural Gas and Water Treatment Operations**

Host: Dick Winschel

Operating Company: CONSOL Energy Inc.

1000 Consol Energy Drive; Canonsburg, PA 15317

CONSOL Energy, a publicly owned Pittsburgh-based producer of coal and natural gas, is one of the leading diversified energy companies in the United States of America. CONSOL's premium Appalachian coals are sold worldwide to electricity generators and steelmakers, and their Natural Gas Division has grown from a pure-play coalbed methane producer to a full-fledged exploration and production operation. CONSOL is a leading producer in the Marcellus Shale and they conduct an active exploration program in the Utica Shale.

1:30 PM **Unconventional Natural Gas Issues – Stakeholder Perspective**
Susan LeGros, Executive Director, Center for Sustainable Shale Development (CSSD)

2:00 PM Depart for MarkWest Energy Partners, L.P. Houston Processing Facility

2:30 PM **Tour MarkWest Houston Processing Facility**

Host: Robert McHale

Operating Company: MarkWest Energy Partners, L.P.

800 Western Avenue; Washington, PA 15301

MarkWest Energy Partners, L.P. is a publicly traded master limited partnership formed in January 2002. MarkWest is engaged in the gathering, processing, and transportation of natural gas; the transportation, fractionation, storage, and marketing of NGLs; and the gathering and transportation of crude oil.

The Houston Processing Facility is part of their Liberty Segment which provides fully integrated natural gas midstream services in the liquids-rich areas of the Marcellus Shale. They are the largest processor of natural gas in Marcellus, with fully integrated processing, fractionation, storage, and marketing operations.

4:30 PM Depart for Sheraton Station Square Hotel

5:30 PM Arrive at the Sheraton Station Square Hotel

(Open Evening)

7:00 PM **Pittsburgh Riverhounds vs. Charlotte Eagles**
Game is not an official event. Pittsburgh's professional soccer team plays at Highmark Stadium, a short walk from the Sheraton Station Square Hotel. General Admission tickets can be purchased at the ticket office for \$12.00 each.

FRIDAY, JULY 18, 2014

(Participants: Please wear casual attire, with flat soled shoes, no high heels or open toed shoes.)

7:45 AM Check out and depart Sheraton Station Square Hotel

8:30 AM Arrive at NETL, Building 83, Conference Rooms 104A and 104B

8:50 AM **NETL Welcome & Overview**
Sean Plasynski, Director, Strategic Center for Coal, NETL

9:10 AM **Gas Turbines**
Robin Ames, General Engineer, Advanced Energy Systems Division, Office of Coal & Power R&D, Strategic Center for Coal, NETL

9:30 PM **Integrated Gasification Combined Cycle (IGCC)**
Jenny Tennant, Gasification Technology Manager, Office of Coal & Power R&D, Strategic Center for Coal, NETL

9:50 AM **CO₂ Storage**
Traci Rodosta, Carbon Storage Technology Manager, Office of Coal & Power R&D, Strategic Center for Coal, NETL

10:10 AM **Alternative Fuels – Coal, Natural Gas, and Biomass to Liquids**
Gary Stiegel, Division Director, Major Projects Division, Office of Major Demonstrations, Strategic Center for Coal, NETL

10:30 AM **NETL International Activities**
Scott Smouse, Advanced Combustion Technology Manager, Office of Coal & Power R&D, Strategic Center for Coal, NETL

11:00 AM **Overview & Tour NETL Office of Research and Development (ORD)**
TBD, Office of Research and Development, NETL

12:00 PM **Lunch**

1:00 PM **Energy and Water Nexus**
Kelvin Gregory, Associate Professor, Civil and Environmental Engineering, Carnegie Mellon University
and
David Dzombak, Sr. University Professor, Civil and Environmental Engineering, Carnegie Mellon University

2:00 PM **Transmission & Distribution Overview: Technology & Regulatory Issues**
Maria Hanley, Program Analyst, Strategic Energy Analysis and Planning Division, NETL

2:20 PM **Smart Grid Overview**
Keith Dodrill, Project Manager, Energy Delivery Technologies Division, Office of Energy Project Management, NETL

Developments in Renewable Energy Panel Discussion

2:40 PM Introductory Remarks and World Energy Demand
Peter C. Balash, Deputy Director, Strategic Energy Analysis & Planning Division, NETL (Moderator)

2:50 PM Hydro Power Generation
Norman Bishop, Senior Vice-President, Hydropower and Renewable Energy, Knight Pièsold and Co.

3:15 PM Topics in the Integration of Renewable Power Generation
Jay Apt, Professor, Tepper School of Business and Department of Engineering & Public Policy, Carnegie Mellon University

4:00 PM Questions & Answers

4:15 PM **Course Closeout Questions & Answers**

4:30 PM Bus departs for the Ritz Carlton – Pentagon City, Washington, DC