Constellation’s Program to Manage Environmental Compliance

ICAC Annual Meeting
Paul Allen, Senior Vice President, Corporate Affairs
Chief Environmental Officer
April 26, 2012
Today’s Topics

- Building a World Class Program
- Integrated Risk Management
- Clean Air Case Study
- A Closing Thought About Jobs
Compliance & Sustainability
EMS
ISO 14001 certifications
Goals
Advocacy
Marketing
Grants
Communication
Strong environmental governance enhances optionality

- Guiding principle: clear and consistent internal governance systems (e.g. EMS) and management of environmental issues positions use well to:
  - Respond to new regulatory requirements
  - Operate wide range of assets
  - Pursue many types of new clean energy solutions, opportunities

- Our EMS was established in 2009 and has now been implemented across the company.

- Constellation Energy Nuclear Group (CENG) is now fully ISO 14001 certified.

- BGE is achieving ISO 14001 certification.
Environmental Dimension of Strategic Objectives

Being a trusted clean energy provider – requires attention to environmental brand

Sustainability leadership, environmental stewardship and performance – going “from good to great” -- requires monitoring and continuous improvement of our impact on the environment (“traditional environmental goals”)

Several areas have an environmental dimension that should be considered when defining objectives and sub-processes to determine appropriate goals and metrics
How does a management system provide value?

Good Systems

1. PLAN
2. DO
3. CHECK
4. ACT

Good results

Become the supplier, employer, neighbor and investment of choice!!

- Reduce Costs and Impacts
  - Incidents
  - Eco-efficiency
  - Fines/penalties
  - Management

- Avoid Risks
  - Non-compliance
  - Supply chain risk
  - Social license to operate
  - Competitor actions

- Create Opportunities
  - New products
  - New markets
  - New partners

- Establishes common language and practices
- Ensures consistent minimum standards across the entire organization
- Creates clear accountability
- Creates focus on key issues
- Finds and corrects problems
- Promotes innovation from engaged/aware employees
- Drives continuous improvement
- Builds culture over time
- Demonstrates corporate diligence
- Supports brand
The Environmental Policy provides guiding principles for our environmental activities across the company.

The Environmental Policy Standards establish the basic requirements for an environmental management system (EMS) at Constellation Energy, in keeping with these guiding principles.

The EPS is consistent with the requirements of ISO 14001 and provides a “master check list” for the elements of the business unit-level EMS and for our company-wide EMS at the corporate level.
Risk Assessment Processes

- Public Affairs Regulatory and Policy Forecasts
- Regulatory Tracking Process
- Investor Relations Q&A Guide Development Process
- SEC Liability Process
- Environmental Sensitivity Review
- Generation EIST Process
- ERMS
- ISO-Style Site/BU Envtl Aspects Assessment Process
- Corp Envtl Metrics Reporting Process
- Audits of Facilities

1. Executive Summary
2. EWG / ERB Review, Endorsement
3. BU Calibration/Review

Report Out to Executive Management and the Board
Environmental Aspects

Consider routine and non-routine operations, including potential emergencies.

**INPUTS**
- Building material
- Equipment
- Fuel (oil, gas)
- Electricity
- Water
- Chemicals
- Labor

**ACTIVITIES, PRODUCTS AND SERVICES**

**AIR EMISSIONS**
- CO2
- CH4
- PM10
- NOx
- SOx
- VOCs
- ODSs

**WASTEWATER DISCHARGES**
- Heat
- pH
- BOD
- TSS

**WASTE**

**COMMUNITY IMPACTS**
- Noise
- Traffic
- Offsite spills
- Light
- Heat

ISO 14001 definition of environmental aspect: An element of an organization’s activities, products or services that can interact with the environment.
ISO 14001 Environmental Aspect/Risk Assessment

• **Purpose**
  – Assess inherent environmental risks (aspects) and quality of controls in place to manage them.
  – Set priorities for where additional controls need to be implemented to mitigate residual risks.
  – Lay the foundation for incorporating significant aspects into other parts of the EMS (e.g., setting objectives and targets, training, emergency plans)

• **Process**

A. List out your work activities and services (internal or external) provided
B. Identify environmental “aspects” that are relevant to those activities and services
C. Assess significance of the aspects and quality of controls in place
D. Determine priority risks and identify improvement opportunities
## CEG ISO Aspect Assessment Tool Template

<table>
<thead>
<tr>
<th>#</th>
<th>Environmental Aspects, Hazards, Issues</th>
<th>Text description of Nature of Aspects/Hazards (how much, from where, how often, etc.)</th>
<th>Risk Rating</th>
<th>Text description of Nature of Controls in Place (hardware, procedures, training, etc.)</th>
<th>Improvement Opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Frequency (F)</td>
<td>Environment [0-3]</td>
<td>Compliance [0-3]</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2.00</td>
<td>1.00</td>
<td>0.67</td>
</tr>
</tbody>
</table>

**Scoring weighting:**

- **Inherent Risk (IR):** IR = (F*S)
- **Residual Risk:** Residual Risk = IR / C

**All the lines of business and corporate functions have been through this process (including at a site level for generation assets):**

Aspects are linked to an activity where possible, as the risks and associated controls are often specific to the source activity that gives rise to the aspect.

*This ISO 14001-style aspect/risk assessment is “impact-based” and bottom-up” in nature.*
Improvement Action Plans

• Close out EPS gaps
• Improve controls in key areas to mitigate risks (based on aspect assessment)
• Although it varied by business unit, most actions taken were related to:
  – Documentation of key programs, procedures and practices
  – Document control and records management
  – Formalizing legal registers and compliance calendars (in particular for the smaller businesses)
  – Training
  – Goal-setting
  – Management review
EMS Implementation: Significant Accomplishments

- Comprehensive audit program and other corporate-level over-sight processes (e.g., SEC reporting, DJSI/CSR reporting, integrated risk management assessment).
- Establishment and evolution of Environmental Review Board (ERB) and Environmental Working Group (EWG) - increased communication, coordination and collaboration.
- Development and implementation of environmental policy standards (EPS)
- Definition of corporate metrics and associated internal quarterly reporting; platform for DJSI and CSR reporting
- Strengthening of environmental compliance and stewardship culture: all-employee environmental awareness training, Environmental Leadership Forum, Earth Month communications, volunteer activities, Environmental Summits, Wildlife Habitat Certifications, EcoStar Grants
## Top Risk Summary – Environmental [snap-shot mid-2011]

### Changes in Laws and Regulations

<table>
<thead>
<tr>
<th>Rank</th>
<th>Drivers/Indicators/Key Concerns</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Environmental Regulations – Clean Air/MACT/CATR [ties to Priority Risk # 19 “MACT”]</td>
<td>Implications of changing air quality regulations, esp. Hazardous Air Pollutants (HAPs) regulations, including Maximum Available Control Technology (MACT). EPA under court ordered deadline to finalize rules for mercury and other HAPs by November 2011, which will require potential upgrades to coal-fired generators. (GHG regulation is not included in this topic.)</td>
</tr>
<tr>
<td>2</td>
<td>Environmental Regulations – Water [ties to Emerging Risk]</td>
<td>Implications of potential strengthening of EPA regulation of water use and water quality, in particular Clean Water Act 316b and effluent limit guidelines – all of which would increase costs and create new risk.</td>
</tr>
<tr>
<td>3</td>
<td>Waste Management – Fossil Generation: CCRs [ties to Priority Risk # 7 “Waste Disposal”]</td>
<td>Implications of EPA potentially regulating coal combustion residuals (CCRs) in a way makes waste disposal more difficult and/or more costly and which may introduce additional risk, including downstream implications for Millennium.</td>
</tr>
<tr>
<td>4</td>
<td>Waste Management – Nuclear [ties to Radar Risk # 32 “Spent Fuel Storage Capacity”]</td>
<td>Legal, reputational, and environmental exposure associated with management of waste from nuclear generation – some of which may introduce cost, risk and/or long term strategic hurdles.</td>
</tr>
</tbody>
</table>

### Non-Compliance and Environmental Impact

<table>
<thead>
<tr>
<th>Rank</th>
<th>Drivers/Indicators/Key Concerns</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Significant Spills and Contamination [ties to Radar Risk # 44 “Spills and Contamination”]</td>
<td>Risk of spills or contamination of land or water that cause adverse environmental or health impacts, entail costs and may constitute material non-compliance and/or have reputational impact.</td>
</tr>
</tbody>
</table>

Environmental Affairs is actively involved, along with Corporate Affairs and Legal and Business Unit experts in policy discussions on key legislative/regulatory risks.
Performance Results Summary

**Compliance**

- NOVs
  - Low overall number
  - Increased inspections vs previous years
- Fines/penalties
  - Low historically
  - Low as compared to peers
- Reportable spills/releases
  - Improvement trend
- Audit findings
  - Fewer per audit
  - None were “significant”

**Stewardship**

- GHG intensity
  - Steady decrease
- NOx intensity
  - Significant reduction
- SO2 intensity
  - Slight decrease
- CCB beneficial reuse
  - Steady progress
Highlights: Much accomplished in recent years
## EPA Regulatory Roadmap for the Electric Sector

### Table

<table>
<thead>
<tr>
<th>Year</th>
<th>MATS</th>
<th>Criteria Air Pollutants</th>
<th>GHG</th>
<th>CCB</th>
<th>316(b)</th>
<th>Effluents</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>Develop MATS</td>
<td>Develop CSAPR</td>
<td>Compliance with Federal GHG Reporting Rule</td>
<td>Develop Coal Combustion By-Products Rule</td>
<td>Develop 316(b) Regulations</td>
<td>Develop Effluent Regulations</td>
</tr>
<tr>
<td>2011</td>
<td>Compliance with MATS (new sources)</td>
<td>CSAPR stayed</td>
<td>PSD/BACT and Title V Apply to GHG Emissions</td>
<td>Pre-compliance Period</td>
<td>Pre-compliance Period</td>
<td>Phase-In of Compliance (5-year NPDES cycle)</td>
</tr>
<tr>
<td>2012</td>
<td>Compliance with MATS (existing sources)</td>
<td>Potential compliance with CSAPR depending on outcome of litigation</td>
<td>Compliance for new sources (effective for new sources upon publication of proposal in Federal Register)</td>
<td>Estimated Compliance</td>
<td>Estimated Compliance</td>
<td>Estimated Compliance</td>
</tr>
<tr>
<td>2013</td>
<td>Potential 4th year*</td>
<td>Estimated Compliance</td>
<td>Estimated Compliance</td>
<td>Estimated Compliance</td>
<td>Estimated Compliance</td>
<td>Estimated Compliance</td>
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<tr>
<td>2014</td>
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<td>2015</td>
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<td>2017</td>
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<td>2018</td>
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### Notes
- Sec. 112(i)(3)(B) authorizes EPA/states to provide up to one additional year to comply with standards if necessary for the installation of controls.
- Enforcement discretion per EPA’s December 2011 memorandum.
- Final Rule (publication date or court deadline)
- Final Rule (estimate; no deadline)
We anticipated a range of EPA regulatory outcomes

<table>
<thead>
<tr>
<th>Regulation</th>
<th>Anticipated Outcome</th>
</tr>
</thead>
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<tr>
<td>HAPs MACT</td>
<td>EPA will adhere to court-mandated timelines; standards will require emissions control equipment on many currently uncontrolled units; some compliance flexibility permitted.</td>
</tr>
<tr>
<td>Transport Rule</td>
<td>Lower caps, but emissions limits less stringent than MD HAA standards; some limited trading.</td>
</tr>
<tr>
<td>CCBs</td>
<td>Hybrid approach; limited beneficial reuse preserved; restrictions on some disposal methods; Millennium permit issued – process moving forward, meets worst case.</td>
</tr>
<tr>
<td>Water/316b</td>
<td>Increased pressure on mountaintop mining and effluent practices puts upward pressure on costs of coal; EPA administrator recently indicated flexibility on cooling tower requirement in 316b.</td>
</tr>
<tr>
<td>GHG Reduction</td>
<td>Mandated reductions in place by 2017 if no federal law; standards/cap will likely require investment in additional efficiency measures and/or lead to gas conversions, CCS, etc.</td>
</tr>
</tbody>
</table>
Brandon Shores
Brandon Shores Plant

- Two 640 net MW pulverized coal units
- Unit 1 – 26 years & Unit 2 - 19 years in Operation
  - Drum Type Boilers operated at 2600 psi
    - produces 4.4 Million lbs/hr of steam
  - Highly Efficient Turbine-Generator
  - Uses 3.5 M tons of coal each year
    - Rec’d by barge, pulverized
  - Produce 6-8.5 Million MWs annually
Designed with the Environment in Mind

- Units circulating water utilizes cooling towers to minimize heat load on the Patapsco River
- Hot Side Precipitators remove 99.4% flyash
- Partnership with STI beneficial re-use of 85% flyash
  - Over 2 Million tons utilized in concrete
- Low NOx burners, Over-fired air
- Selective Catalytic Reaction (SCR)
  - 90% NOx reduction
  - Urea supply converted to ammonia for community safety
- 30-60M gal of plant wastewater recycled each year
- Sedimentation & Erosion control ponds to minimize stormwater run off
Air Quality Control System (AQCS) Project

• Schedule:
  – 2006-2007: Studies on Control System Technology and initial engineering
  – June 2007: Groundbreaking on AQCS
  – September 2009: Construction complete
  – November 2009: Unit 1 AQCS in service
  – February 2010: Unit 2 AQCS in service
  – July 2010: Wastewater system functional

• Cost: $885 Million of a $1B commitment
• Peak of 1,385 personnel on site
Brandon Shores AQCS

✓ Reduced SO$_2$ emissions by 95%
✓ Mercury emissions are expected to be reduced by 90%
CONSTRUCTION PROCESS

The preconstruction and construction process moved forward smoothly because Constellation anticipated stricter federal regulations and prepared accordingly

Groundbreaking June 2007

Completed in September of 2009
Conceptualization of the project prior to the passage of Maryland’s Healthy Air Act (HAA) in April 2006

• Engineering, design, contracting, procurement, planning, and layout commenced while the regulations were being finalized
• Total time from the initial planning to the completion of construction was under four years (January 2006 through September 2009)
• Constellation started the design and permitting process prior to regulations being final
Significant Economic Benefits for the Region

- Constellation's total investment was $885 million
- At peak construction, 1,385 personnel on site at one time
  - skilled craft and construction workers including boilermakers, steamfitters, pipefitters, operating engineers, millwrights, ironworkers, electricians and master electricians, as well as carpenters, teamsters, and laborers.
1600 job-years to build the AQCS

- Outstanding safety performance
- 4.3 million man hours
- worked closely with the Maryland and DC building trades and other unions
- does not reflect the associated manufacturing jobs
AQCS Project Combined Construction Labor Hours
Economic Benefits of the Manufacturing Jobs

• The manufacturers of the cranes and vehicles deployed on site

• Manufacturers of the many large and small components ranging from booster fans, pumps and pump motors, to ball mills, electronics, wiring, steel, concrete, and specialty tiles for the flue gas stack

• Thousands of individuals to make these goods and operate the companies that form the supply chain for this kind of infrastructure
It is this experience that give us the confidence that we our sister companies in the electric power industry can continue to deliver affordable electricity with the great reliability all consumers depend upon, while also meeting the air quality requirements set forth in the Clean Air Act.

- Empirical evidence of man-hours hired and paid;
- Emissions measured and lowered;
- Megawatts successfully produced and bid into the markets.
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