

Workshop on
Electric Utilities and Water: Emerging Issues and R&D Needs
Pittsburgh, PA
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Appendix B
Breakout Group A Participants

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Session Objectives

- Identify current and emerging water issues impacting electricity generation
- Identify technical and scientific RD&D needs and opportunities for industry-government partnerships

Summary of Issues and R&D Needs

Issues

Basin-wide water use planning

- Rationing protocols are needed to handle competing water uses
- Power development is limited due to water supply and restrictions, power transmission and distribution constraints
- A holistic approach is needed to evaluate the effect of U.S. population and economic growth on land management/land use and water/energy infrastructure needs
- Conflicting regulations and regulator interpretation causes confusion
- Incentives are needed to encourage use of new technologies and approaches
- Protocols need to be established for the use of Federal/state/local government authority over water withdrawal discretion
- There is an overall lack of basin-wide management—management needs to be extended across all sectors and stakeholders
- Energy development projects need to address cumulative impacts on a regional/state or watershed basis
- As assessment of new water sources should include underground (e.g. abandoned mines), surface (e.g. reclaimed water), and aquifer (e.g. coal bed methane produced water), and associated new technologies to treat water and/or reduce use and consumption
- Water resource predictions used in evaluating plans for future power plants and technology developments depend on unreliable and uncertain data
- The unreliability and uncertainty in technology development makes planning of future projects difficult

Need for inter-related planning

- Planning is needed to address the impacts of climate variability on power generation
- Water supply and energy supply are planned independently—but they are strongly interdependent. Can this be changed?

- State and Federal agencies need to perform multi-media assessments of power plant development projects

Technology uncertainties

- Environmental and economic impacts of adopting new technologies are not clear
- Power penalties associated with the use of dry cooling technologies in various applications need to be fully evaluated
- Efficiency of water use in power production needs to be fully evaluated
- Can alternative cooling technologies achieve 60-90% entrainment reduction or the equivalent of wet closed-cycle cooling?

Mitigation

- A methodology is needed to quantify and evaluate cost/benefits of restoration measures associated with impingement/entrainment losses
- Does mitigation create the desired result? Is it effective?

Pollution trading

- A framework for Total Maximum Daily Load (TMDL) trading is needed
- Pollution trading guidelines need to be developed

Lack of reliable/consistent data

- Data used in evaluating TMDLs needs to be more consistent
- Additional data and analyses are needed for new policy and regulation development
- What are the minimum flows necessary to support fish and aquatic life?

Regulatory conflict

- Regulations regarding water reuse for cooling need to be clarified
- Conflicting regulatory authorities lead to confusion

Energy security

- How important is a fuel mix to national energy security (electric generation water requirements may differ by fuel type)?

Lack of public education

- Overall public awareness of the interdependence of water/energy issues and economic growth needs to be raised.

RD&D Needs

Basin-wide management tools

- Basin-wide management consortia need to be established—should include all stakeholders in the decision making process
- Develop decision support tools for planning at the basin-wide scale
- Develop regional predictive water resource models, time scales must be flexible enough to span seasonal to decade time frames
- Produce templates for macro-economic evaluations of cooling system alternatives by region
- Develop a better understanding of water use and water balance at power plants using different generation/cooling technologies

Using alternate water sources

- Use of reclaimed/recycled waters needs to be further developed
- Evaluate new water sources and needed technologies, such as water extraction from turbine exhaust
- Evaluate the viability of storm water collection alternatives (“water cropping”)
- Determine compatible uses of waste water
- Evaluate the stability and feasibility of constant water flux in and out of underground storage

- Evaluate the application of aquifer storage and recharge technologies

Cooling system research

- Novel wet/dry cooling systems need to be developed
- Alternate cooling technologies which can achieve 60-90% entrainment reduction or the equivalent of wet-closed-cycle cooling need to be developed
- Determine what environmental problems may result from dry cooling (i.e. entrainment of birds or insects, local heat in air issues, and noise)
- Develop geo-coupling (use of deep mine pools or the earth as a heat sink) for cooling water alternative for power plants
- Evaluate public health effects of alternative cooling systems (direct and food chain effects)

Trading

- Develop an equitable water quality and quantity trading framework
- Evaluate viability of “apples to oranges” trading from an ecological perspective, e.g., pollution-for-fish concept

Refine technology & water quality database

- Capture worldwide experience/data
- Establish a national water information center
- Compile listing of qualified databases for use in TMDL evaluations
- Evaluate the effectiveness and implementation of warm water re-circulation, coatings, etc. for controlling zebra mussels

Secretary of water

- Elevate water issues to the cabinet level