ROLE OF SYSTEMWIDE DISSOLVED GAS ABATEMENT STEERING COMMITTEE

AS PART OF THE TRANSBOUNDARY GAS GROUP

Background

Voluntary and involuntary spill at Columbia River Basin hydroelectric dams (as opposed to water passing through turbines to generate electricity) can cause high levels of total dissolved gas. These high levels can result in violations of federal, provincial, state and tribal water quality standards in both Canada and the United States. Elevated gas supersaturation can also cause gas bubble trauma to both anadromous and resident fish, as well as to other aquatic biota. Various efforts are underway to reduce this problem and improve water quality.

In March 1998, the System Configuration Team and the Dissolved Gas Team, two coordination groups of the U.S. National Marine Fisheries Service (NMFS) Regional Forum, were given the task to begin developing a systemwide approach to dissolved gas management and abatement for the entire Columbia Basin. Previous and ongoing efforts have concentrated on reducing dissolved gas levels at individual dams or through particular river reaches, such as the lower Snake and lower Columbia rivers. This new effort, on the other hand, would characterize the locations and extent of dissolved gas levels produced by dams on the main river channels and major tributaries of the Columbia and Snake rivers. The geographic scope of this cooperative effort will include river basins in British Columbia, Canada, and the states of Oregon, Washington, Idaho and Montana.

This basinwide dissolved gas characterization would be followed by in-depth analyses and modeling efforts to determine a systemwide approach to a basinwide reduction in dissolved gas levels in the Columbia River Basin. This approach may be considerably more cost-effective than proceeding on the present dam-by-dam course of action. For example, the U.S. Bureau of Reclamation is presently evaluating the feasibility of several costly structural alternatives to reduce dissolved gas entrainment supersaturation during spill operations at Grand Coulee Dam on the Columbia River. A systemwide approach to dissolved gas management and abatement may find that operational changes or structural modifications at dams upstream and downstream of Grand Coulee may be less costly and result in greater overall dissolved gas reductions throughout the Columbia River. As a result, a systemwide approach may find that minimal structural and operational changes (at less overall cost) need to be implemented at Grand Coulee as a result of structural and operational changes that could be taken at upstream and downstream projects.

Fortuitously, a second and closely related basinwide dissolved gas planning effort was recently initiated during late April in Castlegar, British Columbia. On April 27-29, 1998, an international conference and workshop entitled "Towards Ecosystem-Based Management in the Upper Columbia River Basin" was held. It was attended by scientists, planners and policy-makers from federal and provincial Canadian agencies, U.S. federal

and state agencies, Indian tribes from the U.S. and Canadian first nations, utilities and private industry. Meetings were held during the conference to discuss transboundary water quality issues, and in particular dissolved gas management and abatement. As a result of these meetings, a Transboundary Gas Group was formed with a membership having a wide variety of water quality and biological expertise. During these discussions, development of a systemwide dissolved gas management plan was identified as a need and as one of several issues to be discussed at the first meeting of the Transboundary Gas Group, which occurred on June 11, 1998, in Spokane, Washington, at the state Department of Ecology office.

At the June 11th meeting of the larger Transboundary Gas Group, which provided an opportunity to discuss transboundary dissolved gas issues in an international forum, the group decided to form subgroups, or work groups, based on various issues discussed during the meeting. Responsibility for coordination for the Transboundary Gas Group is being shared by Bev Raymond of Environment Canada and Mark Schneider of NMFS.

One of the groups formed at the meeting was a Systemwide Dissolved Gas Abatement Steering Committee. This group has met several times during the summer to begin developing a study plan to direct the basinwide effort to abate gas. Les Swain from the British Columbia Ministry of the Environment, Land and Parks, Mary Lou Soscia of the Environmental Protection Agency and James Ruff of the Northwest Power Planning Council serve as co-chairs of the Systemwide Dissolved Gas Abatement Steering Committee. At least one of the co-chairs from each of the other work groups is expected to attend each of steering committee meeting to provide updates and serve as liaison between their respective work group and the steering committee.

Other Transboundary Gas Work Groups

Other work groups, and co-chairs identified for each group, have been formed or combined in the following four areas:

1) Biological Effects and Research (Bonnie Antcliffe, Dept. of Fisheries and Oceans Canada, Bill Maslen, BPA, and Chris Pinney, Corps of Engineers);

2) Monitoring and Information Sharing (Andrea Ryan, Environment Canada and Faith Ruffing, Sun Mountain Reflections);

3) Modeling (Julia Beatty-Spence, BC Environment and Marshall Richmond, Battelle NW);

4) Structural and Operational Abatement (Keith Binkley, Seattle City Light and Dave Zimmer, Bureau of Reclamation).

Goal of the Systemwide Dissolved Gas Abatement Steering Committee

The overall goal of the Systemwide Dissolved Gas Abatement Steering Committee is to develop an action plan for systemwide total dissolved gas abatement. To develop an action plan, the committee will develop a study plan to evaluate and reduce total dissolved gas on a systemwide basis in the most cost-effective manner. The steering committee will also coordinate the efforts of the other four work groups formed as part of the larger Transboundary Gas Group and will manage the overall development and implementation of the study plan. Each work group will be responsible for preparing appropriate sections of the study plan.

Major Elements of the Systemwide Dissolved Gas Abatement Study Plan

The study plan, when completed, would answer the basic questions of what work needs to be done, how long it is expected to take to accomplish the work, and an estimate of the cost for the work. Work on the major elements of the study plan is proceeding in each work group. A draft study plan will be presented to the Transboundary Gas Group at its next meeting on October 15th in Vancouver, B.C. When completed, the work plan will be delivered to decision-makers in both countries with a recommended budget. Decision-makers will then need to allocate funding and/or resources to implement the study plan.

Major elements, or sections, of the study plan are expected to include the following:

- Introduction, including purpose of the systemwide approach to dissolved gas, and the goals and objectives of the effort

- Geographic scope of effort

- Physical dissolved gas and biological monitoring information
    - Identify existing physical monitoring sites and information
    - Identify existing biological monitoring sites and information
    - Compile other available information, including special gas research studies
    - Identify areas of missing data or data gaps
    - Identify known dissolved gas "hot spots" and under what conditions
    - Identify means of systemwide dissolved gas data management and information sharing, i.e., provide a description of how dissolved gas data can be shared among parties on both sides of the border
    - Provide a time and cost estimate, with priorities of effort, to develop physical dissolved gas and biological monitoring data base and a quality control check of data

- Description of dissolved gas modeling approach and alternatives analysis. Explain how the modeling and alternatives analysis will be used in a systemwide approach.
    - Determine appropriate time scale and spatial scale

- Determine degree of model reliability – model calibration and verification
- Develop physical gas production functions for each dam
- Determine modeling output needs
- Develop baseline conditions and gas abatement alternatives for analysis
- Conduct uncertainty and risk analysis
- Provide a time and cost estimate to develop system gas production model, implement each of the items identified above and analyze alternatives

- Development of gas management action plan

  - Identify near-term structural and operational gas abatement alternatives
  - Identify long-term structural and operational gas abatement alternatives
  - Identify relative cost-effectiveness of various gas abatement alternatives
  - Provide a time and cost estimate to further develop and refine gas abatement alternatives
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Transboundary Gas Group Structure

Structural and
Operational
Work Group