

TRANSBOUNDARY GAS GROUP

MEETING NOTES

**October 12, 2000
Simon Fraser University
Vancouver, B.C.**

I. Greetings and Introductions.

Colin Gray and Mark Schneider welcomed everyone to the meeting, held on October 12 at Simon Fraser University in Vancouver, B.C. Gray and Schneider covered a few housekeeping items, then reviewed today's agenda.

II. Transboundary Treaties and Agreements.

BPA's Tony White provided an overview of the various U.S./Canada transboundary treaties and their implications, from the U.S. perspective. White distributed Enclosure C, a brief summary of the Columbia River Treaty; he then spent a few minutes going through its contents, touching on the treaty history, treaty projects, flood control benefits, power benefits, Columbia Storage Power Exchange (CSPE) sales, the entities involved in the various agreements and the Permanent Engineering Board (PEB), operating plans, the Kootenay Diversion, and termination provisions. Please refer to Enclosure C for details of White's presentation.

Next, Ralph Legge of B.C. Hydro's resource management division, chair of the Canadian section of the Operating Committee, provided a Canadian perspective on the Columbia River Treaty. He noted that the Canadian portion contains much of the Columbia River system's storage capability, and regulates a large percentage of the downstream flow. As most of you are aware, he said, British Columbia's main storage projects are Duncan, Mica and Arrow; there are also a number of other storage projects, but they are not covered under the Treaty. In the U.S., only Libby is covered under the Treaty.

As Tony noted, the U.S. and Canadian governments are the two signatories to the Columbia River Treaty, said Legge; the Treaty imposed certain obligations on both sides. Canada committed land, and agreed to develop certain projects; the benefits to this agreement include both power generation and flood control. The period of the Treaty is a minimum of 60 years; if one side or the other decides not to renew the agreement, it will expire in 2024. If either party decides not to renew the agreement, they are required to provide ten year's notice, by 2014 at the latest. Flood control will carry on whether or not the agreement is renewed, Legge noted.

Legge touched on the division of benefits between the two parties, as well as their responsibilities for capital improvements. Obviously, he said, someone is needed on both sides to look after the implementation of the Treaty; on the Canadian side, that entity is B.C. Hydro, while on the U.S. side, it is the Division Engineer of the Army Corps of Engineers' North Pacific Division and the Administrator of the Bonneville Power Administration.

Both parties are required to develop flood control operating plans, Legge continued; the

first plan was prepared in about 1969, and modified in 1972 and 1999. Flood control plans are pretty straightforward, he said; they look at the historic control records, the physics of the entire system and how water can be routed through the system during periods of high flow. It's a pretty basic plan, and doesn't change a lot over time. The hydroelectric operating plans do change, however, he said; the Assured Operating Plan is done six years ahead, and the detailed operating plan is produced the year before the operation, taking into account any changes that have occurred. It is the responsibility of the two parties to develop these plans, then implement that operation.

Legge went through some of the individuals currently involved in the administration of the Treaty; he noted that there is also an Operating Committee, with four U.S. members and four Canadian members, as well as a Hydro Amendment Committee, which has two U.S. and two Canadian members. The Permanent Engineering Board was set up to monitor the agreement, and to ensure that all of the elements of the Treaty are being implemented as intended. Another participant noted that the Columbia River Treaty supercedes the Boundary Waters Treaty within the Columbia River basin; for that reason, he said, the only mention of the International Joint Committee in the Treaty is as an appeals body – it has no governing authority.

Legge said the Treaty participants are currently working on the 2006 Operating Plan; he noted that the operating year runs from August 1-July 31. We've just finished the 2001 Detailed Operating Plan, he said; this plan will cover the period of August 1, 2001 through July 31, 2002.

White noted that the power and flood control benefits of the Columbia River Treaty are fixed every six years in the Assured Operating Plan; once that document is signed, he said, the amount the U.S. will pay the Canadian government under the Canadian Entitlement is fixed – it cannot be renegotiated. If, in the intervening five years, more and more non-power constraints are placed on the U.S. agencies, which reduce their ability to produce power from the Columbia River, we still owe the negotiated amount from Canada – there is no way around that, White said. The non-power constraints that have been imposed on Bonneville, the Corps and the Bureau of Reclamation over the past 15 years have reduced the system's power generating capability by 10%.

Legge noted that the Treaty operator's rule curves include the following:

- • Critical Rule Curve
- • Assured Refill Curve
- • Flood Control Rule Curve
- • Variable Energy Content Curve

He added that all of these curves are updated regularly, based on snowpack and precipitation.

Dave Zimmer asked whether there is any provision in the Treaty for the abatement of gas from the Canadian projects. The short answer is no, Legge replied – the dams are owned and operated by B.C. Hydro, which is solely responsible for their construction, operation and modification. The Treaty requires only that a total amount of storage space be made available behind the dams; their maintenance, operation and modification is up to B.C. Hydro.

Clearly, said Soscia, there is an opportunity for close cooperation between Canada and the U.S. on water quality issues in the Columbia River Basin. She suggested that it might be extremely useful to continue to discuss these issues at future meetings of the Transboundary Gas Group; there was general agreement to this suggestion. Legge noted that, despite the fact that both the U.S. and Canada want to protect their own interests, there is a willingness to work toward agreement on changes that will benefit both sides into the future. There is certainly interest on both sides in finding ways to make the system and the Treaty function better, he said; however, any changes that are to be made will have to benefit both parties.

III. Framework Plan for Coordinated Activities of the Transboundary Gas Group – TGP Bioassays.

Bonnie Antcliffe of the B.C. Department of Fisheries and Oceans provided an overview of recent DFO investigations into the effects of total gas pressure (TGP) exposure on juvenile rainbow trout health and behavior, conducted last year in support of the development of provincial water quality guidelines. She went through a series of overheads (copies of which are available from Antcliffe at 604/666-2210). Among the highlights of the results from this shallow-water, dynamic exposure bioassay:

- • Testing revealed that fish exposed to TGP levels of 114%-116% experienced 42% mortality over 96 hours.
- • Fish exposed to TGP levels of 122% experienced 89% mortality over 96 hours.
- • Variations in tank depth and test duration revealed that allowing fish to seek deeper (2.5 m), less-supersaturated water increased survivability. However, the 96-hour test period may not accurately reflect the effects of dissolved gas on fish as they migrate through the entire Columbia River system.
- • A few replicates were conducted at TGP levels of 140% over three hours; all showed greatly increased mortality.
- • Juvenile fish appear to be at the greatest risk from TGP, because

they make extensive use of shallow-water habitat.

Antcliffe noted that all of these tests were conducted at 10 degrees C; future evaluations will include higher-temperature replicates. She added that rainbow are more susceptible to TGP-related mortality than other salmonid species, such as chinook and coho, so these results cannot be directly extrapolated to those species.

One TGG participant noted that, while this presentation was extremely interesting, total system dissolved gas-related mortality in the actual river, where TDG levels often exceeded 122%, was only 0.2% last year, rather than the 89% mortality observed in the lab. He observed that, to him, this suggests that the fish are able to avoid high concentrations of dissolved gas in-river, while they cannot avoid it in these shallow-water dynamic exposures.

IV. Framework Plan for Coordinated Activities of the Transboundary Gas Group – Biological Resources at Risk.

Bonnie Antcliffe of Canada's Department of Fisheries and Oceans provided an overview of her agency's monitoring activities in 2000 and 2001. The purpose of this monitoring is to provide a picture of the fisheries resources present during periods of elevated TGP, in order to identify key fisheries resources at risk, she said; there are three main tasks associated with this effort:

- • Summarize TGP levels for the transboundary reach of the Columbia River on a seasonal basis – identify the time of year when TGP is typically elevated.
- • Identify the fisheries resources present in specific reaches during periods of elevated TGP.
- • Overlay the information generated during Tasks 1 and 2 to identify key fishery resources and life-history stages at risk – the “biological hot spots.”

Obviously, said Antcliffe, it isn't enough to simply measure TGP levels in the river; many other factors, including water temperature, water depth and duration of exposure play a role in overall mortality. She said there have been a couple of meetings to discuss results from 2000; those results have not yet been fully analyzed, but some preliminary data are available. Antcliffe said it is DFO's hope to have a final report on the 2000 monitoring available some time in the December time-frame; once that report is completed, she said, I will provide it to Mark Schneider for distribution to the TGG membership.

V. Framework Plan for Coordinated Activities of the Transboundary Gas Group – CRIEMP Monitoring.

Dana Schmidt of RL&L Environmental Services provided an overview of his firm's contract TGP monitoring work for CRIEMP. He noted that he has developed mass balance models for each of the facilities RL&L has been asked to evaluate; he went

briefly through these equations, their coefficients and the results from these simulations.

The bottom line, said Schmidt, is that at the Columbia/U.S. Boundary, our analysis, based on the nine-year data set, shows an average of less than one day at 130% TGP, less than two days at 120%+, three days at 115% and 14 days at 114%. In general, said Schmidt, we have a pretty good idea of where our hazards are, with high gas concentrations coming out of Lower Bonnington, Boundary and Keenleyside, and long-term exposure hazards below Brilliant and Waneta – over the nine-year simulation period, we've exceeded the TGP standard 57% of the time at Brilliant and 63% of the time at Waneta.

With respect to our work for Columbia Power, said Schmidt, the Brilliant expansion project is in the planning phase; we're planning to install a 100 MW plant into that facility. The application for that expansion project is expected to be submitted within one month, he said. Once the expansion is complete, it is expected that Brilliant's forebay TDG levels will be in compliance 78% of the time. It is also expected that, once the expansion is complete, it will be possible to reduce TGP levels below Brilliant by 30%-50% simply through spillway selection. The bottom line is that, once the new power plant comes on line, Brilliant will be a much smaller contributor to the downstream TGP problem in the Canadian portion of the Columbia, said Schmidt. The focus of our gas reduction efforts will then shift to the Pend Oreille system, he said.

In terms of future monitoring efforts, Schmidt continued, we're moving away from monitoring for monitoring's sake, and will, instead, be focusing our efforts on solving particular problems at particular facilities.

VI. Framework Plan for Coordinated Activities of the Transboundary Gas Group – 2000 Monitoring in the U.S. – Federal Columbia River Power System.

Dick Cassidy of the U.S. Corps of Engineers provided an overview of the Corps' 2000 water quality monitoring program; he noted that the Corps, the Bureau of Reclamation and the various Public Utility Districts maintain some 40 water quality monitoring stations on the Columbia and Snake Rivers and key tributaries. Data from these sites is posted regularly to the Corps website.

During the winter months, said Cassidy, the Corps is engaged in preparing its annual water quality report; on November 3, the Corps will host a post-season review meeting, to which all of the region's stakeholders will be invited to discuss, with the Corps, the lessons learned over the past year.

Cassidy briefly recapped the 2000 water year in review, characterizing the 2000 water year as below-average. Cassidy touched on the seasonal flow requests at various projects, some of the unusual features of the 2000 water year (including the lack of an Idaho TDG waiver), problem monitoring and TDG areas in 2000 (primarily the reach below Bonneville Dam) and the effects of the 2000 Dworshak operation on water temperatures in the Clearwater and Snake Rivers.

Again, said Cassidy, we will be discussing the results of the 2000 monitoring season in greater detail at the November 3 meeting in Portland. At that meeting, we also hope to generate some ideas about how the program can be improved in 2001, he said.

Mary Todd Haight added that the Corps is currently finishing up Phase II of its five-year study of structural and operational gas abatement alternatives. She noted that this study has already resulted in the construction of flow deflectors at John Day and Ice Harbor Dams. Haight added that the Phase II DGAS report is expected to be available by the end of this calendar year. One participant suggested that, at the next meeting of this group, it may be useful to schedule a presentation on the combined operation of Chief Joseph and Grand Coulee Dams, and the installation of flow deflectors at Chief Joseph.

VII. Framework Plan for Coordinated Activities of the Transboundary Gas Group – 2000 Monitoring in the U.S. – Grant County PUD.

Cliff Sears of Grant County PUD provided an overview of his district's water quality monitoring activities; he noted that Grant PUD maintains five fixed monitoring stations in the Mid-Columbia, at various locations from the Rock Island tailrace to the tailrace of Priest Rapids Dam. We're now using an automated system, which downloads data from the monitoring sites hourly, said Sears; that was new last year, and we have worked nearly all of the bugs out of the system now.

Sears noted that, this year, Grant PUD completed the construction of flow deflectors at Wanapum Dam, which nearly doubled the volume it was possible to spill at that project, compared to 1999 spill levels. In addition, he said, this year, Grant entered into a new spill agreement to improve fish passage for salmon and steelhead during the spring and summer period; under that agreement, we will spill 42% at Wanapum and 61% at Priest Rapids during the spring. During the summer, he said, we will be spilling 49% at Wanapum and 39% at Priest Rapids. That agreement is subject to limitation by TDG levels, he said; if TDG levels exceed 120% tailrace or 115% at the forebay of the next project downstream, spill will be curtailed.

VIII. Framework Plan for Coordinated Activities of the Transboundary Gas Group – Prioritization of Future TGG Framework Activities.

Schneider noted that this is perhaps the most important item on today's agenda; basically, he said, we need to have a discussion about where the TGG is and where we are going. He said Les Swain had developed a strawman TGG framework plan (Enclosure D) which describes the group's various Phase I activities and their current work and funding status. Within each of the various subgroups (Biological Investigations, Structural Characteristics, Facility Operations, Monitoring Information,

Computer Modeling and Framework Plan Integration), there are projects that are either completed, ongoing or proposed, Schneider said; he spent a few minutes going through this list.

Schneider noted that each of the projects on this list has received both an overall priority and a within-category priority; for example, Project MI-00.02 (“Characterize Transboundary Existing Gas Conditions”) has been awarded the top priority, while Project CM-00.01 (“Identify Data and Information Needs for Screening Models”) is ranked second, and Project PI-00.02 (“Transboundary Dissolved Gas Management Status Report”) is ranked last.

The group spent a few minutes reviewing this list; specific project comments included the following:

- • Project ST-00.02 (“Identify Structural Alternatives for Transboundary Gas Planning”) – information on structural alternatives for the American projects will be developed through Phase II of the Corps’ DGAS study.
- • Projects OP-00.01 and OP-00.02 (“Identify Short-Term Operational Measures for Gas Abatement” and “Define Alternative Systemwide Operational Strategies”) – some information will be developed through the upcoming Chief Joseph-Grand Coulee experiment.
- • Project MI-00.02 (“Characterize Transboundary Existing Gas Conditions”) – EPA is considering exploring this question through the upcoming Mainstem Columbia TMDL development process; modeling indicates that there may be some problems and changes necessary, and the Kootenay studies will be examining the existing monitoring data and fixed monitoring network.
- • Project CM-00.01 (Identify Data and Information Needs for Screening Models”) – there is a need to more effectively link reservoir and river conditions.
- • Project PI-00.03 (“Existing Treaties Implications for Dissolved Gas Management in the Columbia River Basin”) – EPA is working on a study to address this question; some funding may be available from the U.S. State Department.

Schneider asked the group to review this list and its proposed prioritization and provide any comments they may have to him prior to the next TGG meeting in April. At that time, he said, it would probably be appropriate to have some discussion about potential funding sources for some of this work. Soscia said that at least some funding may be available through the EPA.

IX. Next TGG Meeting Date.

The next meeting of the Transboundary Gas Group was set for Thursday, April 5 in Portland, Oregon, physical location t.b.a. Soscia expressed frustration that there never seems to be enough time to get to all of the items on the typical TGG agenda; she suggested that it may make sense to make the April TGG gathering a two-day meeting.

There was general agreement that this would be useful. Meeting notes prepared by Jeff Kuechle, BPA contractor.