BC Hydro Site C
Environmental and Socio-Economic Technical Advisory Committees
Process Report

2008 and 2009

Executive Summary

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Executive Summary

The Site C hydroelectric project is one of several options under consideration to help meet BC's future electricity needs. Located southwest of Fort St. John on the Peace River, the potential Site C dam and generating station would provide about 900 megawatts of capacity, and produce approximately 4,600 gigawatt hours of electricity each year. The project was initially proposed by BC Hydro over twenty-five years ago, and has been reviewed as part of long term supply and demand planning several times since.

BC Hydro is taking a staged approach to the current evaluation of Site C as a potential resource option. At the end of each stage of review, BC Hydro will make a recommendation to the Province for a decision on whether to proceed to the next stage of project planning and development. BC Hydro is currently in Stage 2, Project Definition and Consultation; this stage involves consultation with First Nations, public consultation, and engineering and environmental technical studies.

As a component of Stage 2 activities, BC Hydro implemented a series of technical advisory committees (TACs) to collect input and advice from First Nations and government agencies on potential environmental and social issues, and on additional information requirements to better characterize potential effects from the project. The information and advice collected during the TAC process will help inform the decision on whether the project should move on to the next stage of evaluation: Stage 3, which consists of a regulatory environmental assessment.

This Executive Summary document provides an overview of the process and some of the key outcomes from the Site C Environment and Socio-Economic Technical Advisory Committee (TAC) process that was carried out from September 2008 through March 2009.

During Stage 2 this input was considered by BC Hydro during development of baseline studies to characterize existing conditions. Should the project proceed, this input will be further considered toward Stage 3 Environmental Assessment studies.

Overview and Key Outcomes from the TAC Process[1]

The purpose of the Site C TAC process was two-fold:

1. To provide a forum for government representatives and First Nations to provide BC Hydro with input and advice during the pre-regulatory Stage 2 environmental and social assessment activities.
2. To increase the likelihood that pre-regulatory work would be useful for a possible future environmental assessment process.

Invitations to participate in the TAC process were sent from BC Hydro to senior levels of potential participating agencies, including government agencies (local, provincial and federal) and BC Treaty 8 First Nations. Through ongoing First Nations consultation BC Hydro will be open to discussions on these or other topics with additional First Nation communities.

[1] The TAC committee process was conducted under an agreed to Terms of Reference (TOR).

To span the broad range of economic and social assessment issues, seven TACs were formed, including: Fish and Aquatics, Wildlife and Vegetation, Land and Resource Use, Recreation and Tourism, Community Services and Infrastructure, Heritage, and Greenhouse Gas. Each TAC was responsible for addressing the following:

- Scoping and identification of potential issues (impacts and benefits) of Site C,
- Reviewing the assessment methodology for determining the potential effects of Site C,
- Identifying potential information requirements and review proposed study programs, and
- Where sufficient information was available during Stage 2, considering and evaluating preliminary mitigation ideas to minimize or avoid potential adverse effects or to enhance beneficial effects of Site C.

Each TAC met between three and five times between September 2008 and March 2009. The exact approach taken by each TAC to address the above items varied according to the nature of the topics, the status of available information, or participant preferences. In general however the structured dialogues of the meetings were consistent with the generic steps followed in an environmental assessment process (as summarized in the table below).

Table E1. TAC discussions in relation to generic environmental assessment steps

Typical Environmental Assessment Steps	TAC Focus Area
Identify Project Components. These are discrete physical components or activities of a project and/or stages of its implementation.	TACs reviewed project components and activities
Identify Endpoints. Also called Valued Ecosystem Components (VECs) or Valued Social Components (VSCs) these represent key issues and considerations when assessing the effects of the project. For each endpoint, one or more "measures" are defined. Measures may be quantitative or qualitative, but will represent a concise way of summarizing the effects of the project on the endpoint of concern.	TACs reviewed issues / VECs and rationale
Identify Potential Effects Mechanisms. Sometimes called "potential interactions" or "impact hypotheses", mechanisms link project components and endpoints, and describe the pathways or mechanisms by which the endpoints could be affected, positively or negatively.	TACs reviewed potential interactions
Establish Scope of Assessment. Effects are generally characterized at multiple scales, including the local effects in the direct project area, and an assessment of the regional significance of these effects. An appropriate geographic scope of analysis needs to be defined for each endpoint.	TACs reviewed scope questions
Assess Baseline Conditions. This involves establishing the baseline condition (pre-project) of the endpoints and measures that have been identified.	TACs reviewed current baseline studies / information
Assess Effects. This involves predicting the effect of the project on VECs/VSCs compared with either pre-project (baseline) conditions or a predicted future state without the project (base case). The analysis will generally characterize the direction, magnitude, duration/frequency and probability of effects.	TACs reviewed methods for assessing potential effects
Identify Limiting Factors. Where negative effects are projected to occur an analysis is conducted to identify the factors that are limiting the endpoints (e.g.,	Fish and Aquatics, Wildlife TACs reviewed habitat / life

particular habitat types).	stage limiting factors
Identify Mitigation Options. Based on the assessment of effects and limiting factors mitigation options may be identified (e.g., alternative designs or management actions) to reduce adverse effects or enhance positive ones.	Some TACs reviewed preliminary mitigation areas
Assess Residual Effects. This involves estimating the net effects of the project including proposed mitigation measures.	Would be Stage 3 work

Major potential project components or activities were presented and discussed. These components were based on the historic project (the project as it was originally defined about 30 years ago), and provided enough information to understand the general scope and scale of the potential project to guide the TAC discussions. The major components and activities included:

- Dam Site and Powerhouse
    - Construction facilities
    - Water control structures
    - Dam and powerhouse (including diversion tunnels)
- Reservoir
    - Preparation
    - Construction
    - Management
- Water Management
    - Reservoir Conversion (filling)
    - Reservoir Operations
    - Downstream Flow Regime
- Transmission Line
    - Widening of the Right of Way
- Transportation Infrastructure
    - Highway 29 realignment
    - Powerhouse Access Bridge
    - Other Access Roads

Highlights from the individual TAC processes are summarized below.

Fish & Aquatics

The Fish and Aquatics TAC consisted of representatives of federal, provincial and local government, as well as the Blueberry First Nation. The Fish and Aquatics TAC met four times between September 2008 and March 2009.

The Fish and Aquatics TAC identified priority agenda items to address during the process. The group identified key areas of concern for discussion, including species and communities of interest that could be potentially affected by the project. Effects mechanism diagrams were presented by BC Hydro and further developed by the committee to identify areas of potential interaction of the Project with the VECs (also referred to as endpoints). Based on these effects diagrams, the group reviewed existing

information and identified information gaps in consideration of likely future environmental assessment (EA) needs.

The Fish and Aquatics TAC used the following criteria to identify 31 aquatic species as endpoints (of concern):

- Protected status, rare or "at risk" listing.
- Other regulatory requirements
- Cultural significance
- Recreational or commercial significance
- Biological significance – e.g., keystone species
- Sensitivity to expected changes
- Particular dependence on the project area

The Fish and Aquatics TAC reviewed in detail the areas they considered to be the major effect areas:

- Downstream operations
- Upstream (reservoir) operations
- Upstream reservoir conversion (diversion and inundation)
- Dam structure effects

Possible approaches to assessing fisheries impacts for an EA process were considered with the goal of understanding the needs for information requirements; these included habitat-based and biodiversity/biomass-based approaches. Recognizing the role that explicit regional fisheries management objectives could play in an EA, the TAC reviewed draft objectives presented by the Ministry of Environment.

The TAC discussed the topics of fish passage, entrainment and reservoir enhancement. The need for a rigorous framework and analysis in support of decisions regarding fish passage for Site C was discussed, considering a number of factors such as design and cost challenges for a high dam, uncertainty that the resident species would use any provided structures, and ratepayer value in terms of the general cost / benefit considerations of any schemes proposed.

The Fish and Aquatics TAC reviewed considerations for reservoir enhancement:

- **Clarify objectives** – identify the target species (it is anticipated that there will be several scenarios, at least initially).
- **Clarify limiting factors** – what will limit the success of the target species.
- **Identify enhancement opportunities** – based on physical opportunities / constraints and experience elsewhere (what works/doesn't) – identify and characterize the costs and benefits of a set of potential enhancement opportunities.

- **Create fully developed, mutually exclusive packages or strategies** that can be evaluated by decision makers, recognizing that they will have to balance fish, wildlife, recreation, agriculture and other objectives.

Finally the TAC commented on possible next steps and/or follow-up work to support future discussions.

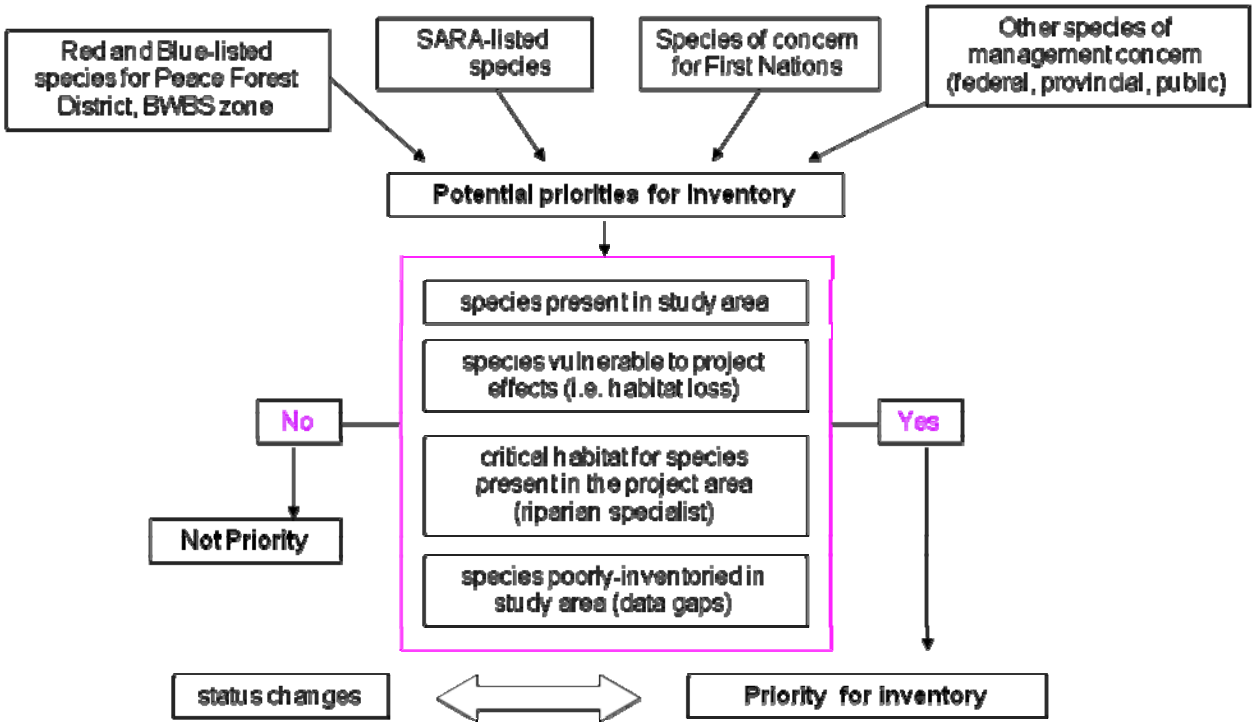
Wildlife

The Wildlife TAC consisted of representatives of federal, provincial and local government, as well as the Blueberry First Nation. The TAC met four times between September 2008 and January 2009.

The Wildlife TAC prioritised its discussion around reviewing the process, criteria and selection of wildlife VECs, reviewing the status of information related to these species (current wildlife studies), and highlighting areas where further study may be required in order to assess the identified VECs, especially in light of baseline data collection which may require several field seasons.

Participants broadly agreed that the ongoing research framework undertaken by BC Hydro through their consultants was appropriate (see Figure E1), including broad definitions of local and regional study areas. The method for selecting endpoints or VECs for detailed survey research was generally seen as sensible, though several alternative or complementary approaches were also discussed, and participants generally agreed with the individual methodologies for field studies initiated and underway (by BC Hydro's wildlife consultants) for establishing baseline data for individual species.

Figure E1: Process for Identifying Species / Groups for Baseline Surveys



Based on TAC discussions, BC Hydro reviewed its existing target species / species groups in consideration of recently released provincial and federal conservation management frameworks (see list below). As a result of the input and further review, additional baseline data surveys were recommended for: northern goshawk, northern harrier, yellow rail, Nelsons sharp-tailed sparrow, American bittern, Le Conte's sparrow, fisher, grouse, woodpeckers, swallows and dragonflies. In response to First Nations interests, work on Stone's sheep was integrated into the remainder of 2008/09 field work.

List of identified wildlife species/species groups identified for assessment:

- Amphibians
- Beaver
- Diurnal raptors
- Fisher
- Large nesting birds
- Rare plants
- Songbirds
- Waterfowl / shorebirds
- Bats
- Butterflies
- Dragonflies
- Harlequin Duck
- Owls
- Reptiles
- Ungulates

In addition, during the course of discussions several species were identified as being of particular concern, but not necessarily in need of direct assessment. A suggestion was made to create a 'watch list' of such species – *black and grizzly bears, Stone's sheep, and river otters* – so that any observations by field researchers will be recorded and reported.

The TAC provided some preliminary advice on project options and mitigation possibilities, such as reservoir clearing, roads and access. The committee expressed a strong preference for decommissioning temporary access roads on the south bank to minimize long-term access by recreational users and associated degradation of wildlife values.

Greenhouse Gas

The GHG TAC consisted of representatives of the federal, provincial and local government, and Blueberry River First Nations and was supported by BC Hydro's consultant (Jacques Whitford AXYS Ltd). The TAC met three times between September 2008 and February 2009.

The central focus of the GHG TAC was to elicit input and advice on the assumptions and modelling methods used by BC Hydro's consultant in developing a GHG emissions model for Site C. In addition, the TAC provided input on information needs for a potential regulatory process and GHG mitigation options at a high level (as options require further engineering analysis to determine feasibility).

The TAC provided a number of suggestions on the methodology for estimating emissions, including:

- A comparison of Site C in relation to other generation technology options and with a consistent methodology, if possible (e.g. life cycle emissions accounting),
- Project emissions should be cumulative over the project lifespan,

- Maintain an ongoing understanding of policy and modelling methods (e.g. Western Electricity Co-ordinating Council, Province of BC and international),
- Update the estimate to include GHG aspects of project construction; including fuel consumption and materials such as cement, and
- At a later date consider including GHG aspects of road and highway use changes pending final decisions regarding regional roads.

Preliminary discussion of GHG mitigation strategies included:

- Use of a conveyor belt (as used at W.A.C. Bennett Dam) to move material,
- Use of a biomass energy plant (thermal only or cogeneration) to combust wood waste,
- Use of "clean" equipment in the construction of the dam site,
- Use of Best Available Proven Technology (BAPT); and
- Purchase of carbon credits.

Socio-Economic / Social TACs

Because of the diverse agency and government interests in social topics, BC Hydro hosted four topic areas – *community services and infrastructure; recreation and tourism; land and resource use; and heritage* – to allow more detailed and comprehensive input from participants. Over the course of the social TAC meetings, participants were provided with overview summaries of the BC Hydro Site C project outline, and relevant information from past or ongoing preliminary studies related to TAC subject areas. Participants reviewed potential project effects and effects mechanism diagrams, identified additional information requirements, and shared ideas for mitigation of potential effects.

Recreation & Tourism

The Recreation and Tourism TAC consisted of representatives of federal, provincial and local government, as well as the Blueberry First Nation. The group met three times between September 2008 and February 2009. Key recreation areas discussed during the TAC included hunting and guide outfitting, fishing, public recreation, tourism, and navigable waters.

BC Hydro reviewed its current recreation and creel survey and recreation inventory, underway during 2008 and 2009, that will be a key piece of baseline information on current recreation use. It was agreed that, overall, the ongoing recreation and angler surveys and baseline data collection were thought to be broadly appropriate.

Several agencies have legislation or jurisdiction related to recreation use, including

- Transport Canada (*Navigable Waters Protection Act*)[2],
- Government of BC (e.g. ILMB through land use planning and MOE through parks and protected area management)[3],
- BC Hydro with existing upstream operations and contributions to boat launches on the Peace River, and
- Local governments and local recreation planning objectives.

The TAC discussed mechanisms by which the project may affect the supply and quality of recreation and tourism opportunities and the demand for those opportunities, including:

- Changes in recreation and tourism setting,
- Changes in recreation and tourism infrastructure,
- Changes in recreation and tourism access,
- Changes in environmental conditions as they affect recreation and tourism, and
- Change in demand for recreation and tourism.

The committee provided a number of preliminary concepts when considering potential mitigation or future recreation use opportunities, including consideration of:

- Seclusion, security, uniqueness of setting,
- Current recreation uses (e.g. fishing, boating, hunting, camping),
- Camping needs,
- Development of new amenities, both public and private (e.g. boat launches, marinas, campgrounds),
- Regulatory requirements, and
- Tourism amenities and activities.

Land & Resource Use

The Land and Resource Use TAC consisted of representatives of federal, provincial and local government, as well as the Blueberry First Nation. The TAC met three times between October 2008 and February 2009.

[2] Transport Canada outlined to BC Hydro and participants the regulatory requirements related to the *Navigable Waters Protection Act*, including how the current recreation use survey should consider detail on water craft usage.

[3] It was noted that there are potential competing management priorities between recreation access and wildlife conservation interests on the south bank of the Peace River associated with the possible Peace River Boudreau Lakes Protected Area as proposed in the 1997 and 1999 Land and Resource Management Plans (LRMPs).

Land and resource values for this TAC were discussed according to the following topic areas:

- Forestry
- Powerhouse Access Bridge[4]
- Minerals and Aggregate
- Land Use Planning
- Traditional Use Activities[5]
- Agriculture
- Transportation (highways)
- Oil and Gas
- Trapping

TAC discussions occurred for each topic area covering identification of potential effects and issues, review of available information, identification of potential information gaps, and preliminary discussion of mitigation considerations particularly in light of a draft reservoir clearing plan presented to the TAC.

Some of the key land and resource use potential effects highlighted during the TAC discussions included:

- Land being altered or converted from its current use. For example:
    - Loss of agricultural land, or the conversion of land away from agricultural purposes, including fragmentation of farm land.
    - Loss of timber from the timber harvest land base and an associated potential change to the annual allowable cut, and possible pricing and market distortions to the regional forestry industry associated with project clearing activities (i.e. merchantable timber).
- Impeding access to or alienation of resources.
- Potential "public use" of the powerhouse access bridge – any future decision to allow "public use" of the powerhouse access bridge would increase the study area for assessing project effects on land and resource use, due to increased access to south bank land and resources and a possible shift in regional travel and access patterns.
- Local government future development areas – understanding any direct or indirect project impacts or constraints to local government planning boundaries (e.g. would it be more difficult for local governments to withdraw areas from the Agricultural Land Reserve).
- Regional land use planning - clarifying the future base case against which project effects would be compared, including the possible Peace River Boudreau Lakes Protected Area as proposed in the 1997 and 1999 Land and Resource Management Plans.

The importance of including a cumulative effects assessment associated with other land use activities and developments was raised[6].

[4] The powerhouse access bridge was considered as a separate category to explore how public use may affect the other land and resource categories.
[5] Traditional use activities were added as a land and resource use category at the request of Blueberry River First Nation's representative.
[6] It was noted that cumulative effects would be a regulatory requirement to evaluate should an environmental assessment be carried out, if the Site C project moved into Stage 3 of the review process.

Prior to the start of the TAC process, BC Hydro had commissioned a consultant to seek and compile baseline information on existing conditions, and to identify any data gaps related to assessing potential project effects on land and resource use interests. The preliminary baseline information was shared and discussed during the last TAC meeting to request input to refining future information requirements.

Community Services & Infrastructure

The Community Services and Infrastructure TAC consisted of representatives of federal, provincial and local government, as well as the Blueberry First Nation. The TAC met three times between September 2008 and February 2009.

Community services and infrastructure values were organized according to the following categories:

- Labour Market
- Community Infrastructure
- Health Services
- Government Finances
- Lifestyle and Recreation
- Housing
- Education
- Solid Waste Management
- Economic Development
- Public Safety

Some of the main community services and infrastructure potential effects highlighted during the discussions included:

- Local labour market effects associated with the potential project construction phase.
- Need to understand the potential implications of temporary and permanent construction worker housing requirements, and worker housing alternatives, including the location and size of any worker camps.
- Demographic and population changes in host communities, if people move to the area in response to employment opportunities.
- Any requirements by the project for community services (e.g., education, health, or recreation) or infrastructure (e.g., sewer, water or waste).
- The lead-time necessary for local or provincial governments to plan for and implement any services or infrastructure programs after a decision has been made to proceed with the project.
- The limited capacity of current regional solid waste management facilities to accept project waste.
- The inter-community effects between northern communities associated with the potential project.

Although information on potential effects was not available at this early stage, some preliminary thoughts on mitigation areas were offered by TAC participants, as follows:

- Upfront training and skills development to facilitate local labour force participation, in particular under-employed groups.
- Hire from non-local labour sources (to lessen in region labour competition).

- Consideration of a procurement approach that favours local participation in project construction, such as coordination with local employment agencies, monitoring local labour market conditions.
- Consider worker housing options in view of the current community interests (e.g. percent of construction workforce living in camps).

Prior to the start of the TAC process, BC Hydro had commissioned a consultant to seek and compile baseline information on existing conditions, and to identify any data gaps related to assessing potential project effects on community services and infrastructure interests. The preliminary baseline information was shared and discussed during the last TAC meeting to request input to refining future information requirements.

Heritage

The Heritage TAC consisted of representatives of federal, provincial and local government, as well as the Blueberry First Nation. The TAC met three times between October 2008 and February 2009.

TAC discussions were generally organized into three main categories: archaeology sites (pre-contact), heritage sites, and palaeontology sites. The emphasis of this TAC was on discussions related to heritage assessments needed to better characterize potential project effects on heritage values.

Prior to the start of the TAC process, BC Hydro initiated a heritage resources data gap analysis, which compiled existing information and identified additional heritage assessment work that may be required. The draft results from this work, including maps of previous surveys and found sites, were shared and discussed during the TAC process and helped inform the discussions.

TAC participants discussed a wide array of potential issues associated with the potential project on archaeology values. In general, these issues were related to changes in:

- The condition or integrity of an archaeological site[7],
- Access to a site for future scientific investigation or research,
- Spiritual value or importance of a site, and
- The ability to use the site for social and traditional use purposes.

It was highlighted that any assessment of, investigation of, or changes to archaeology sites would be regulated under the provincial *Heritage Conservation Act*. A key area of TAC discussion was the appropriate approach for carrying out an archaeological inventory and a general framework for guiding a sampling program was agreed to, which included the development of a potential archaeological model, assessing landscape units, identifying sampling areas and appropriate survey methods.

For heritage and paleontology sites, the main areas of interest in terms of possible project effects included:

[7] This would include any physical changes with the artefacts themselves, or a change in the relationship among the artefacts or in context of the greater landscape setting.

- The condition or integrity of a site,
- Access to a site for future investigations or interpretations, and
- Possible effects on the tourism industry with the loss or alteration of a site.

TAC participants also offered a number of ideas as mitigation considerations or benefits, for example:

- Opportunities for local First Nations to be involved in future heritage field work,
- Capacity building and training opportunities with First Nations to better allow them to participate in heritage inventory and assessment work,
- Development of a web-based inventory catalogue,
- Support the ability to display or hold artefacts in local communities (e.g. First Nation communities),
- Use the local museum as the repository for archaeological artefacts (Note. Fort St. John museum is often the local repository, however much of the previously found artefacts are at SFU),
- Minimise heritage site disturbance by minimising new road development where possible, or by considering design or route options where new temporary or permanent access roads are developed (e.g. transmission right of way, helicopter use),
- Consider transmission tower designs that minimise right of way clearing or tower footprint, and
- Consider physical site protection (e.g. capping).