

Peace Project Water Use Plan

Physical Works Terms of Reference

- **GMSWORKS#6 Peace River Mainstem Stage Discharge**

Addendum 2 (Rev. 1)

June 27, 2013

A2 Addendum to GMSWORKS#6 Peace River Mainstem Stage Discharge

A2.1 Addendum Rationale

The WUP prescribed a budget of \$50,000 to deliver this project over a 10-year period. However, after the installation of the equipment, it is clear that the WUP budget estimate does not reflect the effort and costs required to obtain data sufficient to reach the objective that drives the project. Specifically, the budget will not support the envisioned methodology of maintaining five stations to RISC (2009) Grade A standards over a 10-year period. The RISC standards were developed by the BC Ministry of Environment to define uniform guidelines for field procedures, calculations, validations, and documentation of hydrometric information from non-integrated (non-Water Survey of Canada, WSC) hydrometric stations. Grade A standard is applied to the highest level of data quality. The consultant has proposed an alternative maintenance program of regularly scheduled annual work for a period of five years at the RISC (2009) Grade A standard. The consultant advises that this will address the objective. The revised five-year program, with contingency for the full five years, will be delivered under the same total budget as was planned for the 10-year period. The work for three of the five years is now complete, and the remaining two years will be delivered in 2013 and 2014.

A2.2 Revised Work Plan for GMSWORKS#6 Peace River Mainstem Stage Discharge

1. Annual Gauging: One one-day field excursion in per year to collect one flow measurement and water surface level survey at each hydrometric station.
2. Quality review of data including data reviewed for anomalies, results compared between the other four sites and local Water Survey of Canada (WSC) station data, flow measurements compared with past results (i.e., stage discharge rating curve), and level surveys compared with recorded data.
3. Station Repair and Maintenance: Station maintenance in 2013 includes checking and potentially replacing components of the stations; such as voltage checks on the batteries to ensure that the solar panels and batteries are fully functional, desiccant pack replacement for moisture absorption, and any repair and replacement that is required for damaged station components. Currently the following maintenance is required or expected to be required:
 - . Peace 1: replace desiccant
 - . Peace 2: replace solar panel, battery, desiccant, lock, pressure transducer
 - . Peace 3: replace desiccant
 - . Peace 4: replace desiccant
 - . Peace 5: replace solar panel and desiccant

A2.3 DATA QUALITY REVIEW 2009 TO 2012

Past data - to the end of 2011 - has been checked for obvious errors and rating curve consistency. However, it is recommended that more detailed quality assurance / quality control (QA/QC) review be conducted. It is proposed that the data be incorporated into the consultant's Aquarius database and thoroughly compared for both temporal and spatial inconsistencies. Comparisons will be made with the other BC Hydro Peace River gauges and the local WSC gauges. A seasonal flow balance model will be developed both to assist in the QA/QC assessment and to provide an improved tool for approximation of lateral inflows to assist in future model runs (application of model developed in GMSWorks#5). Following the QA/QC review a document will be prepared similar to the yearend report proposed under Annual Gauge Maintenance.

A2.4 Revised Deliverables for GMSWORKS#6 Peace River Mainstem Stage Discharge

This project includes the following deliverables: Annual reporting, including summary of gauge and measurement QA/QC, as described below, and follows the requirements suggested previously by BC Hydro, that is:

- (a) An executive summary of the project to date;
- (b) The objectives and scope of the project;
- (c) Methods of data collection (including map of sites and photo documentation), assumptions, and analysis;
- (d) A description of all maintenance work completed;
- (e) A description of all maintenance work recommended but not yet completed;
- (f) A description of the compiled data set and results of all analyses, and
- (g) A discussion of the consequences of these results as they pertain to the project and use of the collected data.

A2.5 Revised Schedule GMSWORKS#6 Peace River Mainstem Stage Discharge

Year 4 (2013)	Fieldwork (gauging & station repairs and maintenance): March to November Reporting: February 2014
Year 5 (2014)	Fieldwork (gauging): March to November Reporting: February 2015

A2.6 Budget for GMSWORKS#6 Peace River Mainstem Stage Discharge

Total revised costs: \$266,922