Peace Project Water Use Plan

Monitoring Program Terms of Reference

- GMSMON#18 WLL Dust Control Monitoring

Addendum 2

2011-04-06
A2 Addendum to GMSMON#18 WLL Dust Control Monitoring

A2.1 Addendum Rationale

This project is intended to carry out a long-term air quality monitoring program in the Finlay Arm of the Williston Reservoir. This monitoring will quantify the 24-hour average levels of particulate matter (PM) less than 10 \( \mu \)m and less than 2.5 \( \mu \)m in diameter (PM10 and PM2.5) in the airshed of the Finlay Arm.

These data will provide a means to evaluate the effectiveness of the control measures that will be used to reduce the emissions of PM10 and PM2.5 caused by wind erosion on the exposed beaches of the Williston Reservoir. Acquiring these data will also be important for assessing whether the PM levels are within the proposed standards set by the Provincial and Federal regulatory agencies. In part, these data can be used to evaluate the degree of exposure to airborne PM for people living in this area.

In 2008 through 2010 this project conducted air monitoring throughout the Finlay Arm of Williston Reservoir. In 2008 and 2009, data collection occurred from early May through late June, a period coinciding with the lowest water levels and greatest potential for dust emissions from Williston beaches. In 2010, air monitoring was extended at a subset of locations through to the end of August due to low reservoir elevation that resulted in a longer period of beach exposure to wind and consequently a longer dust season. In addition, in 2010, the long term strategy for this project was developed based on our learnings-to-date. Those learnings, described below, have resulted in several proposed changes to this project to better address the management question.

Key learnings that impact the addressing of the management question:

- In years of less-than-full-pool, the dust season extends from spring through autumn. Dust mitigation techniques currently in use have a limited life in some locations and treatments must be reapplied over the course of the dust season. There is, therefore, the need to assess air quality throughout the dust season to address the management question.

- The air quality monitoring instruments acquired in 2008 have significant logistical constraints (particularly power requirements) that limit the operational period of use to a short window, precluding air monitoring throughout the dust season. Accompanying the logistical limitations is a risk of environmental damage by fuel spill and forest fire.

- Monitoring instruments now available can provide the same quality of data but do not have the same logistical limitations and environmental risks as the original equipment. New instruments will allow air quality monitoring in the field throughout the dust season and in the two communities throughout the year.

- Better baseline data is required in the dust-affected communities of Tsay Keh and Fort Ware, home to the Tsay Keh Dene and Kwadacha First Nations, respectively. The communities are concerned with both the nuisance and potential health impacts of reservoir dust. Fort Ware was the control site for air quality monitoring in a study into the health impacts of dust in the communities conducted jointly by the two First Nations, Health Canada, and BC Hydro. To date the project has not monitored air quality within the actual communities, although data was collected from the beach in front of the village of Tsay Keh. Because the management question is directed at assessing the impact of dust mitigation efforts in the upper Finlay Reach airshed, appropriate measurements...
in both Tsay Keh and Fort Ware are required to accurately assess the human exposure to the dust.

The revised project described in A2.2 replaces the existing instrumentation with the improved and more suitable modern units, and makes provision for monitoring air quality throughout the dust season in the drawdown zone and throughout the year in the communities of Tsay Keh and Fort Ware.

A2.2 Long-Term Air Quality Monitoring Program

The long-term air quality monitoring program is designed to answer the management question and objectives of the project as described in the original TOR. The program is not designed to measure short-term dust concentrations at an eroding point.

The program includes:

- Monitoring concentrations of PM10 and PM2.5 and meteorological conditions (wind speed, wind direction, temperature, relative humidity, and atmospheric pressure) at all study sites
- Baseline monitoring stations
  - Two sites, one each in the village of Tsay Keh and Fort Ware. Site selection of the stations will consider the need for unobstructed airflow between the station and the reservoir, exposure to buildings, trees, and distance from nearby emitters (e.g., roads, wood burning appliances)
  - Year round hourly average PM aerosol mass and meteorological measurements
- Remote air quality monitoring stations
  - Eight sites along the shoreline of the reservoir. Site selection will be based on the following considerations: cost, elevation, horizontal distance from reservoir, road accessibility, distance from village of Tsay Keh, and equal positioning on each side of reservoir at approximately the same latitude.
  - Operation of these stations will be from spring to peak pool of the reservoir, with a 24-hour PM aerosol mass measurement taken every six days along with hourly average meteorological measurements.
  - An identical instrument will be set up at the Tsay Keh baseline station to quantify the bias of the remote instruments.
- PM chemistry analysis for selected samples
- QA/QC procedures (e.g., calibration of instruments, filter blanks, performance and system audits)
- Data analysis: The data set will provide the means to characterize and quantify the regional average 24-hour PM levels as a function of location and meteorological conditions in the Finlay Arm of Williston Reservoir. Analysis will include time series plots of the mean PM concentration as a function of location to compare measurements to criterion set by the regulating agencies. The accumulation of the annual record will form the basis for determining spatial and temporal trends in the regional air quality and link the trends with dust mitigation practices in the Finlay Arm of the reservoir.
Data reporting will include the development of a database to store all data as well as a formal report (see Section A2.3 for details)

- Engagement with the communities of Tsay Keh and Fort Ware

**A2.3 Revised Deliverables for GMSMON #18 WLL Dust Control Monitoring**

All deliverables listed in the ToR.

**A2.4 Revised Schedule**

Implementation of the long-term air quality plan will begin in 2011 and the schedule is anticipated to be as follows:

- Air quality monitoring equipment purchase – March 2011
- Installation of existing air quality monitoring and meteorological equipment at TKD, Fort Ware, and remote sites – May 2011
- Weekly data download of monitoring equipment
- Monitoring station construction (climate-controlled huts) for new air quality equipment – May-June 2011
- Installation of new equipment – July-August 2011

Once installed new equipment will require site visits on a 5-day cycle to replace filters, download data, and provide any necessary maintenance. Remote stations will be removed from the field each year when reservoir levels reach peak pool or by October 15, whichever comes first. Equipment will be re-installed in the spring of the following year. Baseline stations located in Fort Ware and Tsay Key will operate year round. Draft annual reports are due in February and final reports in March of each year.

**A2.5 Revised Budget for GMSMON#18 WLL Dust Control Monitoring**

The following table replaces that in section 2.6 of the TOR and section A1.7 of Addendum 1. The total cost for the Revised GMSMON#18 WLL Dust Control Monitoring is $4,599,960.