Q. **Reference: Upgrade Diesel Plant Production Data Collection Equipment – Various Sites, Volume II, Report 23**

Is this project economically justified? If it is not, explain why it should not be economically justified.

A. This project is not directly economically justified. However, the data collected as a result of this project will be used to produce better economic justifications for future equipment replacements in Hydro's isolated systems.

Timely production data will provide the necessary data for Hydro's operations and system planning purposes. Currently, the data is typically retrieved on a monthly basis and does not provide the sampling rate to provide detailed plant load profiles.

The more accurate and detailed the data that is available, the more confidence there is in the results of studies and thus the longer system upgrades can be delayed without exceeding criteria. With coarser data to work with, decisions have to be more conservative, and sometimes, system upgrades have to be carried out sooner. On multi-million dollar generation upgrade projects, being able to delay a project by as little as one year can lead to savings of tens of thousands to hundreds of thousands of dollars.

The increased detail of the data collected will also be used to improve planning in a number of areas:

a) Forecasting

Having access to detailed demand information facilitates annual peak forecasting efforts by allowing for the normalization of weather, day of week and cold load pick-up effects on actual peak demands. The increased demand detail will also provide a better understanding of isolated system demands which can then be applied to predicting demand by hour and day of week which aids unit sizing for capacity additions or unit replacements.

As well, the increasing presence of electric heat in Hydro's isolated systems is changing the historical typical load shape. Having detailed information will better allow Hydro to predict the consequences of these changes, such as determining if current criteria for the requirement of additional generation are in need of adjustment.

b) Unit Sizing

The availability of more detailed production data will enable the optimization of the sizing of new diesel generation units, to give the minimum life cycle cost for the new unit and for the entire diesel plant in which it will be installed.

First, the unit can be sized to maximize fuel efficiency among all the units in the plant. Second, as unit maintenance intervals and replacements, and thus costs are based on unit operating hours, units can be sized to minimize total unit operating hours in a plant.

It is preferred that the output of a diesel unit should not fall below 30 percent of the prime power rating for any length of time. Operating a diesel unit at 30 percent

or less of its prime power rating is inefficient and may lead to the emission of soot into the local environment, which has a negative effect on the near-by community and its residents. Having access to detailed plant output data would aid in determination of the minimum loading on the diesel plant. This would enable sizing of units to avoid this condition. As well, in cases where the load in a community is declining, it would aid in pinpointing when action needs to be taken to avoid this condition.

c) Studies

Hydro is looking at the option of having renewable energy sources, such as wind and hydro, supplying energy to its isolated systems. The more detailed picture of system load that is available, the more that use of alternative energy sources can be maximized. In addition, the increased metering detail will allow for more accurate pre-impact and post-impact analysis for evaluating demand management programs within isolated diesel communities.

Finally, any models used to study the system can be better correlated to actual operating data.