



**TARONG
ENERGY**

WIVENHOE POWER STATION

MEMORANDUM

TO : GM Generation Ops via Mgr Ops and Mgr Engineering Services

FROM : Lead Engineers Hydro
Wivenhoe Power Station Mgr

DATE : 20 January 2011

FILE :

Response to TE Board Request Following High Rainfall Event 11 January 2011

Following the high rainfall events at Wivenhoe Power Station and the subsequent limited access to/ from the station due to large landslides, the Board members had a few queries. The GM Generation Operations posed those on their behalf during his visit to WPS on 18 January 2011 as follows:

1. Engage a consulting engineer to undertake a geotechnical review of the land surrounding the power station and Splityard Creek Dam
2. Document what the standard operating protocol would be in the event that TE cannot monitor the integrity of Splityard Creek Dam
3. Document the communication protocol with SEQ Water and the Queensland dam regulator in the event of being unable to monitor Splityard Creek Dam

In addition to the answers, the document also outlines some improvements/ considerations for significant events in the future.

ANSWER 1 – Complete. The geotechnical survey took place on 19 January 2011. WPS hydro personnel arranged for SunWater to conduct both a geotechnical survey and a dam safety inspection as soon as suitable expertise was available. Some of the specialists' recommendations have already been implemented.

ANSWER 2 – The protocol for the operation of Splityard Creek Dam when WPS hydro personnel are unable to physically monitor the integrity of the dam depends on the type of the emergency. For example a high rainfall event response would be vastly different than the response to an earthquake.

During the 11 January 2011 event the calculated inflow to Splityard Creek Dam was approximately 110 ML per hour over a 4 hour span which triggered consecutive high water level alarms. While significant, the inflow represented less than 5% of the spillway design capability. Despite the fact that the dam had been pumped up "to the brim" the day before, the risk of overtopping the dam and compromising its integrity via that failure mechanism was low. The concern was instead related to potential slips, rock movement, subsidence and erosion of the dam wall and embankments caused by the extreme rainfall.

As such, once access out of WPS and to the dam was severed by landslides and a large dam water level instrumentation discrepancy became apparent (a legacy of the obsolete control system), the hydro personnel on duty took the decision to rapidly reduce the hydraulic forces on the dam by lowering the dam water level. The decision was taken following discussions with DERM and in accordance with *WIV-OPS-15, High Rainfall, High Dam Water Level* as well as the *Dam O&M Manual*. The decision was enacted promptly by the traders.

The ideal dam surveillance method is monitoring the dam integrity directly. The next best option is to be able to remotely monitor the dam integrity and the final alternative is to reduce the operating range to increase the factor of safety. On the day of the event, with first option temporarily unavailable and questions over the accuracy of second option, option three was taken. As soon as the road became passable again on PM 11 January 2011, dam inspections resumed.

Some alternatives are being looked at including stationing someone at the security hut closer to the dam, or perhaps seeking access via the station's boat and then a track on a neighboring property. Another consideration is to expand the existing security video network to allow a camera to also monitor the downstream face of the dam wall and the spillway.

With a new Control System planned for the station in the near future, field instrumentation can be enhanced to provide better monitoring of the dam and conditions affecting the dam. Some initial ideas centre on automation and include:

- Trending of v-notch weir levels via the future control system and telemetry;
- Trending of piezometer measurements via the future control system;
- The use of movement indicators being monitored by the future control system;
- More accurate level indications for the future control system; and
- A weather station, monitored by the future control system, at Splyard Creek Dam to provide accurate rainfall data

ANSWER 3 – WIV-OPS-15 WPS procedure for guidance in the event of high rainfall/ high dam water levels covers communication with SEQWater. Communications with DERM and SunWater (Wivenhoe's dam safety consultant) are also required to be maintained specifically with regard to the dam integrity issues like the V-notch weir measurement abnormalities, but may include discussions on any matters of concern. Following the events on the 11 January this procedure is already under review to encompass the learnings from the day and also to include other triggers.

The communication protocol between WPS and SEQWater also has certain requirements outlined in the Deed of Practice between the two parties.

Communications between the named parties on the day of the event and subsequent days:

- WPS Mgr to/ from SEQWater Ops Mgr
- WPS Lead Engineer Hydro to/ from DERM
- WPS Lead Engineer Hydro to SunWater
- WPS Hydro Duty Officer to/ from SEQWater Flood Engineers
- WPS Mgr to the Wivenhoe Pocket Rural Fire Brigade (by radio)
- WPS Mgr to SEQWater Wivenhoe Dam Ops (by radio)

The communication protocol relies heavily on telephone and e-mail remaining operational. During the event a major obstacle to the communication flows from WPS within and outside the corporation was the corporate phone and network failure combined with congestion on the state mobile phone network and localised interruptions of the phone landline.

Ends _____