Backgrounder:

Summary of Findings – Special Dam Review 2011

Saskatchewan Watershed Authority

1. **Dam Safety Inspections**
   - Overall, the Watershed Authority's water management infrastructure did not suffer significant damage as a result of the 2011 floods.
   - Water levels and flows remained high at the Candle Lake and Lac la Ronge dams when the special inspections were undertaken. Follow-up inspections will be required once water levels and flows at these structures abate.
   - Flood induced damage (rehabilitation need) largely related to erosion at approach and outlet channels at control structures of the Authority's dams. Dams where this damage was most significant are Katepwa, Moose Mountain, Theodore and Candle Lake. Seepage flows around the left abutment of Kingsway Dam also increased notably. It is unknown whether the high flows on the Moose Jaw River were responsible for this increase.
   - The flooding was responsible for generating some additional maintenance needs. However, given that the Watershed Authority manages over $3 Billion worth of assets, the amount of added maintenance required was relatively small.
   - The Watershed Authority plans to spend an additional $1.9 million this year to address flood related damages.

2. **Infrastructure Renewal Needs**
   - Beyond identifying additional maintenance activities, the Watershed Authority used the additional inspections and information attained from regular monitoring of the Authority's four major dams to identify long-term infrastructure renewal needs. Given the critical role of the Watershed Authority's dams in providing effective flood control and reliable water supplies to support the province's growth, additional rehabilitation and upgrades are needed over the next decade to ensure that any long-term infrastructure issues are addressed in a timely and effective manner.
   - The results of two-dimensional stability modelling of Alameda Dam conducted in June suggests that upgrades are required in the long-term to increase the margin of safety when the reservoir is at full supply level or higher. Though this does not present any danger at the current time, the Authority is in the process of commissioning more

detailed and complex investigation to ensure that safety issues are addressed in a timely and effective manner.

- The 2011 floods showed that the capacity of the Rafferty Dam spillway is not adequate to handle a very large flood if the reservoir level significantly exceeds the full supply level. The Authority has commissioned a conceptual level study to investigate options to enhance the reservoir outlet capacity.
- Much of the instrumentation which is used to monitor the performance of the Authority's significant consequence dams should be replaced because it is nearing the end of its life expectancy and new equipment will be more reliable and data collection and analysis more efficient. Computer software and hardware is also needed to convert from manual data entry and manipulation to automated methods. As a result of the redundancy in the system these instrumentation issues do no present any danger in the short term, but left unresolved could present challenges in the long term for the Watershed Authority's ability to monitor and maintain these dams in a safe and effective manner.
- No rehabilitation needs directly attributable to the floods were identified at SaskPower's Boundary Dam. Likewise, no significant maintenance issues manifested. Over the course of the 2011 spring flooding, SaskPower identified and is working to address an issue associated with achieving the ultimate design capacity of the Boundary Dam spillway, which is approximately four times larger than what was experienced in 2011.

3. Dam Safety Program Upgrades

- No substantive diminution in the safety of the Authority's dams occurred as a direct result of the flooding. However, as implicated in the findings above, upgrades are required to ensure Saskatchewan water management infrastructure remains safe and effective over the long-term.
- The dam consequence reclassification completed by the Authority reduced dam safety management activity requirements for a number of its dams. The reclassification, however, confirmed that certain dam safety activities, principally the need to commission external dam safety reviews, remained necessary for seven high consequence dams. To date such reviews have not been undertaken at five of these dams.
- To further increase the margin of safety at Saskatchewan's water management structures, the Watershed Authority recommends accelerating and enhancing the extensive dam safety and infrastructure rehabilitation programs already in place.

4. **Operational Reviews – Alameda, Rafferty, Boundary & Gardiner Dams**
    - The reservoirs created by these dams provide a critical supply source for a large portion of the province's drinking water and municipal water needs. Key economic drivers in Saskatchewan also depend on these reservoirs, which provide a reliable irrigation source for famers, hydro-generation capacity for SaskPower, and a predictable water supply for the potash sector. Balancing these needs with the flood management function of these reservoirs, particularly during unprecedented flooding seasons like 2011, is a complex task and requires further examination in light of the events of this year.
    - Given the competing functions of the Lake Diefenbaker as a reservoir, as well as the fact that the Watershed Authority directly manages how these functions are appropriately balanced, an independent, expert-driven process will examine operations of the Gardiner Dam.
    - Operations at the major reservoirs created by the Alameda, Boundary and Rafferty Dams are governed by the International Souris River Board under the auspices of the International Joint Commission. Watershed Authority is in discussions with representatives of North Dakota and Manitoba to request the Board undertake a full review of operations in the Souris Watershed, which encompasses all three of these dams as well as dams in North Dakota.