Kootenay Lake Operations
Columbia Basin Regional Advisory Committee

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Golden, BC

Blair Weston
(250) 368-2920
blair.weston@fortisbc.com

FORTIS BC

FortisBC

Natural Gas, Electricity and Propane

- Approximately 1.1 million customers
- 22% of energy consumed in B.C.
- Serve 135 communities
- More than 2,200 employees
- Own and operate 2 LNG facilities
- Own 4 generating facilities (225 MW capacity)
- Operate and maintain 5 third-party generating facilities (1,282 MW capacity)

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- **Fortis Inc.** is the largest investor-owned distribution utility in Canada, with total assets of more than $13 billion and fiscal 2010 revenue totaling approximately $3.7 billion.
- The Corporation serves approx. 2,000,000 gas and electricity customers.
- Planned capital investment of $2.5 billion over next five years

FortisBC does not make money of the commodity– the electricity or natural gas itself– we make money on delivering these services through a regulated rate of return on our required infrastructure (capital value of dams and pipelines, etc.). We have to prove all new capital investment is required for our customers by applying for new investment to the BCUC.

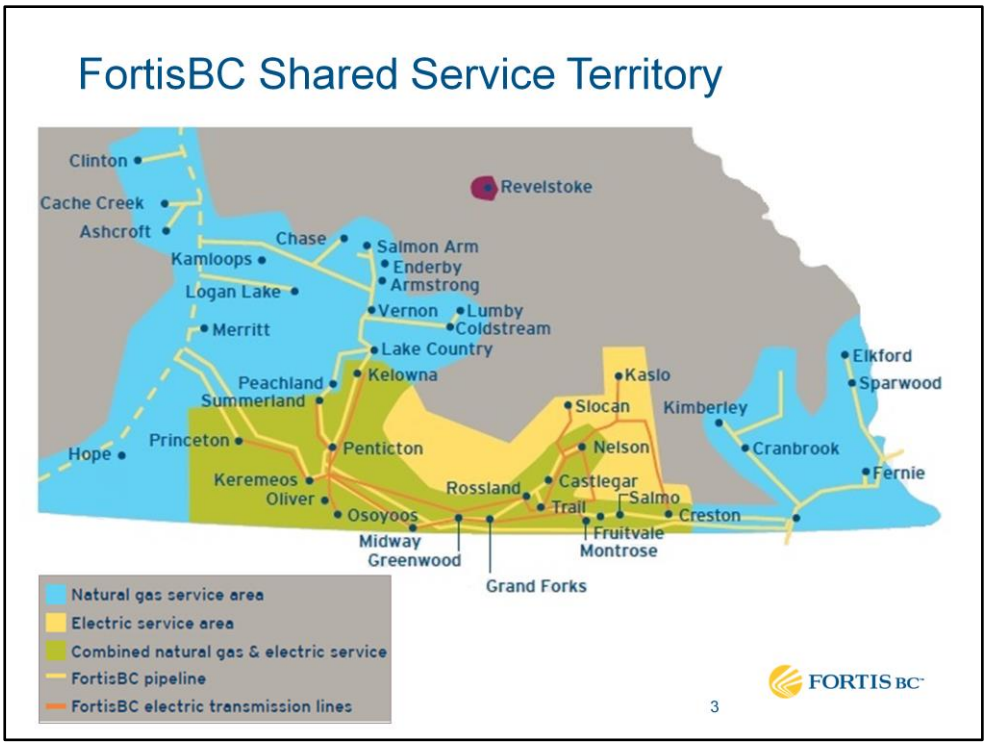
Customer Service:

- Bringing Customer Service In House
  - Better serve our customers' changing needs
  - Increase customer satisfaction
  - Keep our commitments to our customers

- FBC planned electricity capital investment over next 5 years = $400 million (related to substation, transformer, etc upgrades to improve capacity and reliability)

- Fortis BC planned natural gas capital investment in the southern interior over next 5 years = $10 million dollars

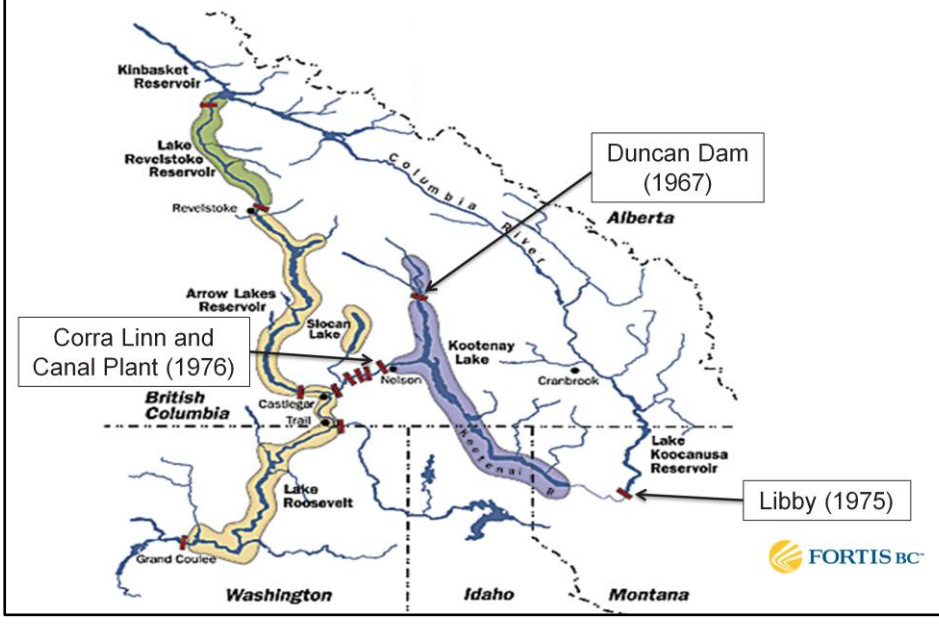
- Whistler used to be on propane but converted to natural gas (2009)

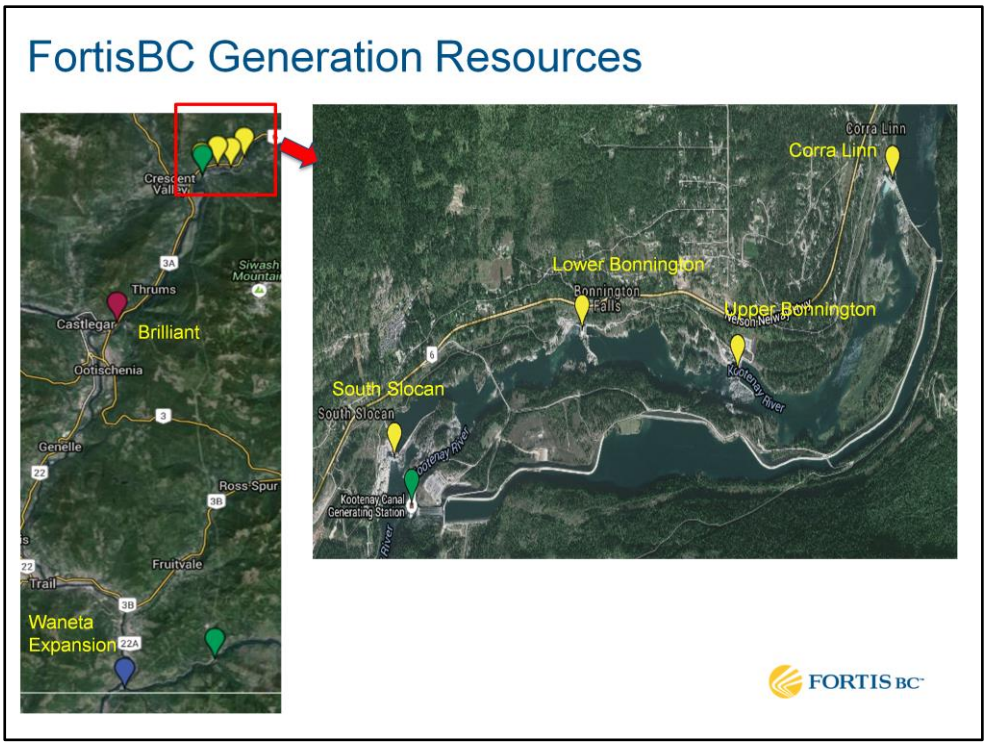


- FBC Electricity customers total about 166,000 (2014 data)
- Revelstoke has approx. 1,500 propane customers that could be switched over to natural gas through LNG deliveries
- We are also looking at ways that we can economically bring natural gas to other locations in the Southern Interior that aren't currently served… Our Main Extension Test is currently before the Commission, but this may be something you want to talk about in the discussion portion of the workshop

- *Why are we not part of BCH ? Why is FBC service area in middle of BCH area?*
- FortisBC is an independent privately owned utility with more than 100 years of history of providing electricity to its customers in B.C. FortisBC preceded the creation of BC Hydro, and has a franchise area of 150 miles from the City of Rossland. West Kootenay Power and Light Company Ltd. was formed in 1897 to supply power to the mining industry in Rossland and to serve the area within a 50 mile radius of Rossland. In 1929, the province gave permission to extend the service territory to within a 150 mile radius.

Kootenay/Columbia River System





-FortisBC currently owns and operates four generating stations along the Kootenay River: **Lower Bonnington Dam** originally constructed in 1897 and upgraded in 1924, the **Upper Bonnington Dam** constructed in 1907 and extended to incorporate an additional two units in 1940, the **South Slocan Dam** constructed in 1924 and the **Corra Linn Dam** which was constructed in 1932.

-Together, they are about 45% of FBC's energy resources and about 28% of capacity resources

-The Company operates the FBC Plants in accordance with the Canal Plant Agreement (CPA). In 2005 BC Hydro and the Entitlement Parties (FortisBC Inc., Teck Metals Ltd. (Teck), Brilliant Power Corporation, Brilliant Expansion Power Corporation and Waneta Expansion Limited Partnership) entered into a renewed CPA, which amended and extended the original Canal Plant Agreement for a further 30 year term. The CPA enables BC Hydro and the Entitlement Parties, through coordinated use of water flows and storage reservoirs, and through coordinated operation of generating plants, to generate more power from their combined generating resources than they could if they operated independently.

-Brilliant dam and expansion facility are owned by Columbia Power Corp and CBT (140 MW and 120 MW)

- WAX is owned by Fortis Inc, CP and CBT (335 MW)

CPA and FortisBC Operations Impact

BC Hydro Kootenay Canal Plant

- Required to take full advantage of upstream CRT projects
- Diverts water around FortisBC's plants on Kootenay River
- Drives need for the Canal Plant Agreement

Canal Plant Agreement

- BC Hydro has overall dispatch rights
- FortisBC gets "entitlement" capacity and energy
- Units need to be available to generate
- Many Operating Procedures dictating Operations

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FBC has 235 Mw
1609 Gwh entitlement

BCH 580 Mw

Historical Perspective
Boundary Waters Treaty

- Origins of the Boundary Waters Treaty Water and water rights have been important issues in the relationship between Canada and the United States since the American War of Independence. The Definitive Treaty of Peace, concluded in 1783 between Great Britain and the United States, recognized that each country had jurisdiction over waters on its own side of the border. During the following century, Great Britain and the United States concluded several treaties with provisions relating to the use of water flowing along or across the boundary, particularly for navigation. These included the 1794 Jay Treaty, the 1817 Rush-Bagot Agreement, the 1842 Webster-Ashburton Treaty, the 1846 Northwest Boundary Treaty, the 1854 Reciprocity Agreement, and the 1871 Treaty of Washington
- During the nineteenth century, several other arrangements relating to the use and sharing of waters were concluded in Europe and elsewhere in North America. The multinational Rhine and Danube Commissions were established in Europe in 1815 and 1856 respectively to undertake administrative responsibilities for navigation in those two waterways. As a result of treaties concluded in 1889 and 1895, a Mexico-United States International Boundary Commission was established to examine and report on irrigation and the possibility of constructing storage dams on the Rio Grande.
- Against the background of difficulties encountered in apportioning the waters of the St. Mary and Milk Rivers in the west, the Rainy River, the Chicago Diversion of Lake Michigan, (which at the time lowered lake levels by 6 inches) the St. Mary's River at Sault Ste. Marie and the Niagara River, resolutions introduced by the Canadian delegate and adopted unanimously by the United States, Mexican and Canadian delegations at International Irrigation Congresses in Denver, Colorado in 1894 and in Albuquerque, New Mexico in 1895 recommended to the United States "the appointment of an international commission to act in conjunction with the authorities of Mexico and Canada in adjudicating the conflicting rights which have arisen, or may hereafter arise, on streams of an international character."

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What is the International Joint Commission?

- Realizing that water flows were not impeded by borders, the US and Great Britain began creating navigable water treaties in the 1700's
- These transformed into The Boundary Waters Treaty in the early 1900s
- Out of this grew the IJC
- 3 Canadian and 3 US Commissioners

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What is the International Joint Commission?

- Investigate and report upon the conditions and uses of the waters adjacent to the boundary lines between the United States and Canada,
- Maintenance and regulation of suitable levels, and also upon the effect upon the shores of these waters and the structures thereon,
- Report upon the necessary measures to regulate such diversion, and to make such recommendations for improvements

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International Kootenay Lake Board of Control

- On November 11, 1938 the Commission granted an Order of Approval to the West Kootenay Power and Light Company to operate Corra Linn dam at Granite, B.C. to store six feet of water in Kootenay Lake and also to excavate the outlet of the lake at Grohman Narrows.
- Supervise construction and operation of the lake
- Created the IJC "rule curve" for Kootenay Lake that sets maximum levels for the lake
- Meets annually alternating between Bonners Ferry and Nelson

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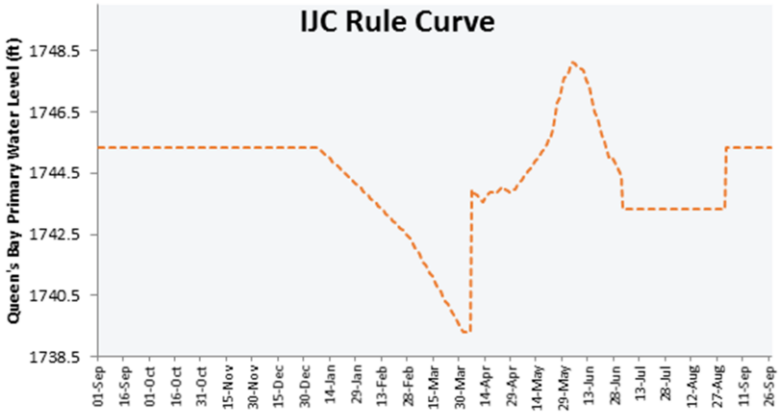
IJC Rule Curve
Queen's Bay Primary Water Level (ft)
1748.5
1746.5
1744.5
1742.5
1740.5
1738.5
01-Sep
16-Sep
01-Oct
16-Oct
31-Oct
15-Nov
30-Nov
15-Dec
30-Dec
14-Jan
29-Jan
13-Feb
28-Feb
15-Mar
30-Mar
14-Apr
29-Apr
14-May
29-May
13-Jun
28-Jun
13-Jul
28-Jul
12-Aug
27-Aug
11-Sep
26-Sep

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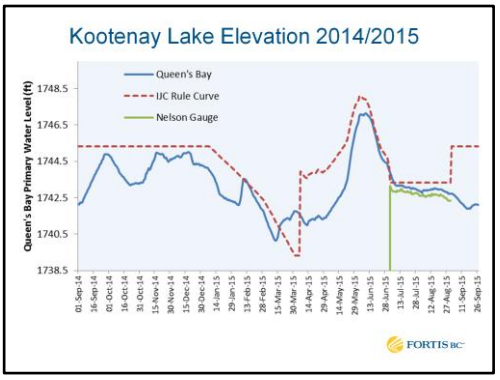
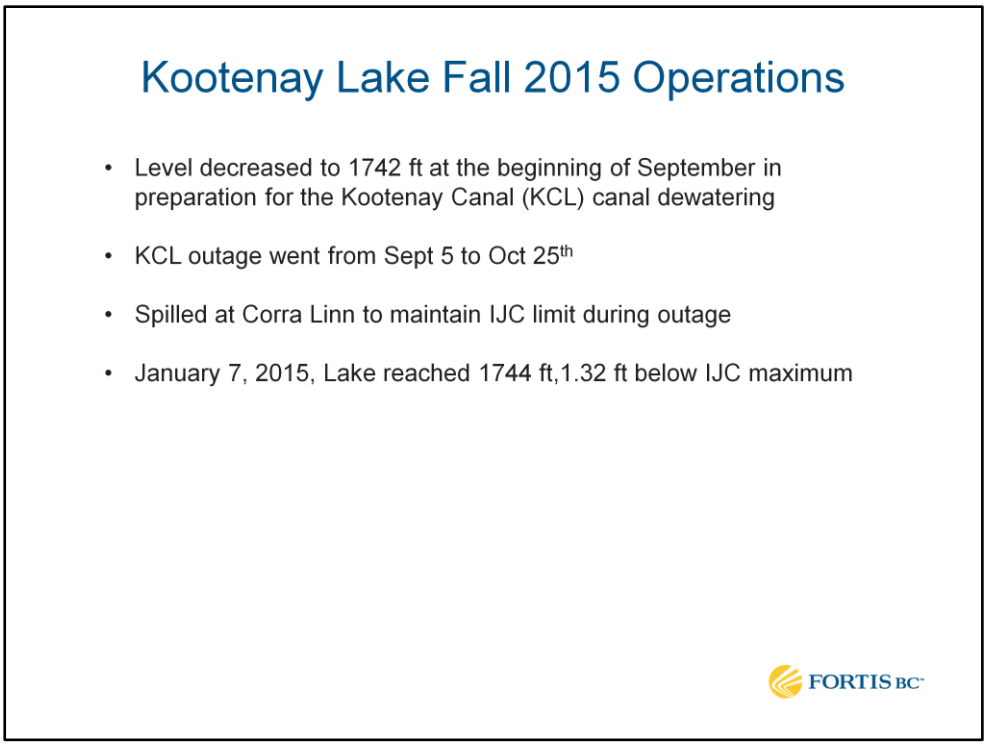


1974 peak was 1754.23
2012 peak was 1753.78

- Report concludes the operation was "a considerable improvement in the reduction of the proportion of Kokanee Redds dewatered during spawning, incubation and emergence along the shores within the West Arm"

- Only 35% of the Redds (or eggs) we dewatered, compared to 83% during the previous decade



KCL dewatering video:
http://www.bchydro.com/news/press_centre/news_releases/2014/bc-hydro-at-work--crews-lower-the-kootenay-canal-and-extend-its-.html

Corra Linn had unit outage in September. Spilled water to maintain flows and keep IJC limit.

Libby water forecast in December 2014 were for 117% of normal, but the water supply didn't materialize

Targeting Qbay 1739.32 ft by March 20th, earlier than normal.

Kootenay Lake 2015 Operations

- February 6th, 2015, Kootenay Lake had a 1.7 ft margin to the IJC rule curve
- Actual inflows on Feb 7, 8 and 9th were 8.5 times the normal inflows
- Feb 9th, IJC margin decreased to around 0.32 ft, considered normal for that time of year
- Feb 9th, FBC increased discharge through Corra Linn, reaching free fall on Feb 10th
- Feb 10th, Kootenay Lake crossed the IJC rule curve
- Feb 14th, Lake returned under the IJC rule curve

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No change to Libby or Duncan operations during this time.

Daily inflow peaked at 45 kcfs on the 9th

FBC believes this is considered “extraordinary high inflow conditions” as per IJC

Kootenay Lake 2015 Operations

- March 13th, hit the lowest lake level of 1740.13 ft
- Warm temperatures resulted in early run off of low level snow pack
- March 15, 2015, Libby discharge increased
- March 16th, Kootenay lake was placed into free fall, but couldn't turn the lake around
- April 2nd, freshet was declared on Kootenay Lake
- June 9th Kootenay Lake peaked at 1747.14 ft
- July 2nd Kootenay Lake went to Nelson gauge control
- Fall 2015, reduced lake to 1742 ft by Sept 15 to support Kokanee Shoal Spawning Salmon

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Warm temps and local inflows resulted in increased run off Mid-march.

Libby went from around 4 to 13kcfs on the March 15th, 16 kcfs on the 16th, and then around 9-10 kcfs for the rest of the month, increasing again in April.

Lowest peak since 2004

2014 peak = 1750.37
2012 peak = 1753.78

Questions?

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