

# Flood Control

## COLUMBIA RIVER TREATY



Hugh Keenleyside Dam and Arrow Lakes Generating Station, Castlegar

### How does flood control currently operate and how will it change in 2024?

Reservoir storage facilities in the Columbia River system in Canada and the U.S. are operated in a coordinated manner to provide flood control benefits for the communities and residents in both countries.

The Columbia River Treaty (CRT) prescribes two types of flood control provisions: Assured Annual Flood Control and On Call Flood Control.

#### 1. Assured Annual Flood Control

Under the CRT, Canada agreed to provide 8.45 million acre feet of assured annual water draft at the three Canadian CRT reservoirs for flood control purposes. This would continue for 60 years in exchange for a one-time payment of \$64.4 million US. That 60-year agreement expires in 2024, regardless of whether the CRT is terminated or not. Thus the assured annual flood control provisions of the CRT are not expected to be available after 2024 unless they are renegotiated.

Assured Annual Flood Control is implemented via a set of rule curves that dictates the maximum levels for the reservoirs at various times throughout the fall/winter snowpack accumulation season and the spring/summer snowmelt runoff season. This action ensures a certain amount of evacuated space is available in the reservoirs to contain the excess water volumes and thereby reduce flows downstream of the reservoir relative to flows that

would occur without the dams. These rule curves vary based on runoff volume forecasts, which are a function of snowpack, weather and river flow measurements throughout the Columbia Basin. During the spring freshet, the U.S. and Canadian CRT entities maintain frequent contact and adjust reservoir levels and discharges as needed to ensure that the intended flood risk management benefits of the Assured Annual Flood Control provision are realized.

#### 2. On Call Flood Control

The On Call Flood Control provisions of the CRT were designed to be used during periods when very high inflows are forecast. Prior to 2024, under certain conditions, the U.S. can request that Canada provide On Call Flood Control protection in addition to the Assured Annual Flood Control provisions. These conditions are that the U.S. must first use all of its effective reservoir storage space and that, even with this use, the flows below Dalles Dam are still forecast to exceed 600,000 cubic feet per second. In this case, Canada would then provide additional reservoir drafts and management of reservoir refills at Canadian reservoirs over and above that prescribed by the CRT Assured Annual Flood Control plan. Canada would be compensated by the U.S. with a payment of \$1.875 million for the first four calls, plus operating costs and any hydroelectric power losses.

After 2024, when the Assured Annual Flood Control provisions expire, the On Call Flood Control provisions revert



Duncan Dam, Duncan Reservoir

to what is referred to as Called Upon Flood Control. Under this operation, certain conditions must again be met in the U.S.: they must first use all effective U.S. reservoir storage space and, even with this use, the flows are still forecast to exceed 600,000 cubic feet per second. Called Upon Flood Control provisions apply to all storage in the Columbia River Basin in Canada, and are not limited to treaty storage within Kinbasket, Arrow and Duncan reservoirs. Under this scenario, Canada would be compensated by the U.S. for all of its operational and economic losses, but would not receive the addition \$1.875 million. The Called Upon Flood Control provisions remain in effect for the life of the CRT dams, even if the CRT is terminated.

Since the signing of the CRT, the U.S. has not requested an On Call Flood Control operation. While the CRT Flood Control Operating Plan contains some documentation on the implementation procedures for this operation, many practical details would need to be worked out during the first request. Thus, there is considerable uncertainty as to exactly how this type of flood control operation or post-2024 Called Upon operation would be managed, how effective it might be and how much it might cost.

### What are the implications of a post-2024 flood control regime for the Columbia Basin, the Province, Canada and the U.S.?

In the CRT Review phase 1 studies, the entities studied one set of assumed procedures and methodologies for Called Upon Flood Control. The studies found that effective use of flood control facilities in the U.S. resulted in reservoirs being drawn down more frequently and deeper than current conditions—with reduced refill reliability—resulting in potential impacts to power production, irrigation, recreation and ecosystem values in the U.S.

There are currently differing views between the entities

with regard to both:

1. the interpretation of Called Upon Flood Control rights and obligations
2. the specified CRT flood control objectives.

Difference in perspectives between Canada and the U.S. creates planning and operational uncertainty. The trigger flow level for a request is also a point of disagreement between the entities.

### What is the Canadian entity's view of post-2024 Called Upon Flood Control?

The Canadian entity, BC Hydro, believes that before a Called Upon Flood Control request, the U.S. must demonstrate planned, effective use of its reservoirs and should plan to operate its dams for flood control as if the Canadian dams did not exist. Accordingly, the existing storage reservation diagrams for the U.S. reservoirs should be changed to reflect the deeper drafts required to meet flood control objectives and make effective use of U.S. reservoirs with no reliance on Canadian reservoirs. Only after it is shown that the U.S. flood control objectives could not be met with all effective U.S. reservoir storage would the Canadian reservoirs be used. The Canadian entity also has the view that Called Upon Flood Control operation will not meet U.S. needs for flood risk management even with significant changes in the operation of U.S. reservoirs, and that a negotiated extension of Assured Annual Flood Control agreement is the best path to an operation that balances the needs of both Canada and the U.S.