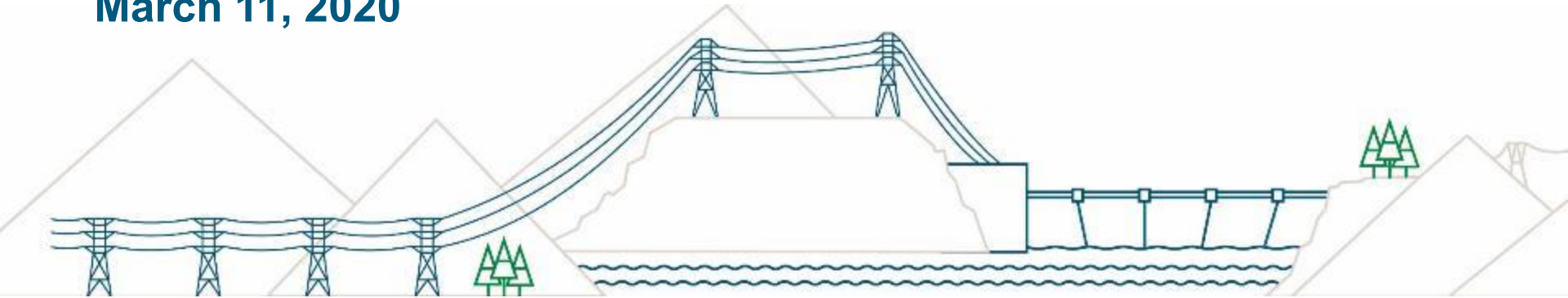
Site C Clean Energy Project

Regional Community Liaison Committee
Project Briefing

March 11, 2020



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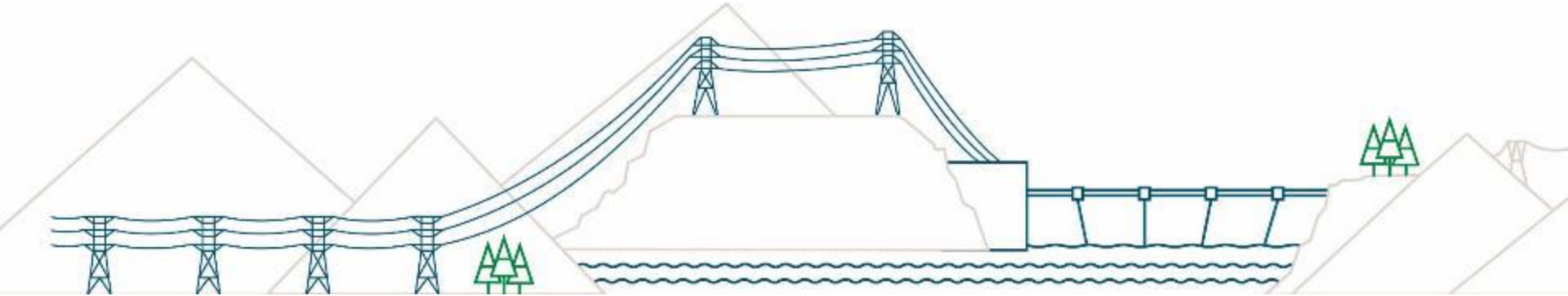
Diverting the Peace River

Chris Hatton

Project Manager, Main Civil Works - Diversion



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Presentation overview

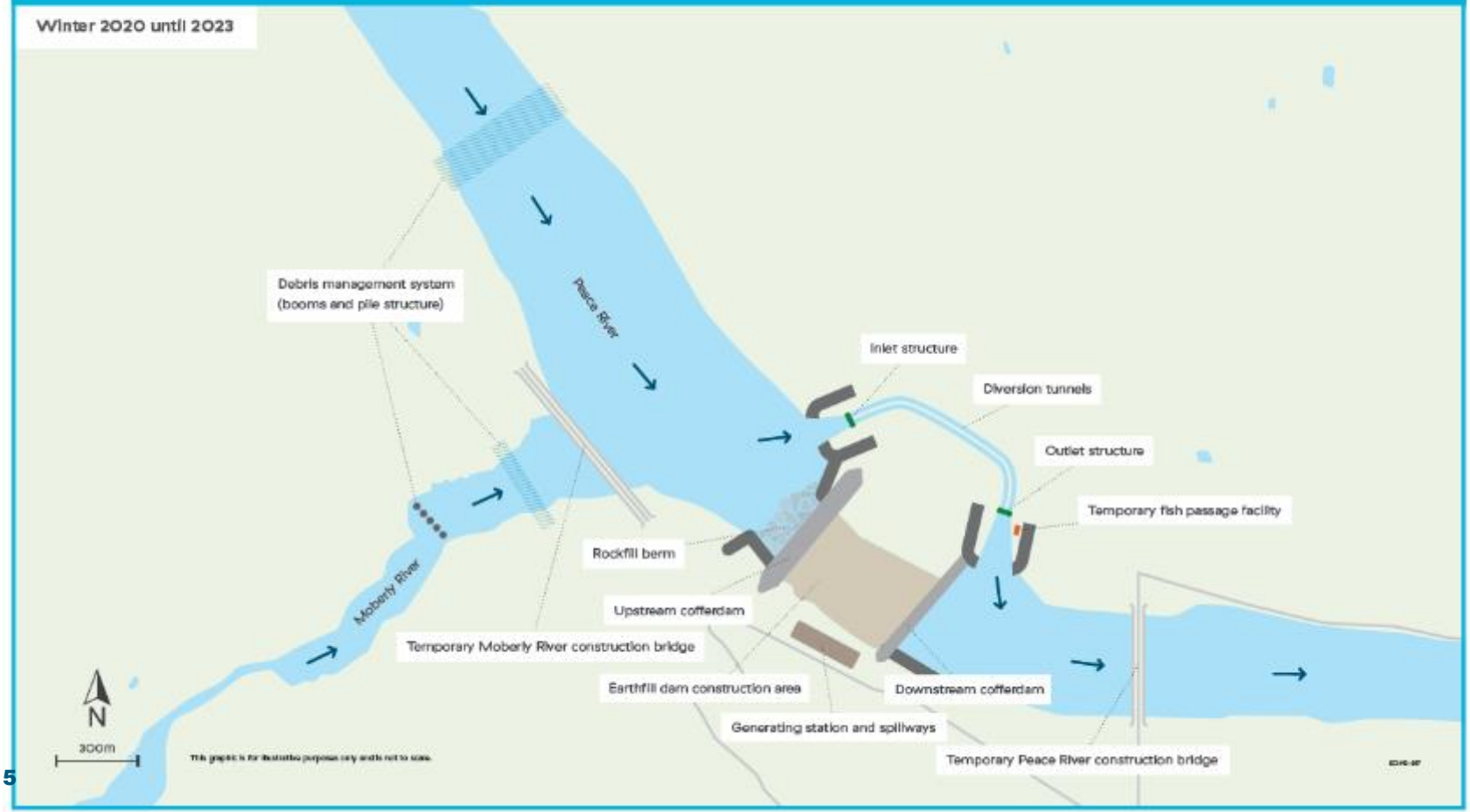
- What is river diversion?
- Stages of the river diversion process
    - Cofferdams
    - Diversion Tunnels
    - Debris Management Structures
- Flow Management
- Questions/discussion

What is river diversion?

And how do we do it?

- River diversion is a construction phase of the Site C project
    - Lasts approximately three years
- Involves temporarily redirecting the flow of the Peace River to support the construction of the Site C dam
- Two major processes make up the act of diversion:
    - 1. Divert river flow (rockfill berm)
    - 2. Seal off river channel (upstream and downstream cofferdams)

Site C river diversion—Upstream and downstream cofferdam construction



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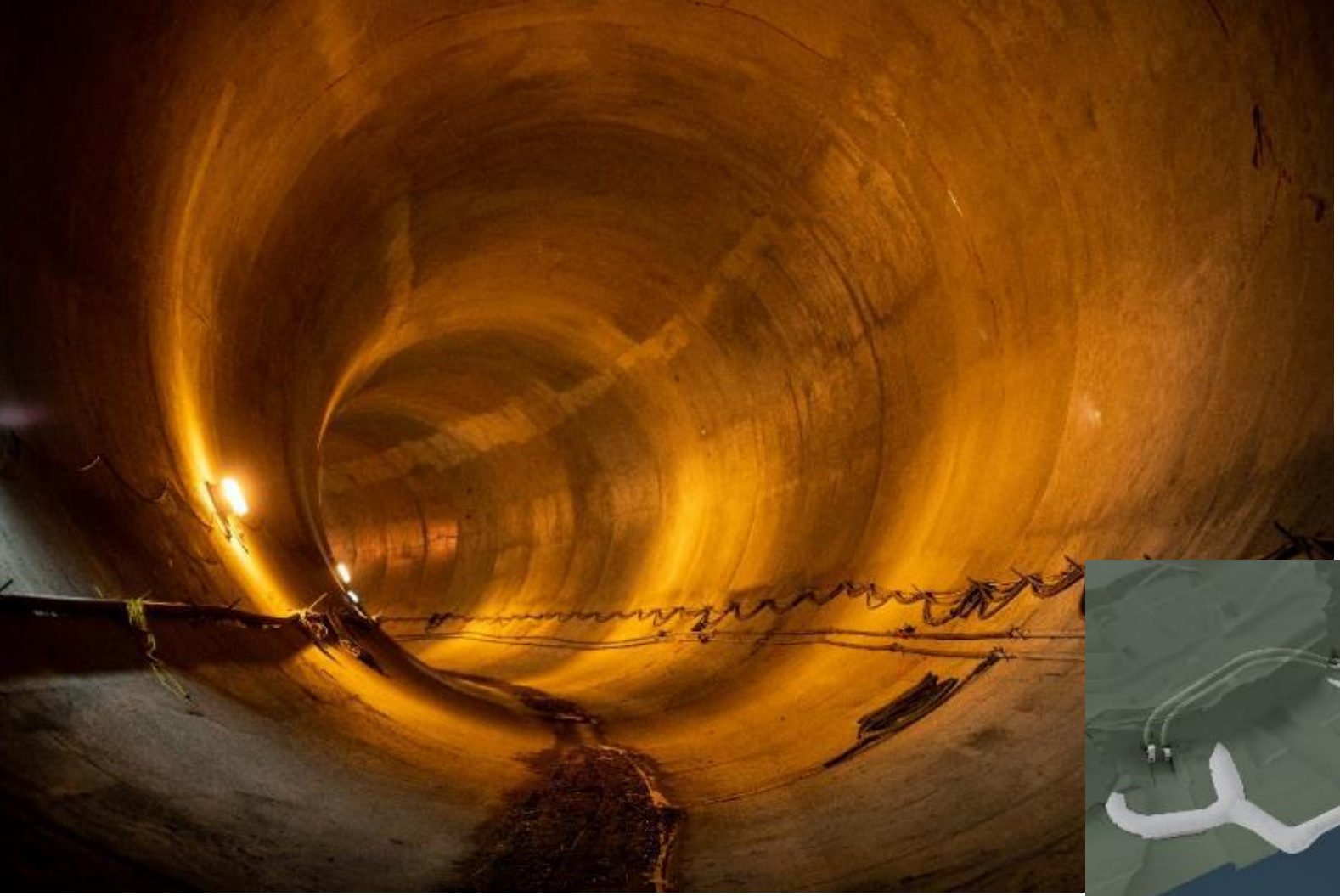

River diversion tunnels

- The two large tunnels approximately 750 metres long and 11 metres in diameter
- Located on the north bank of the Peace River
- Tunnels will have the capacity to pass 3,000 cubic metres of water per second (combined)

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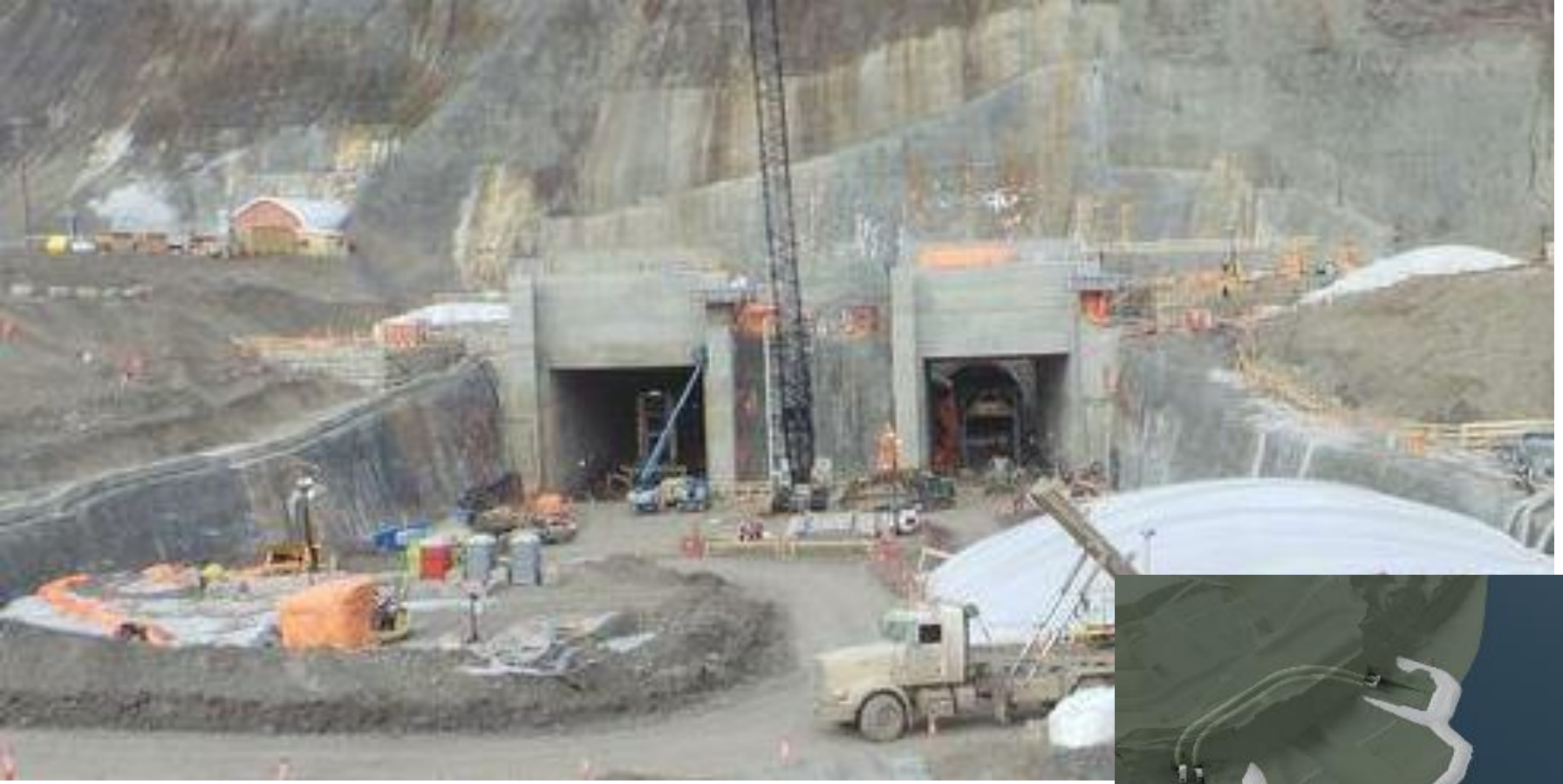
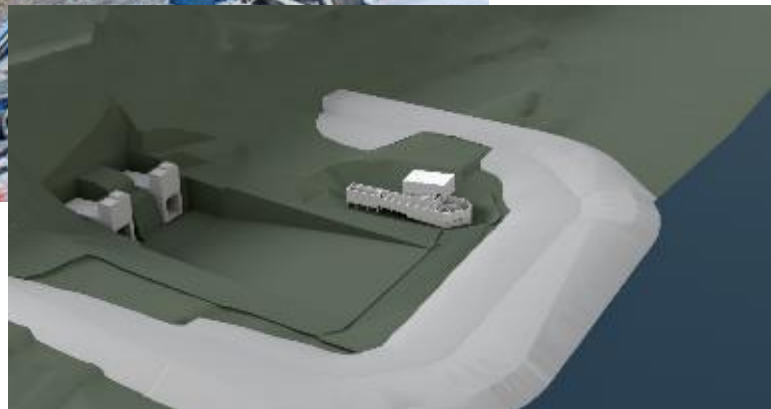
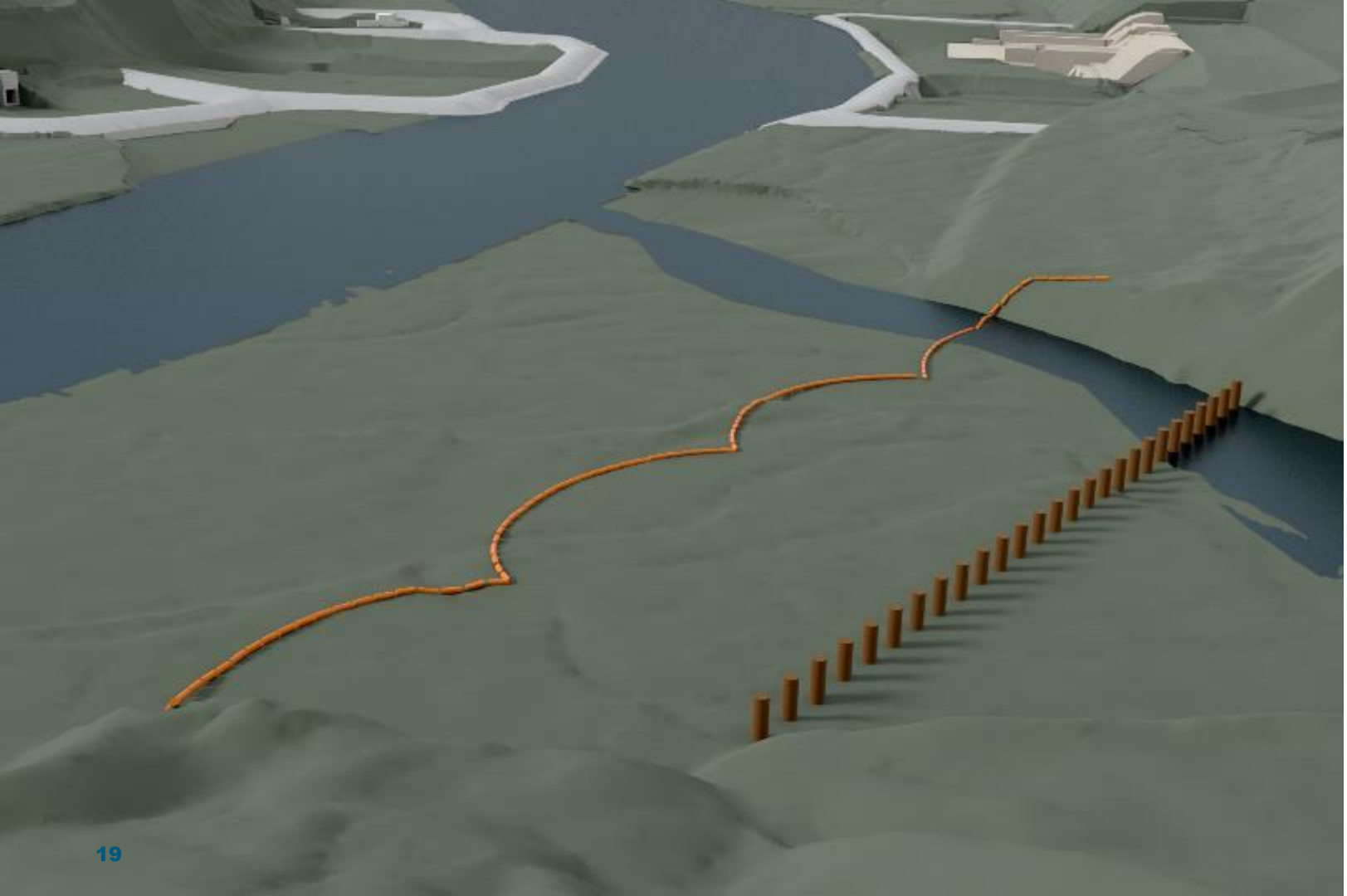
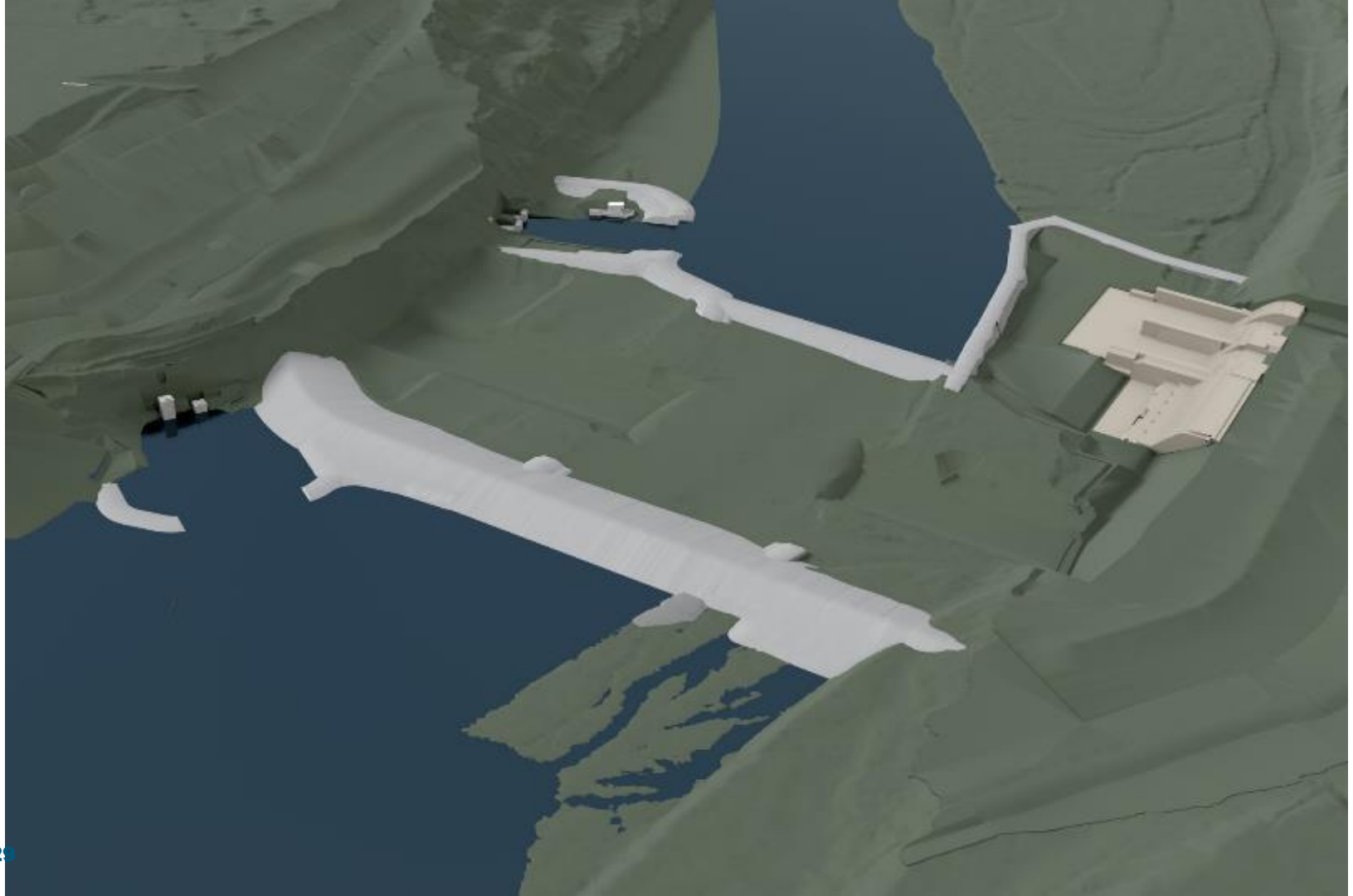
Tunnels: design, safety, and monitoring

- Tunnel Stats:
    - Concrete is up to 2m thick at the inlet and reduces to 0.4m thick at the outlet
    - Extremely smooth “F4” finish on the concrete liner
        - Quality is paramount – through inspections and stringent repair requirements
    - Tunnels are designed to pass debris up to 10m in length







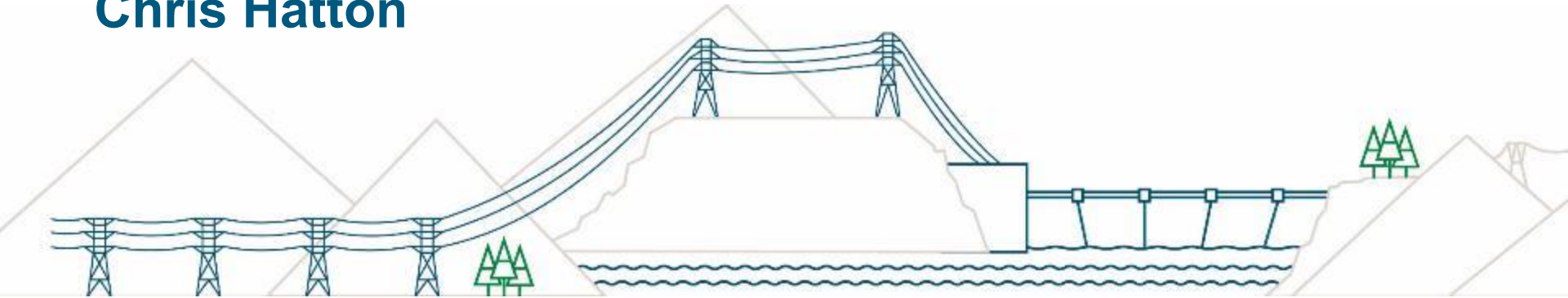


Cofferdam safety, stability, and monitoring

- Design
  - Follows all Canadian Dam Association guidelines for dam safety design, check, and independent review
  - Design is reviewed and approved by the provincial Dam Safety Engineer, as well as BC Hydro's internal Dam Safety Team
- Monitoring
  - Continuous monitoring of instruments for the entire diversion process
  - Weekly visual inspections
  - Bi-Annual Dam Safety Engineer inspections

Site C – Peace River Flow Management

Chris Hatton



March 11, 2020 Regional Community Liaison Committee Meeting

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Williston 2020 operations forecast

- During 2020, the Williston Reservoir is forecast to operate at levels near, or above, those observed during 2019.
- BC Hydro will continue to operate Williston Reservoir to avoid drafting below 2150 ft (655.3 m) under most conditions.
- BC Hydro will manage its requirements within existing Peace Water Use Plan (WUP) operation limits.
- BC Hydro will continue to update and meet with First Nations, local government, and public regularly to share information and receive feedback.

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Williston Operations in prep for Site C diversion

- During 2020, Williston Reservoir will fill no higher than 2200 ft (5 ft below full pool), unless filling above this level is necessary to protect the Site C diversion works.
- During Sept-Oct 2020, Peace River discharges will be held very low during a critical construction period for the diversion dams.
- After the diversion dams are completed (Nov. 2020), Peace River discharges will return to higher (more normal) winter values.

Site C cofferdams: 2021-24

- By 15 Nov 2020, cofferdams will be high enough to manage the “full turbine” discharge from GMS/PCN through the winter months (2020-21)
- By spring 2021, cofferdams will be constructed to their full design height (433.9 m) able to manage the 200-yr return period local inflow event with GMS/PCN reduced to minimum discharge
- BCH will continue to operate Williston Reservoir with its Storage Reservation Curve and 5-ft buffer until 2023-24

Site C local basin

- Site C local basin (downstream of Peace Canyon) is not regulated
- Halfway River is the biggest tributary in this basin. Moberly River is also a significant tributary.
- Most severe local inflow events are associated with rainfall systems that travel NW from the Gulf of Mexico into the Peace River basin … very infrequent, and hard to predict the location & amount of rainfall
- We should have at least 3 days notice of high flows (and high forebay levels) at Site C.

On Dam Site Construction Update

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On Dam Site Construction Update

- 2020 Spring/Summer Schedule
- Left Bank
  - Worker accommodation lodge expansion
  - 85th Avenue Industrial Lands & till conveyor
  - Diversion tunnels, portal structures, fish passage
  - Cofferdams
  - Core trench & earthfill dam

- Right Bank
  - Powerhouse concrete placement
  - Powerhouse structural steel placement
  - Penstock installation
  - Dam Buttress RCC placement (planned for 2020)
  - Rip Rap Stockpiling (at Septimus)

On Dam Site Summary Schedule: 2020

Construction Activity	Anticipated Schedule
Diversion Tunnels ready for diversion	Q3 2018 to Q3 2020
Assemble Till Conveyor	Q4 2018 to Q3 2019
Left Bank Dam Grout & Fill	Q3 2019 to Q4 2021
Crusher & Aggregate Production	Q1 2017 to Q3 2023
Spillway RCC	Q2 2019 to Q4 2019
Powerhouse Concrete	Q3 2018 to Q4 2022
Penstock	Q2 2019 to Q3 2022
Infrastructure Upgrades	Ongoing
*All major construction activities	*To be completed by Q4 2024

Left Bank

ATCO Two Rivers Lodge Phase 2 Expansion

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Till conveyor system

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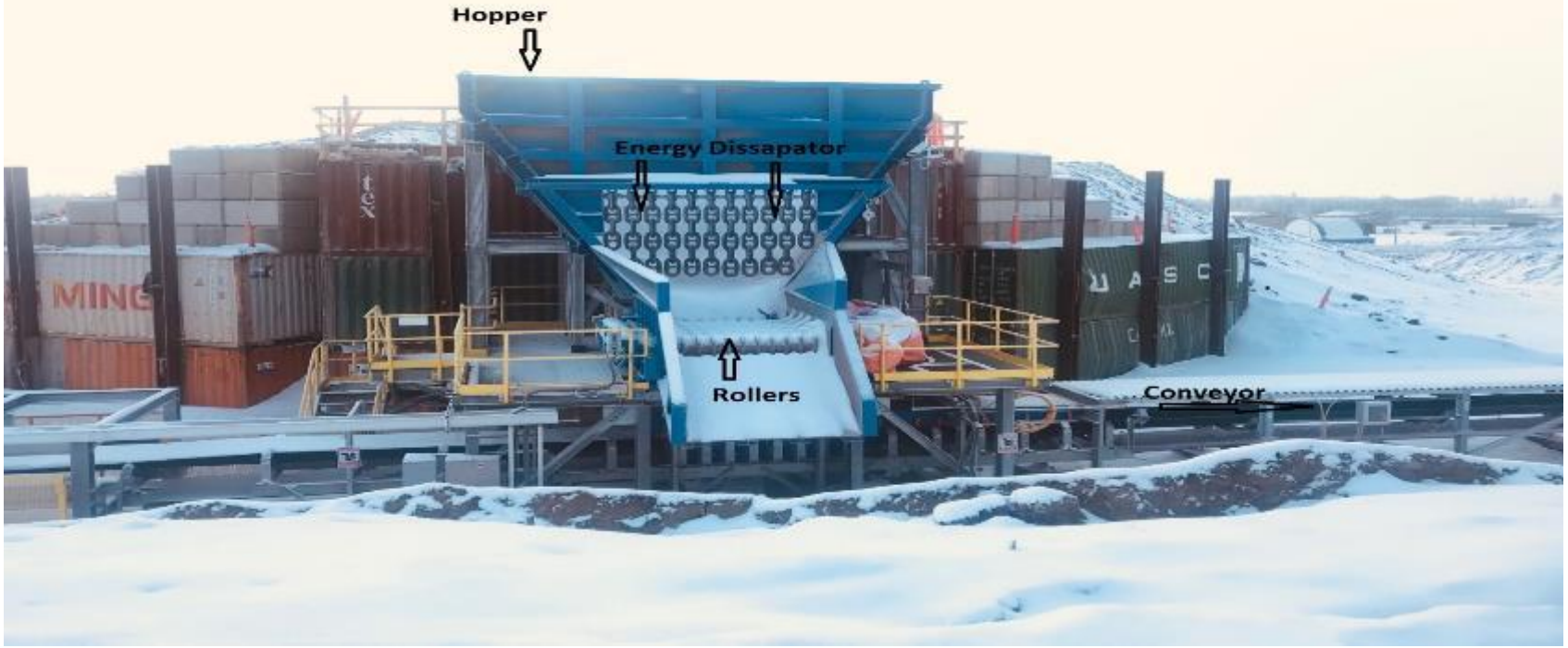
Left Bank
Conveyor feeds the Hopper to Stockpile Aggregate



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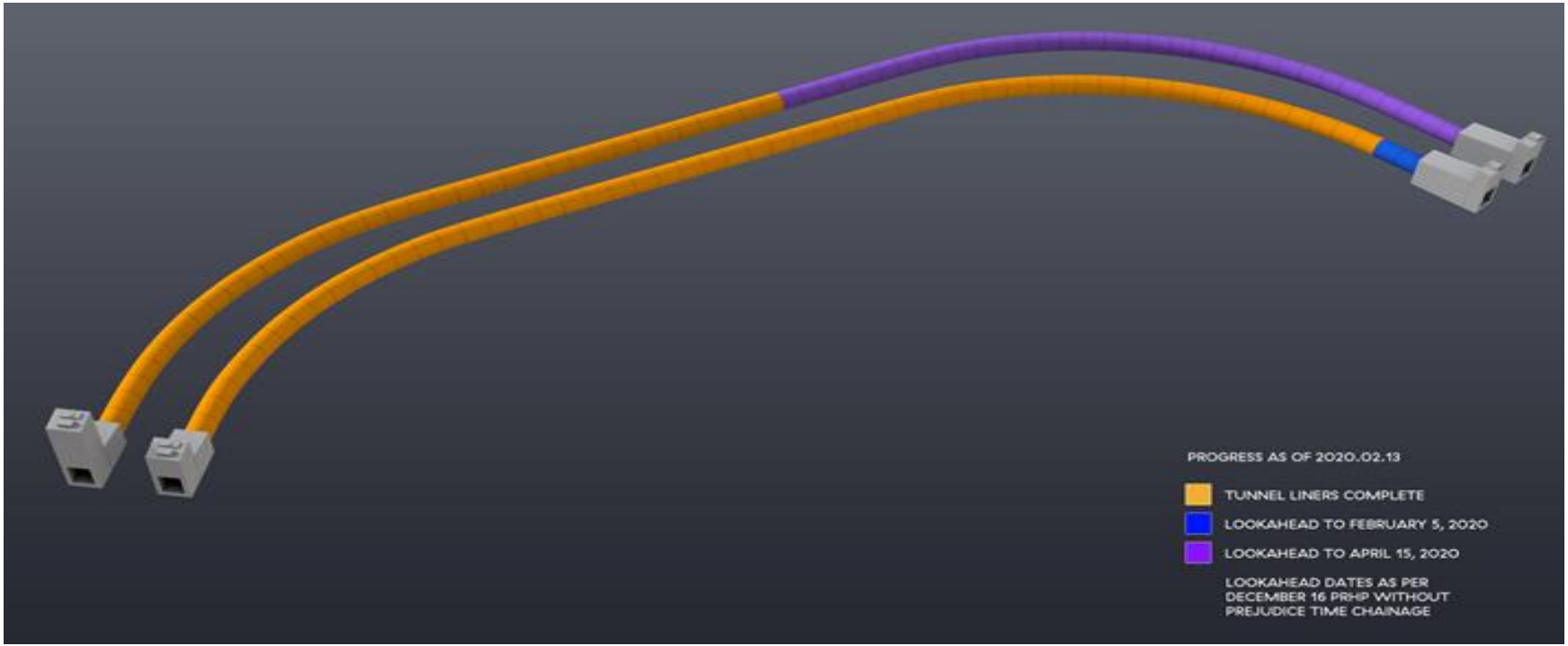
Left Bank: Diversion Tunnels and Portals



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Left Bank – Inlet Portals

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Left Bank – Diversion Tunnel Outlet Portals & Temporary Fishway

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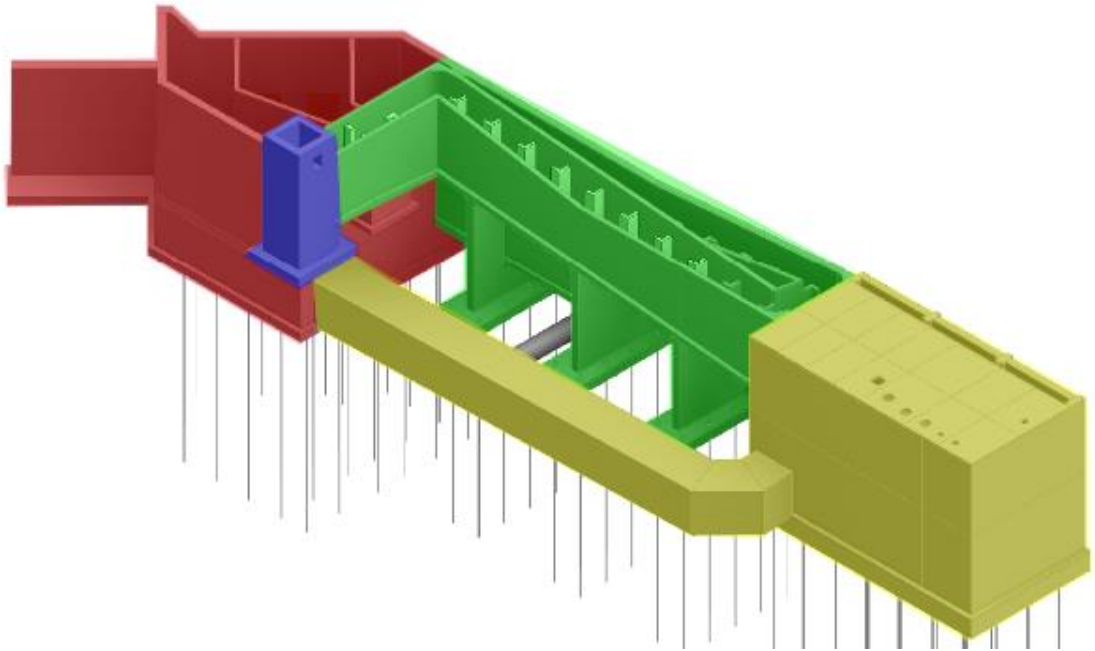
Temporary Upstream Fishway (TUF)



Project Stats

CIPC:

- Previous update 88%
- CIPC 89% completed
- Entrance – 100%
- Fish lock – 100%
- Fish ladder – 81%
- Pump station – 100%

Mechanical:

- Mechanical tasks continue

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Right Bank: Powerhouse, Intakes and Service Bay

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Powerhouse – Structural Steel Erection

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Powerhouse – Structural Pour

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Right Bank: Spillway

RCC Placement Complete – winter cladding in place

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Penstock Assembly

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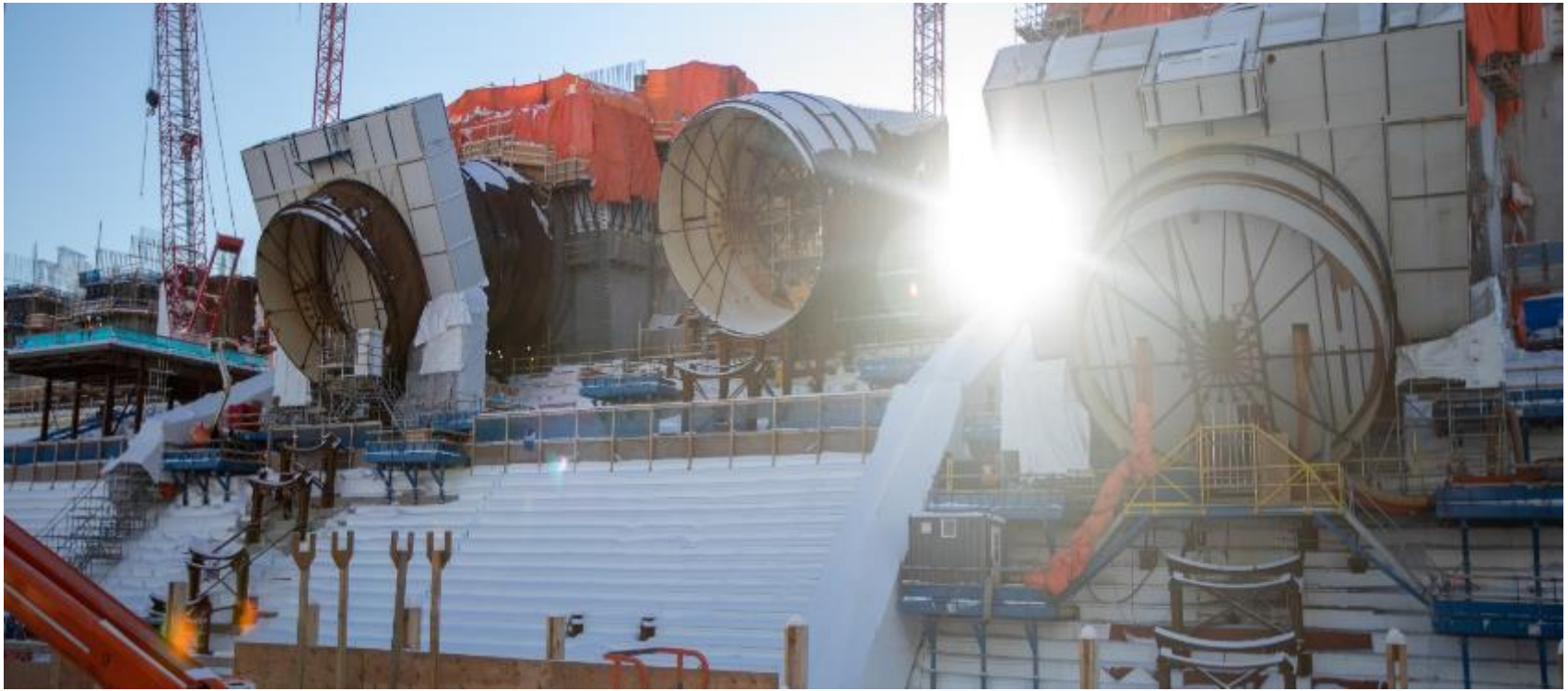
Penstock for Units 1, 2 and 3



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Off Dam Site Construction Update

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Off Dam Site Construction Update

- Transmission Work
- Highway 29 realignment
- Hudson’s Hope Shoreline Protection
- Reservoir clearing work

Transmission Work: Site C Substation

South Bank Sub-Station

Control Building – Cable Stripping

P&C relay testing & NERC hardening

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Transmission work: Transmission lines

Highway 29 realignment locations

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Highway 29 Construction Timeline

Roads and Highways*	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Highway 29 realignment											
Cache Creek West											
Cache Creek/Bear Flat											
Halfway River											
Dry Creek											
Farrell Creek											
Farrell Creek East											
Lynx Creek											

Hudson's Hope Shoreline Protection	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Hudson's Hope Berm/ DA Thomas Road upgrades											

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Highway 29 realignment – Cache Creek East

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Highway 29 Realignment - Cache Creek West

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Highway 29 Realignment – Halfway River

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Portage Mountain Quarry

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Hudson's Hope shoreline protection

Location	Type of shoreline protection				
Zone A: Below the residential area and extends just downstream of the hotel on Clarke Ave	1,650 metre berm	**Zone B:** Below the light industrial land	550 metre slope flattening and armoring of the shoreline	**Zone C:** Below the municipal sewage treatment lagoons	450 metre berm

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Reservoir Clearing

Debris Management

South Bank, Eastern Reservoir

Current clearing work:

- South Bank, Eastern Reservoir
- Peace Islands, Middle Reservoir
- Cache Creek to Peace Islands, Middle Reservoir

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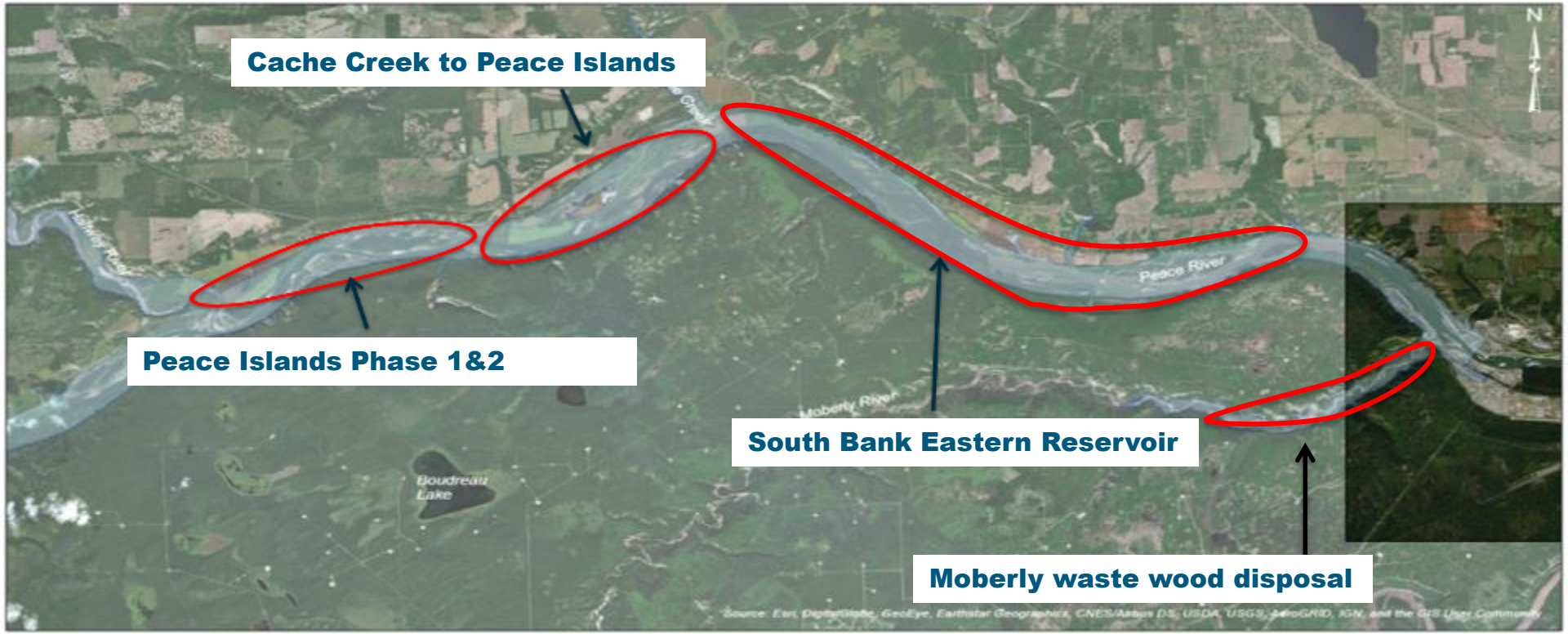
Reservoir clearing: Work plan for winter 2020



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EAC Amendments and Program Updates

Nancy Pepper

Community and Social Mitigation Manager

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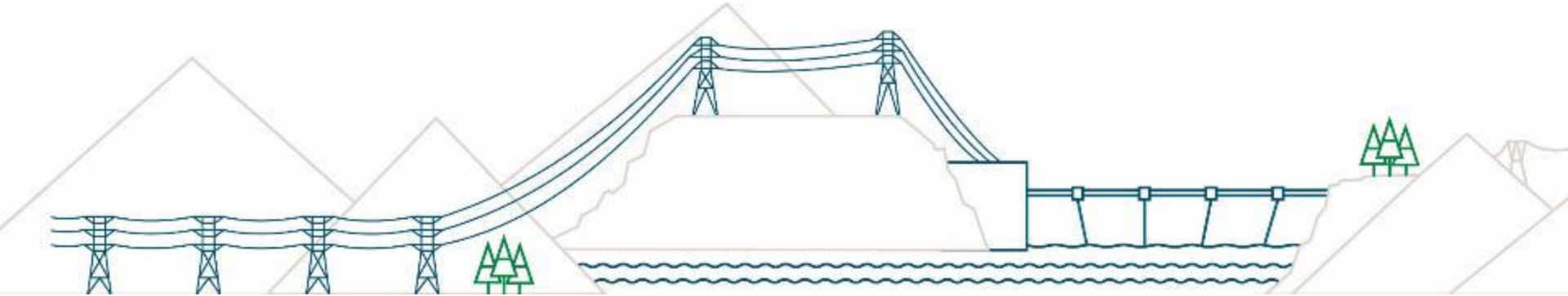
Mitigation Update



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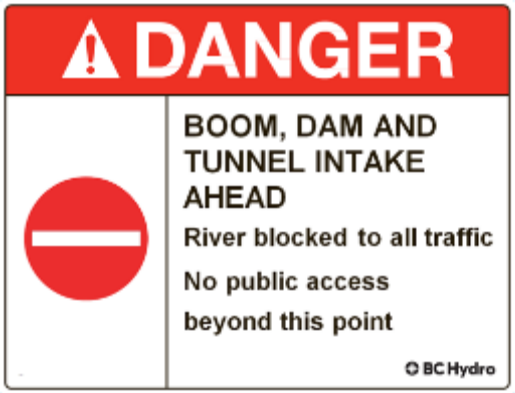
Peace River boater communication updates – Travelling Downstream



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Peace River boater communication updates – Travelling Upstream

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BC Hydro Peace Agricultural Compensation Fund

2nd Funding Intake Update

BC Hydro GO Fund

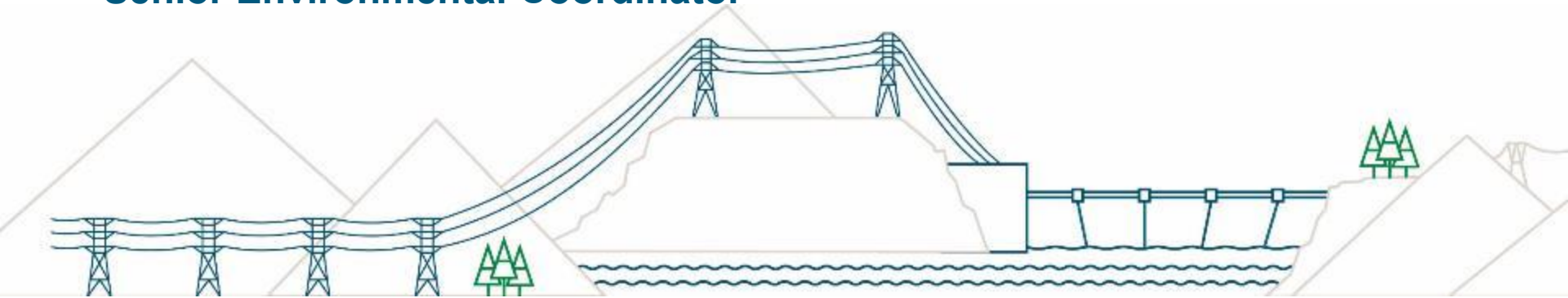
14th Funding Intake Update

North Peace Gymnastics Association
- Special Abilities Program (June 2019)

Peace River Methylmercury Update

Dave Hunter

Senior Environmental Coordinator



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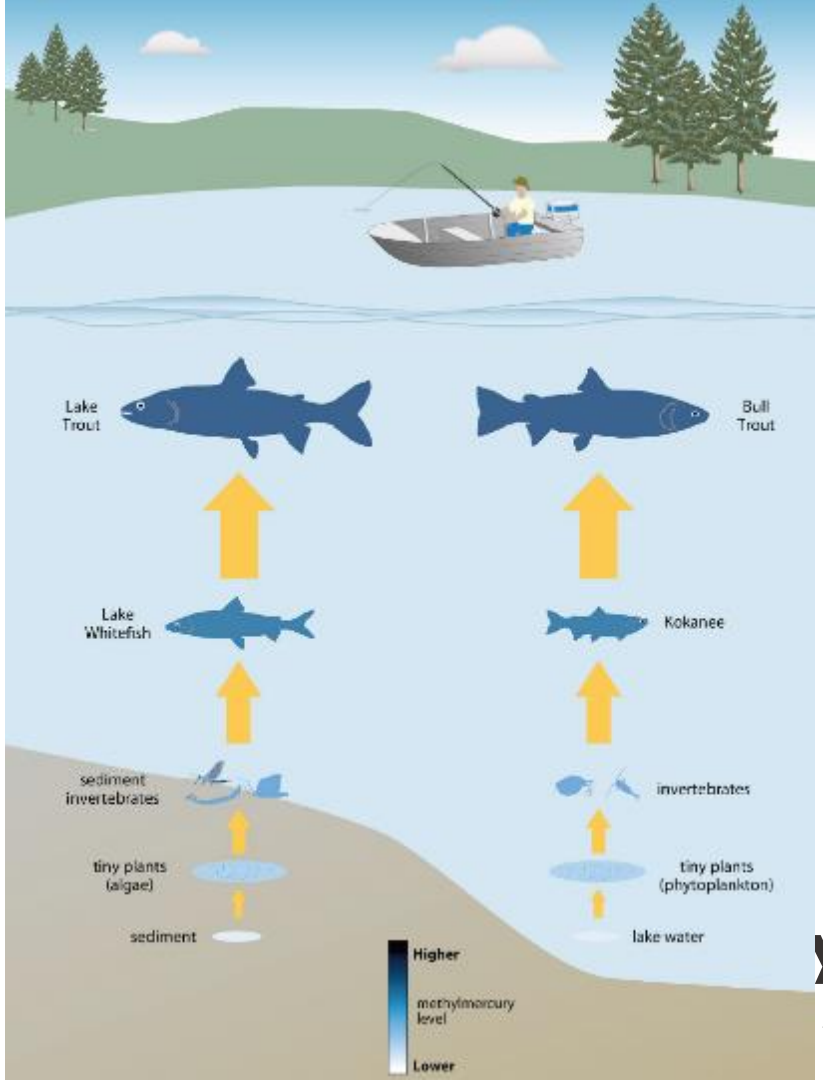
Presentation overview

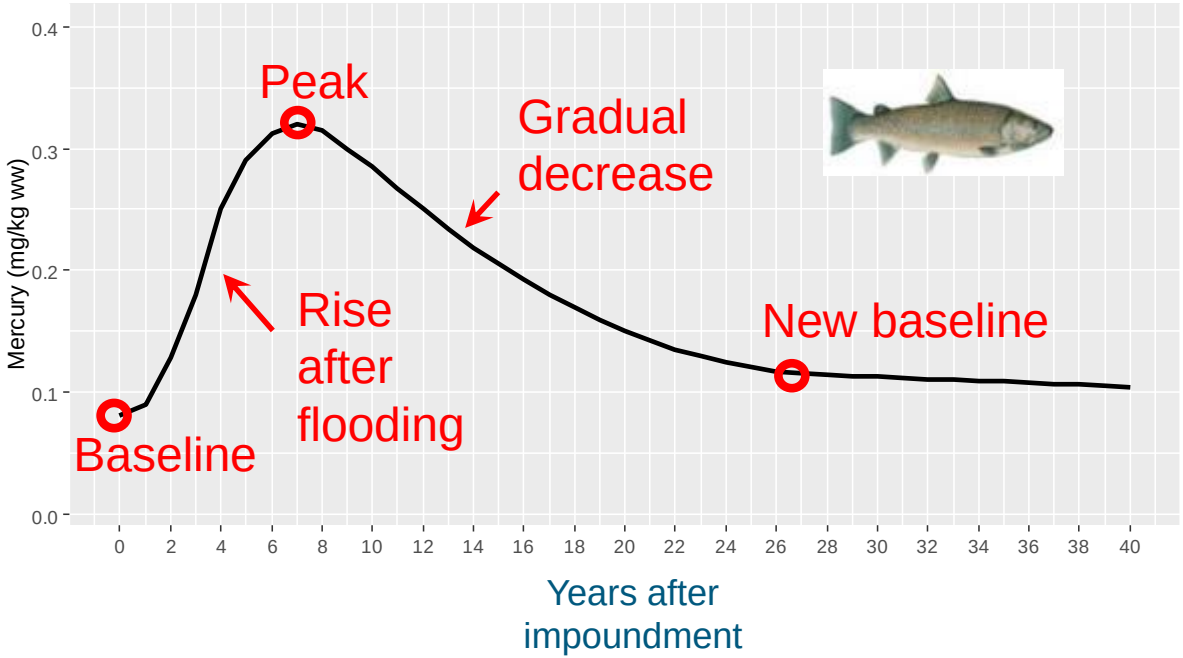
- Mercury 101
- Site C Requirements: Methylmercury Monitoring Program
- Work with health agencies and Indigenous groups to monitor and communicate results

Mercury in Fish

Traditional foods at a WMFN camp



Hypothetical trajectory: fish mercury levels in a new reservoir (the “reservoir effect’)



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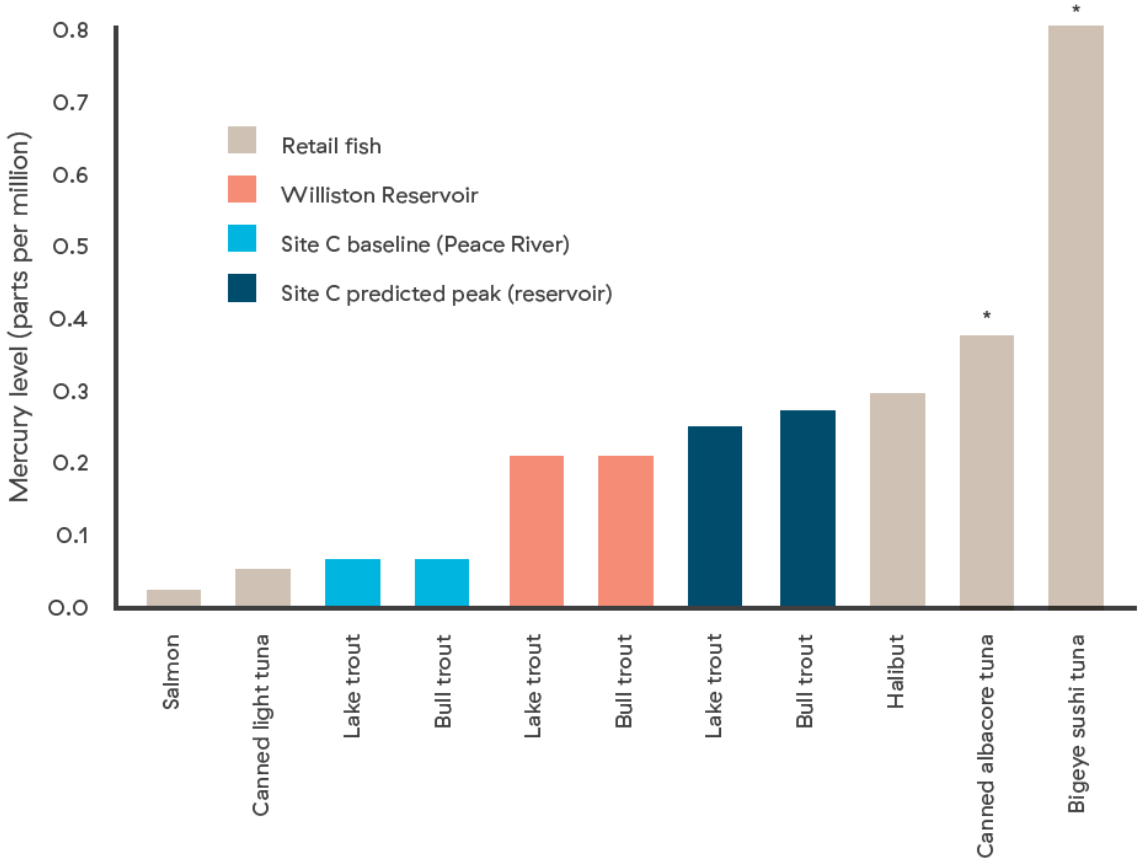
Comparison of Methylmercury Levels in Fish



Data for retail fish (sold in restaurants and grocery stores) are from Health Canada (2007) and Lowenstein et. Al. (2010)
Note: * Refer to Health Canada consumption guidance for retail canned albcore tuna and fresh bigeye tuna.

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Site C - Requirements

60	**Methylmercury** The EAC Holder must, in collaboration with the First Nations Health Authority (FNHA), NHA and Aboriginal Groups, develop a Methylmercury Monitoring Plan. The Methylmercury Monitoring Plan must include: Methods for collecting monitoring information must include: • Involving Aboriginal Groups and the FNHA in the design, implementation, management and interpretation and communication of results; • Use of information regarding consumption of fish by Aboriginal Groups known to consume fish in the methymercury monitoring study if available, and non-aboriginal harvesters including: ○ species and size of fish caught for consumption; ○ location where fish are caught for consumption; ○ consumption of fish by age group and gender; ○ fish meal sizes by age group and gender; ○ fish meal frequency; ○ parts of fish consumed; ○ fish preparation methods; and ○ other relevant consumption information (e.g. events where consumption is higher over a short period

First Nations Health Authority
Health through wellness

northern health
the northern way of caring

Saulteau
FIRST NATIONS

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Methylmercury Monitoring Plan

Site C Clean Energy Project

Revision 1

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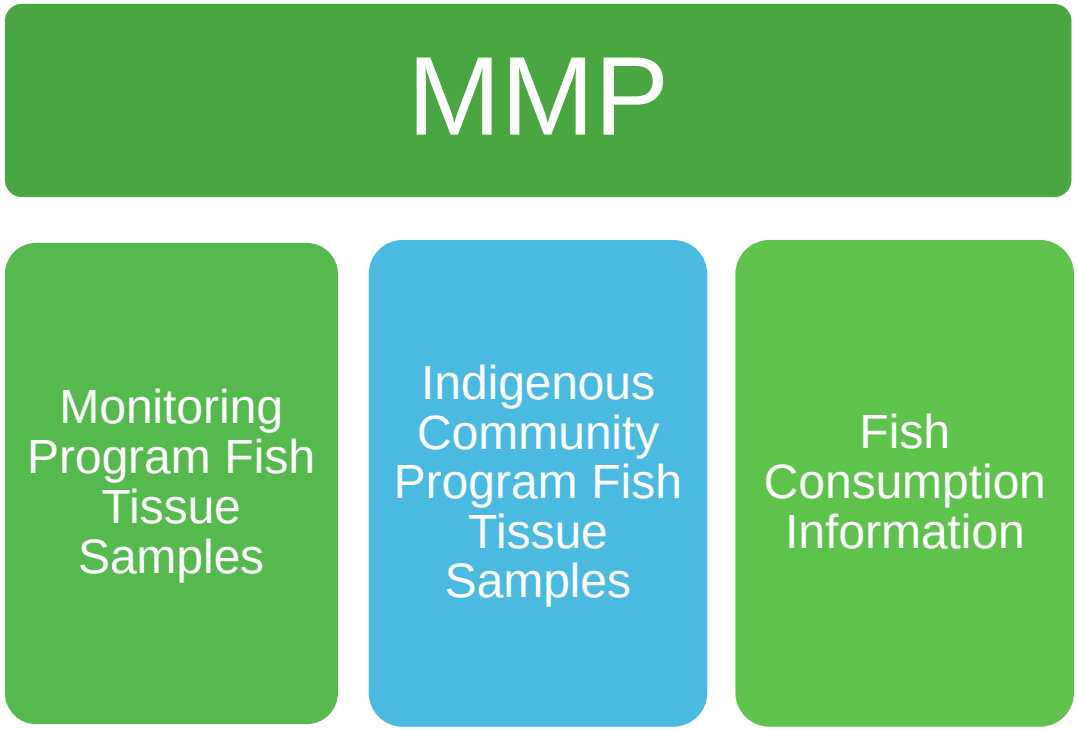
What Information Will Be Collected?



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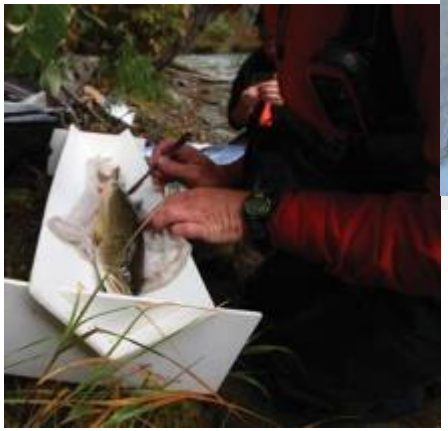
MMP Implementation- Existing Fish Programs



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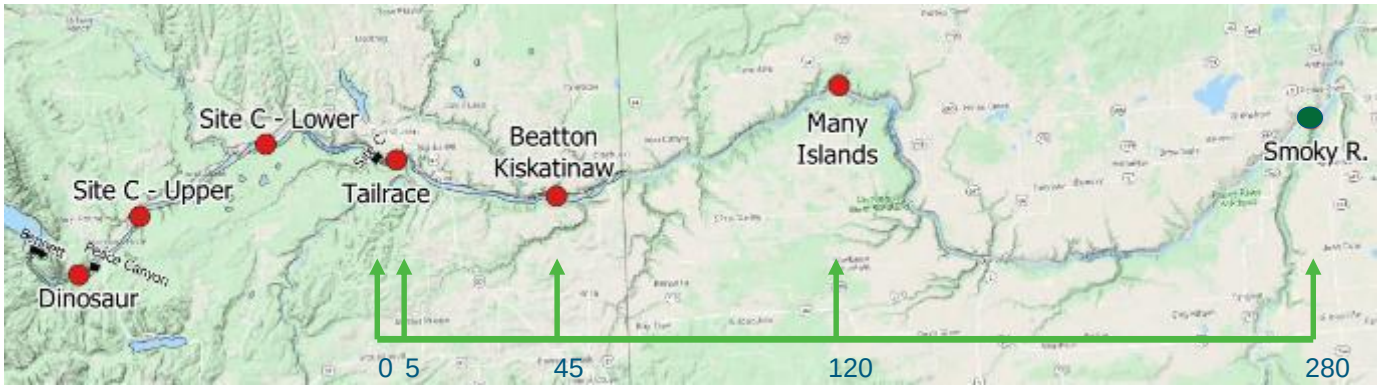
MMP Monitoring Locations



Kilometers Downstream from Site C Dam

- Monitoring Program
- Included within Indigenous Community Program

MMP Implementation – Indigenous Group and Health Authority Involvement

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Summary

- **“Reservoir Effect” – temporary increase in mercury levels**
- **Work with health agencies and Indigenous groups to monitor and communicate results**

Jobs and business opportunities

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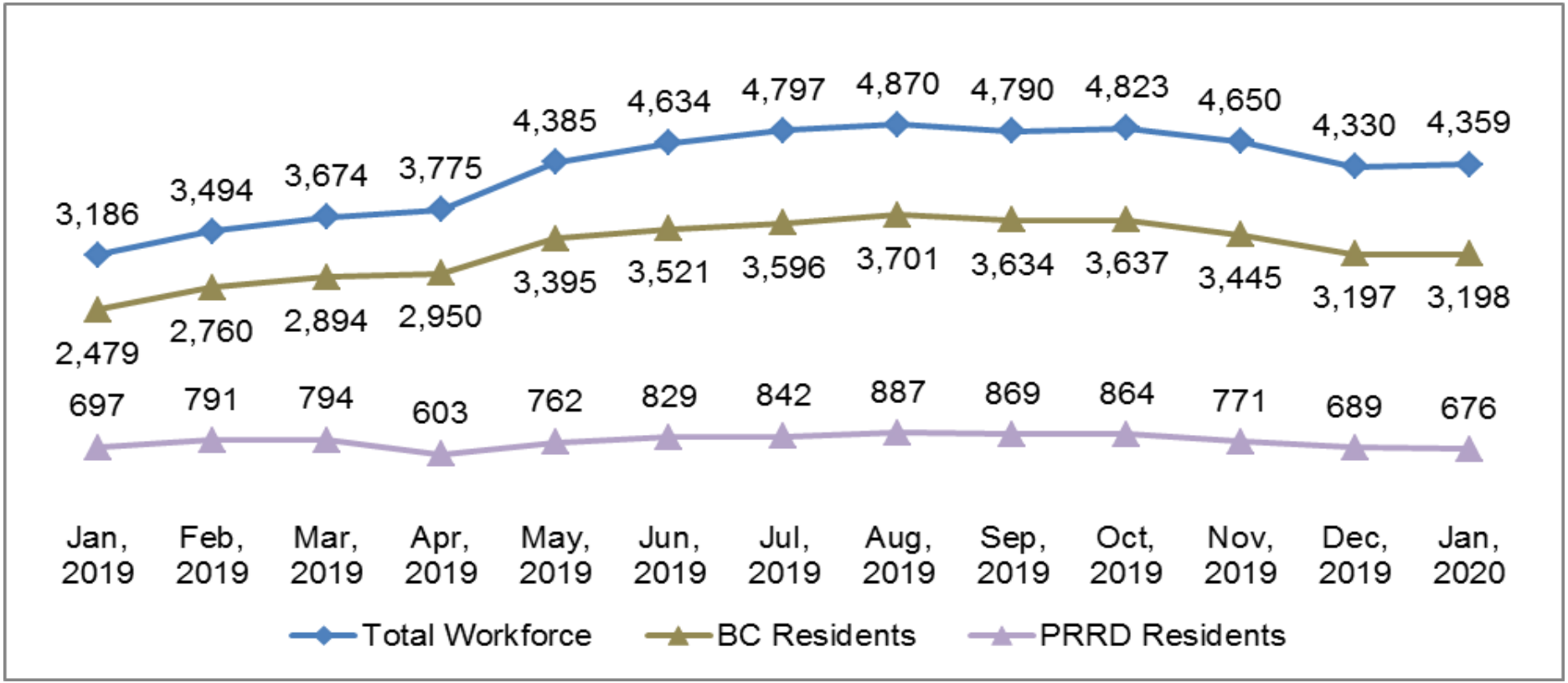
Employment statistics

- Site C jobs posted to WorkBC / Employment Connections (Fort St. John) website; all contractors listed on Site C website.
- BC Hydro requires all major contractors to report employment information.
- Total of **4,359 workers** in January 2020; **3,198** from B.C (73%). Total of **676** workers from PRRD (19%).

Site C Employment Statistics – January 2020			
	# of Total Workers	# of BC Primary Residents	% of BC Workers
Construction and Environmental Contractors	3,613	2,511	69%
Engineers and Project Team	746	687	92%
Total Workforce	**4,359**	**3,198**	**73%**

Site C jobs snapshot (January 2020)



2019 Q4 Regional Business Participation

Companies engaged by BC Hydro and Site C contractors to provide goods & services in relation to Site C construction between October – December 2019

Community	Number of Businesses	Community	Number of Businesses
Cecil Lake	1	Pouce Coupe	2
Charlie Lake	19	Prince George	30
Chetwynd	27	Rolla	1
Dawson Creek	32	Rose Prairie	2
Fort Nelson	2	Taylor	8
Fort St. John	360	Tumbler Ridge	3
Hudson's Hope	5	Wonowon	1
Moberly Lake	13		
Total		**506**	

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