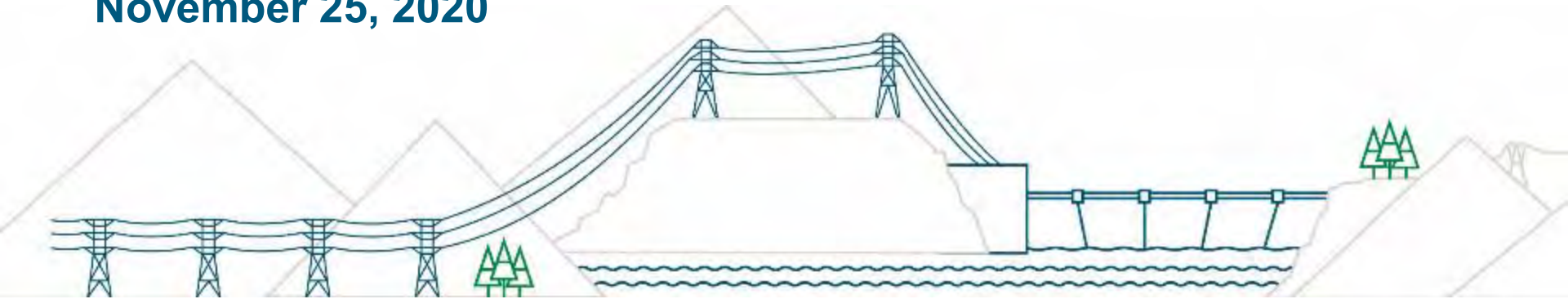
Site C Clean Energy Project

Regional Community Liaison Committee
Project Briefing

November 25, 2020



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On Dam Site Construction Update

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On Dam Site Construction Update

- Stage 2 cofferdams – upstream and downstream
- Bar Island excavations
- RCC
- Core trench & earthfill dam
- Other Main Civil Works
- Powerhouse, Intakes and Penstocks
- Intakes and Penstocks installation
- Spillway
- Powerhouse structural steel placement

Stage 2 Cofferdams – Upstream and Downstream

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Bar Island

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Dam Core Trench

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Dam Buttress RCC Placement

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Dam Buttress RCC Placement

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Other Main Civil Works – Approach Channel

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85th Avenue Industrial Lands

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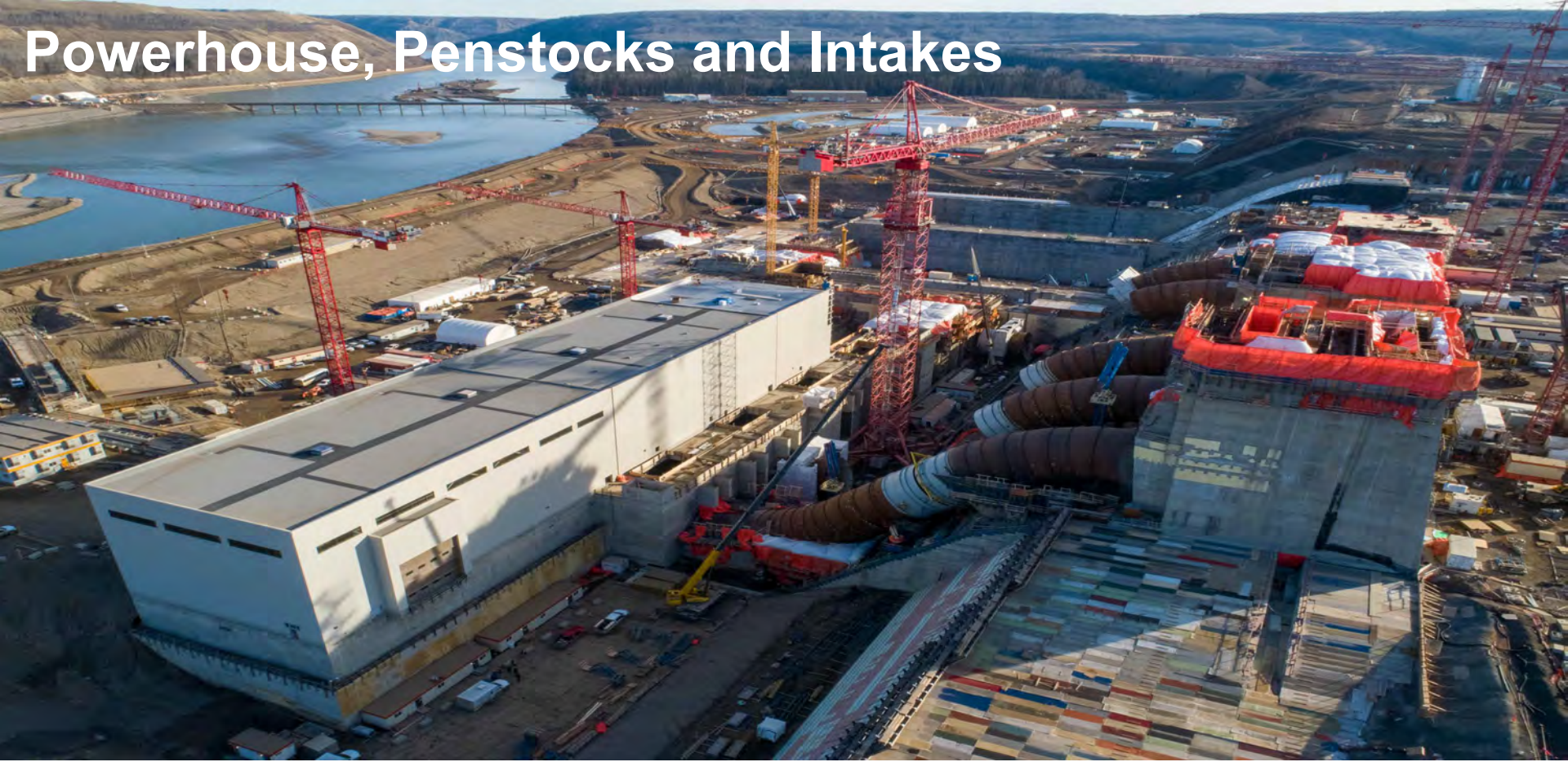
Powerhouse, Penstocks and Intakes



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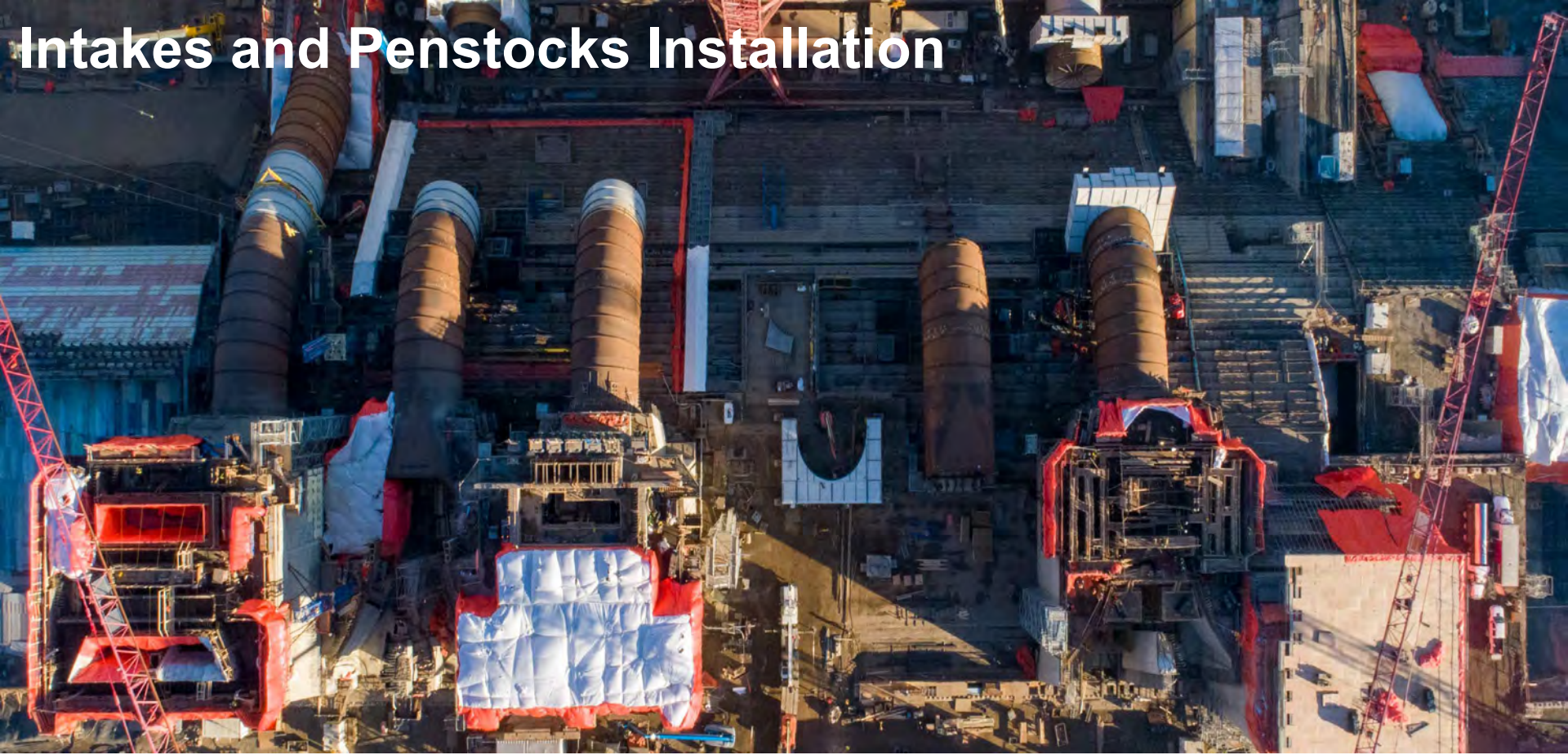
Intakes and Penstocks Installation



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Spillway

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Spillway Stilling Basin

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Powerhouse Structural Steel

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First Draft Tube Elbow is Shipped to the Generating Station

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First Draft Tube Elbow is Delivered

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Off Dam Site Construction Update

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

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Site C Substation

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Connecting 5L5 at the Peace Canyon Substation

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Connecting 5L5 at the South Bank Substation

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Highway 29 Realignment Segments

Construction Schedule Start to Finish

Lynx Creek – 8.1 km	2019 to 2023
Dry Creek - 1.4 km	2020 to 2022
Farrell Creek – 1.9 km	2020 to 2023
Farrell Creek East – 3.0 km	2021 to 2023
Halfway River – 3.7 km	2018 to 2023
Cache Creek West – 4.0 km	2018 to 2020
Cache Creek East – 8.6 km	2019 to 2023

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Highway 29 realignment – Cache Creek east

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Highway 29 realignment – Halfway River approach

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Highway 29 realignment – Halfway River

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First girder is installed at Halfway River

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Highway 29 realignment – Farrell Creek west

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Highway 29 realignment- Drilling at Dry Creek

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Highway 29 realignment - Lynx Creek

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Portage Mountain Quarry

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Area 4 – Aggregate Stockpile

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Hudson’s Hope Shoreline Protection

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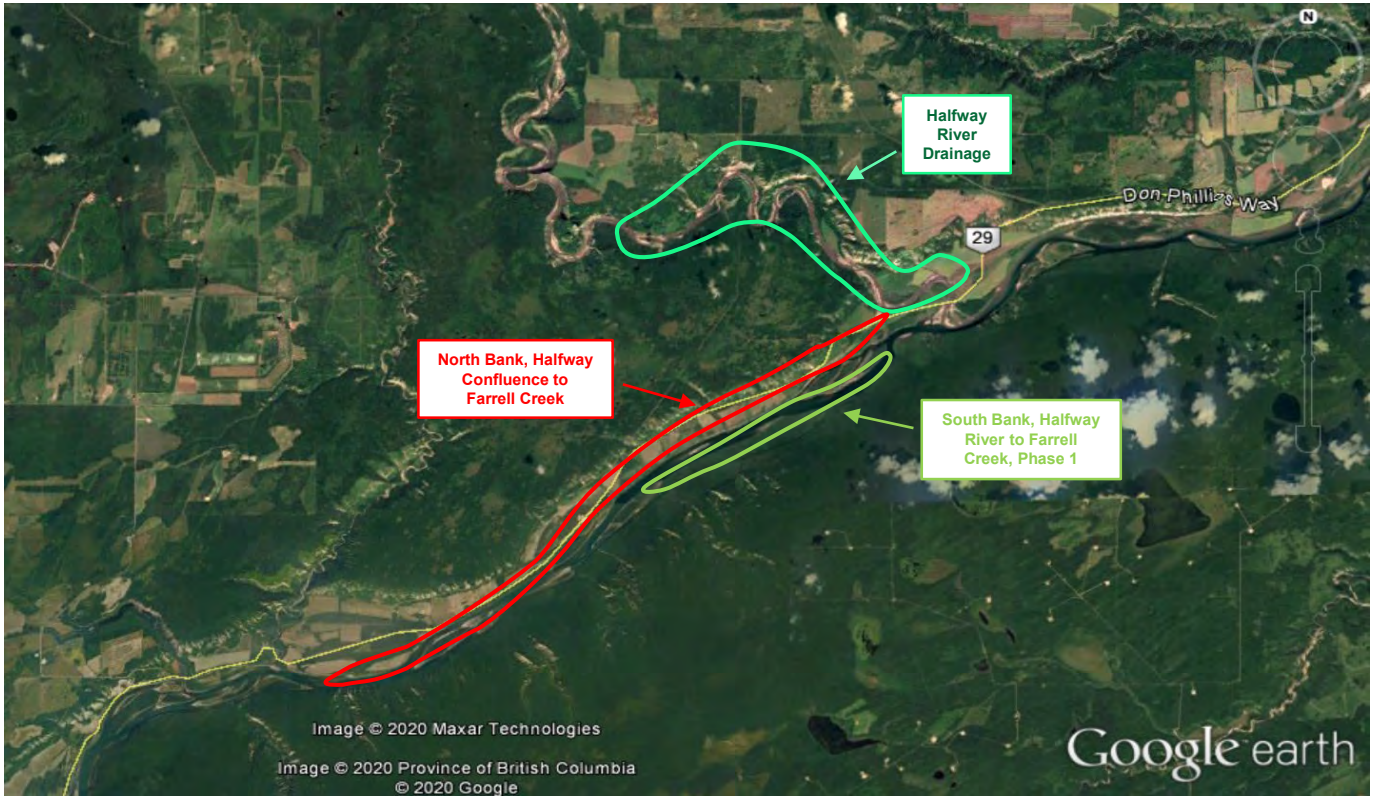

Fall Winter Clearing work:

- **Halfway River Drainage**
- **Western Reservoir South Bank, HR to FC Phase 1**
- **Western Reservoir North Bank, HR to FC**

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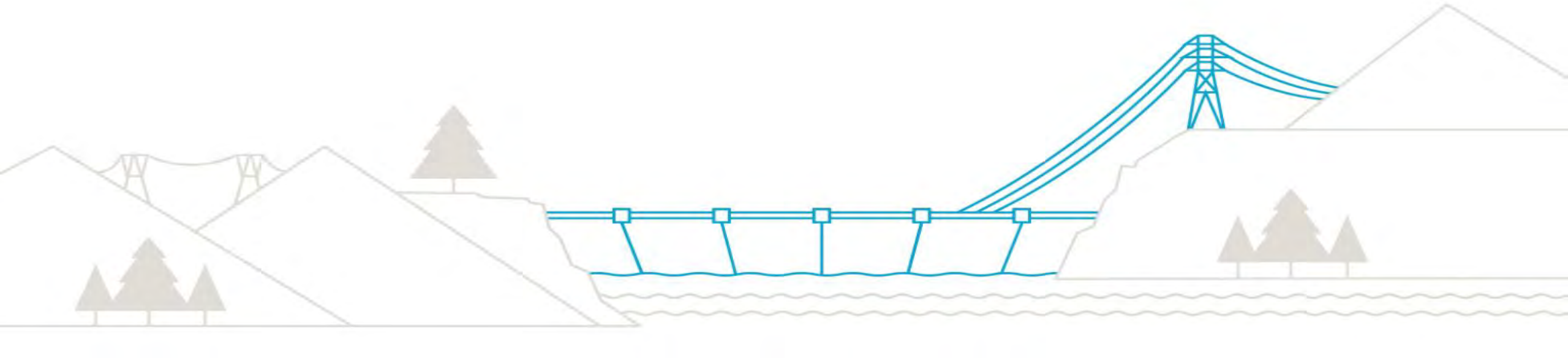
Site C Reclamation Overview

Greg Scarborough



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Agenda:

1. What are the Reclamation Requirements and Where are they Required
2. Site Clean-Up Verification
3. Delivery modes (Contractors and BC Hydro) and Timing
4. Current Reclamation Status
5. Next steps

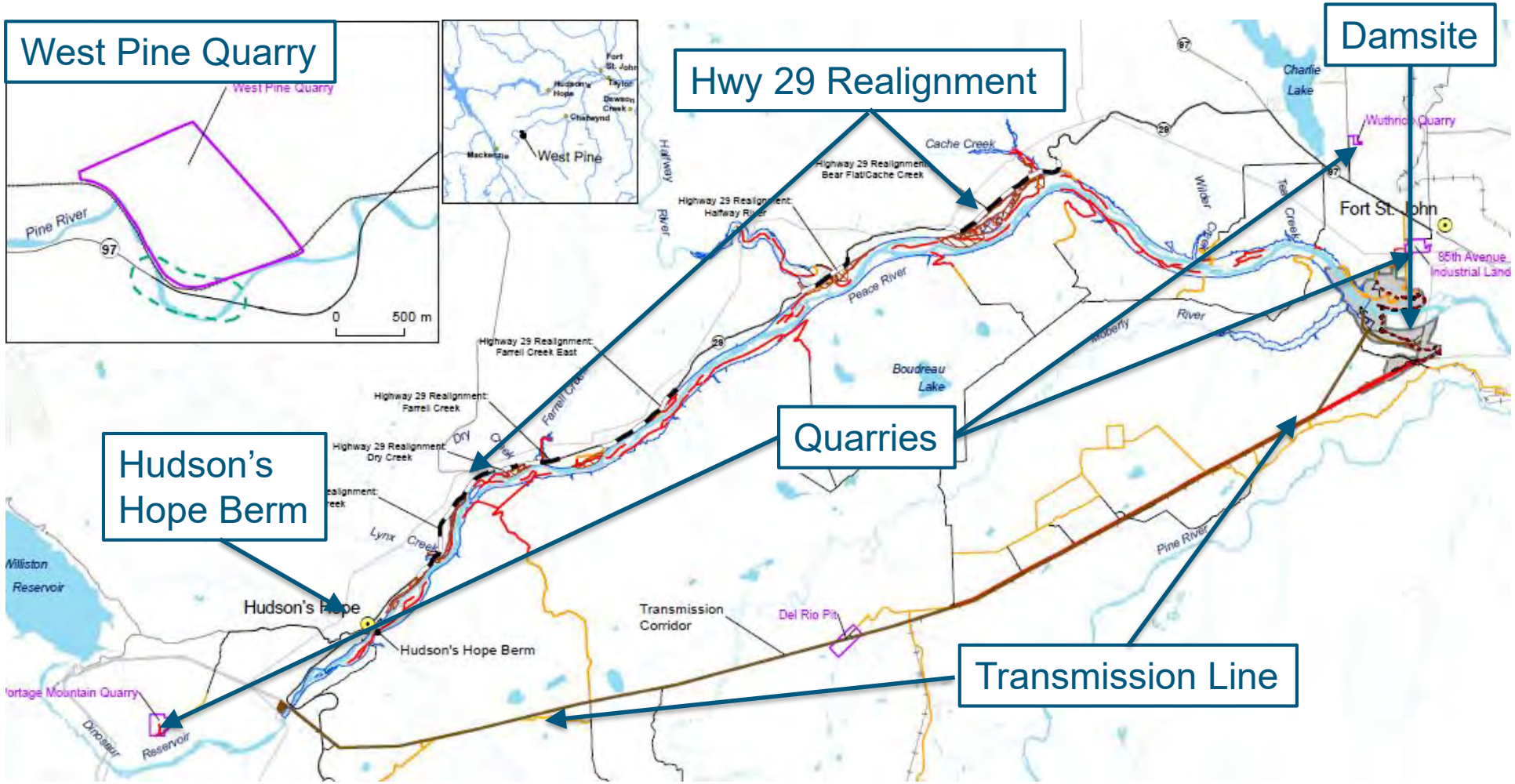
Construction Environmental Management Plan (CEMP) Reclamation requirements

To re-establish native vegetation communities on areas disturbed during Project construction that will not be needed during Project operations. The intended use of the areas after construction will determine how site reclamation and revegetation activities will be conducted and the type of vegetation re-established.

Further details can be found in:

- Section 4.12 and Appendix H of the CEMP @ https://www.sitecproject.com

Reclamation Areas



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Pre-Reclamation Clean-up Verification

CEMP Defined Deliverables and Payment Items help ensure construction wastes and equipment are properly disposed

- Contractors must submit an “Environmental Completion Report at the end of construction activities that describes compliance with the applicable EPPs” (CEMP S. 2.3)
- BC Hydro verifies the Environmental Completion Report through field inspection
- Contractors’ Holdback is withheld until Environmental Completion Report is reviewed and accepted.

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General Reclamation Requirements, Status and Who Implements

Transmission Line corridor – Erosion and Sediment Control (ESC), measures, topsoil replacement plus natural vegetation regeneration. Contractor implements as work progresses

Highway 29 Realignment – Topsoil replacement and ESC measures per MOTI spec. Contractor implements as work progresses.

Quarries – Permit condition reclamation plan plus CEMP deliverables. Quarries not transferred to MOTI upon completion will be reclaimed by Contractor/BC Hydro per CEMP and plan

Hudson's Hope Berm – Reclamation as per plan plus ESC measures by Contractor at end of work.

Damsite area – Reclamation as per CEMP by Contractor & BC Hydro as areas are complete

CEMP Prescribes Reclamation Outcomes by Landscape type

South Facing Slopes

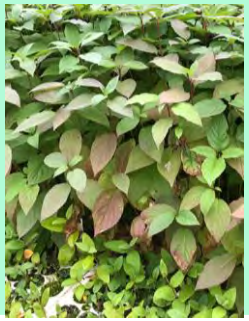
- Native grassland with coarse woody debris

North facing and Plateau

- White spruce forest with course woody debris + alder

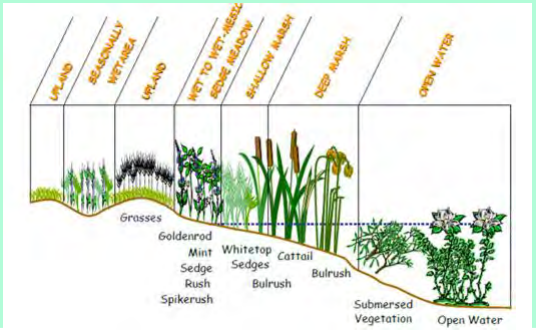
Riparian Area

- Live stake planting (dogwood, poplar) with coarse woody debris



Wetland

- Various plantings, contouring to achieve wet and drier areas



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Current Reclamation Status 2020

L3 Ravine

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Next steps:

2020 **2021** **2022** **2023** **2025**

Guidance, advice and help with planning and reclamation prescriptions

Local trials to optimize prescriptions

Procuring Growing and supplying seedlings / live stake collection

Implementation of reclamation prescriptions / Monitoring success and adapting

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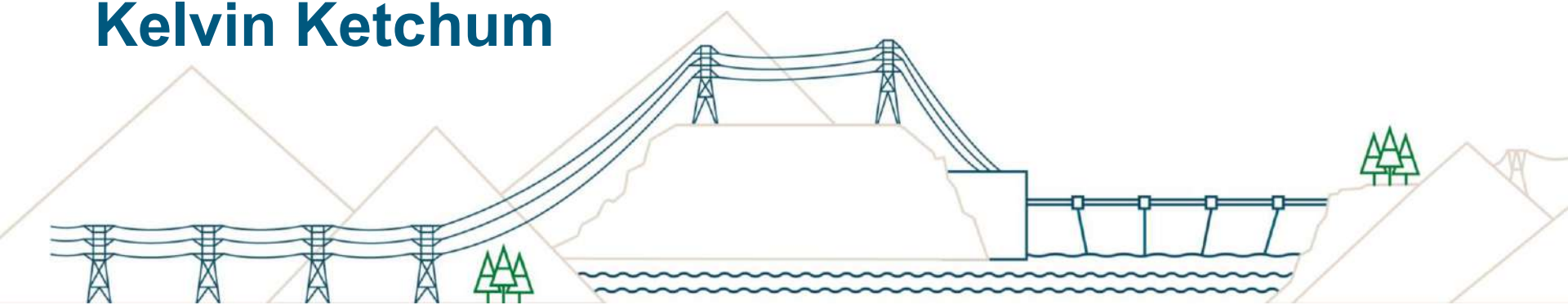
Summer Rain Events

Weather/Inflow Monitoring & Response

Kelvin Ketchum



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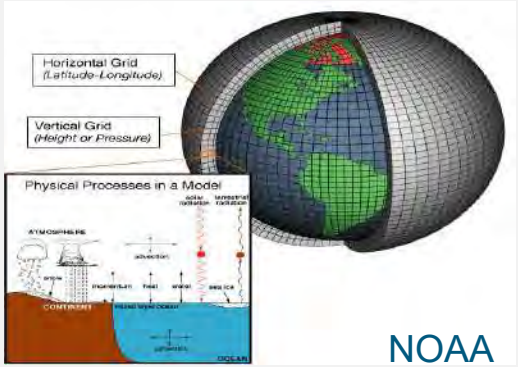
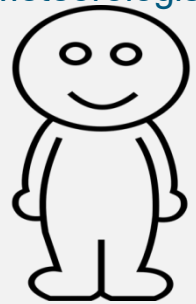
Weather and Inflow forecasting at BC Hydro

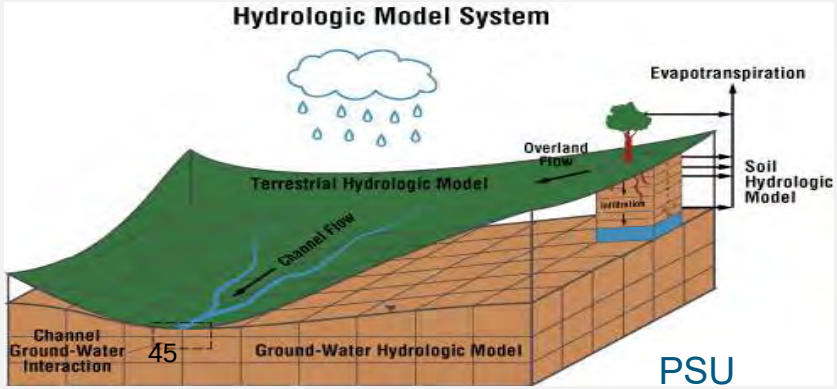


NOAA

ECMWF

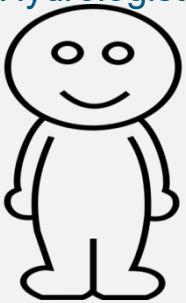
Meteorologist





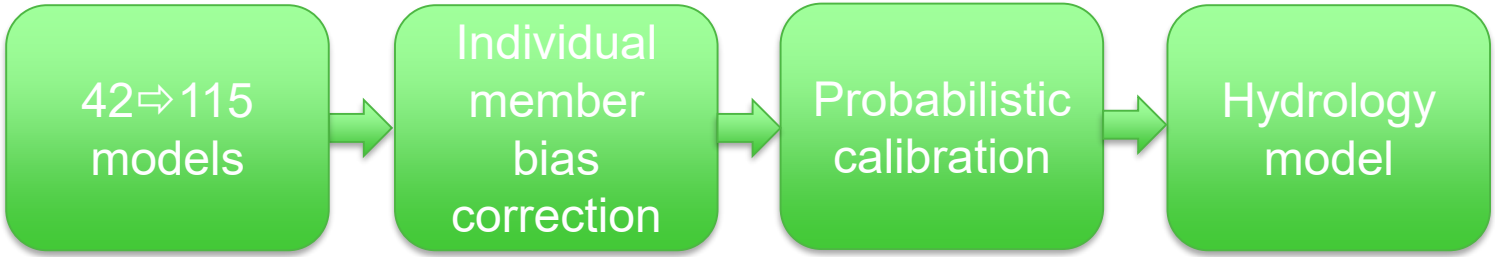
PSU

Hydrologist



Planning Engineers

Weather Forecast System Overview



- "Ensemble" of weather models yields a more accurate "expected" forecast; also gives information about more extreme (very unlikely) scenarios
- Uncertainty is unavoidable, best to provide estimates of it … so that risk can be managed
- Transition to a new forecast system designed to better capture low-probability scenarios. Continuing to improve this Fall/Winter.

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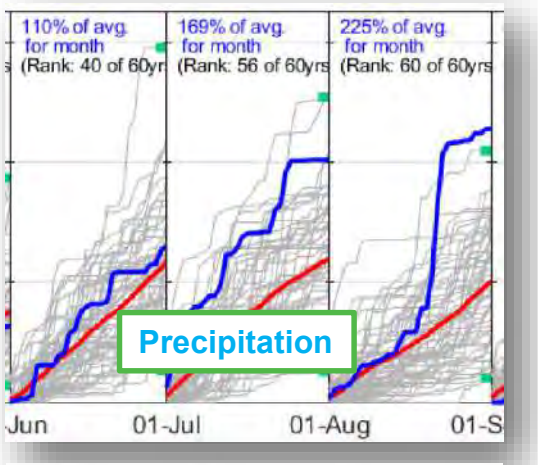
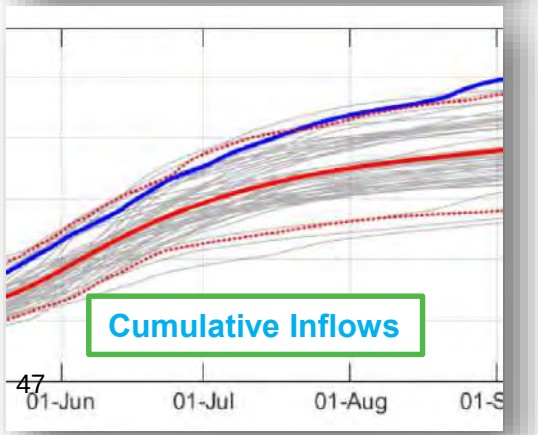
Summer 2020 Weather Overview





- Summer 2020 was very wet … with 5 major rainfall events during June-August
  - Williston Reservoir basin:
    - rainfall was 68% above average
    - highest seasonal inflows on record
  - Site C Local basin:
    - rainfall was 19% above average
    - 3rd highest seasonal inflows on record

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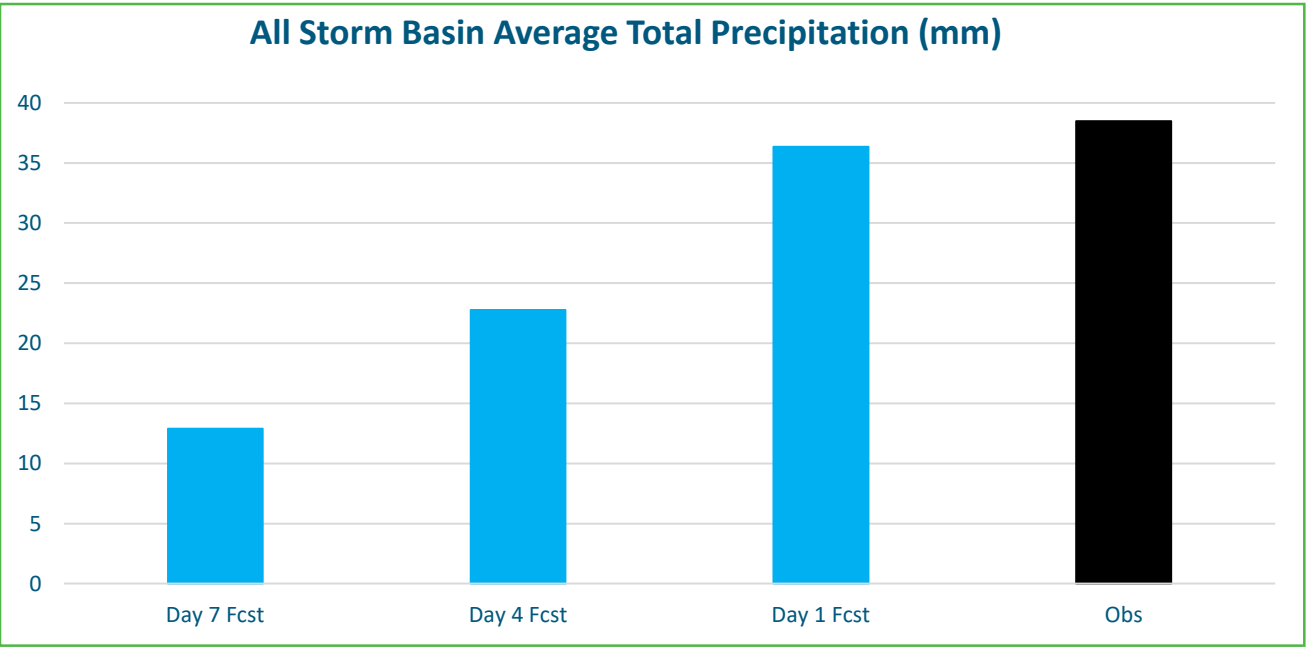
Event Verification – 5 biggest storms in 2020



- Overall basin-average precipitation forecast skill is good.
- Forecasts for individual points in the basin have less skill.

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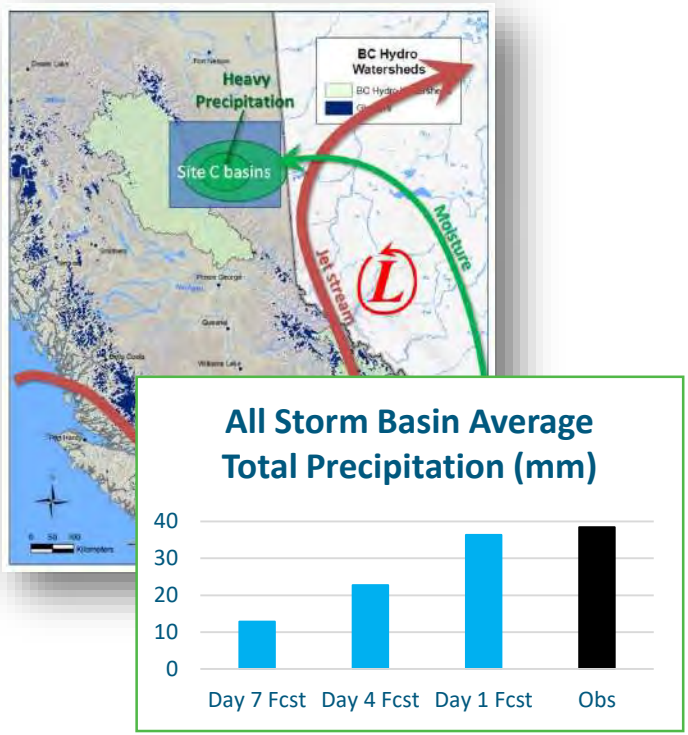
Weather Forecast Summary



- Verbal and written information also important (not just numbers)
  - 4-8 day lead time for significant events. No missed events.
- Forecast system performed as expected. Generally good forecasts.
- New forecast system improves accuracy and will better capture potential extreme (but unlikely) scenarios in future storm seasons

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Site C Local inflow forecasts for 3-4 July (peak inflow for storm event)

Forecast Day/ Date	Expected Forecast (2-day avg)	Actions
Day 5-Jun 29	448 m3/s	Maintain PCN discharge near min. (350 m3/s)
Days 4&3- Jun 30 & Jul 01	1130 m3/s	Maintain PCN discharge near min. (350 m3/s)
Day 2-Jul 02	860 m3/s	Increase PCN discharge slightly (to 650 m3/s) to manage Williston Reservoir level
Day 1-Jul 03	974 m3/s	Increase PCN discharge slightly (to 800 m3/s) to manage Williston Reservoir level
Actual	1210 m3/s	

Site C Local inflow forecasts for 3-4 July (peak inflow for storm event)

	Expected Forecast 2-day avg	Actions
Day 1-Jul 03	974 m3/s	Increase PCN discharge slightly (to 800 m3/s) to manage Williston Reservoir level Debris accumulation on boom Issue advisory to boaters regarding debris and high flows Briefed PRRD Chair and CAO about debris on boom
Jul 04 Dam Site Peak	Actual 1210 m3/s	Activated dam site Emergency Operations Centre Updated PRRD and notified RCLC on debris accumulation on boom Mobilized equipment to remove debris from boom Reduce PCN discharge (to 410 m3/s) to manage risk for Site C river debris boom

July 1-4 storm event – estimated Site C forebay levels with cofferdam in place

	Est. water level at Dam Site	Actions
Storm Start- Jul 1	410.4 m	Maintain PCN discharge near minimum
Jul 2	412.5 m	Increase PCN discharge slightly to manage Williston Reservoir level
Jul 3	418.0 m	Same as above
Jul 4 – peak flow at dam site	418.4 m	Reduce PCN discharge to near-minimum to manage river levels & debris boom risk
Jul 5	415.7 m	Water levels begin to drop. Increase PCN discharges gradually to manage Williston Reservoir level & debris boom

Site C local inflow forecasts for 23-24 Aug (peak 2-day inflow for storm event)

Forecast Day/ Date	Expected Forecast (2-day avg)	Actions
Day 7-Aug 17	126 m3/s	High PCN discharge (2300 m3/s) for 2 days, then reduced to 1900 m3/s as storm approaches
Day 4-Aug 20	292 m3/s	PCN discharge held at 1900 m3/s to manage levels at Site C & Williston Reservoir
Day 3,2,&1 -Aug 21,22,23	352 m3/s	PCN discharge reduced to 1740 m3/s to manage levels at Site C & Williston Reservoir
Actual	204 m3/s	
24-25 Aug		Inflows receding so PCN discharge gradually increased to manage Williston Reservoir level

Aug 21-24 storm event – estimated Site C forebay levels with cofferdam in place

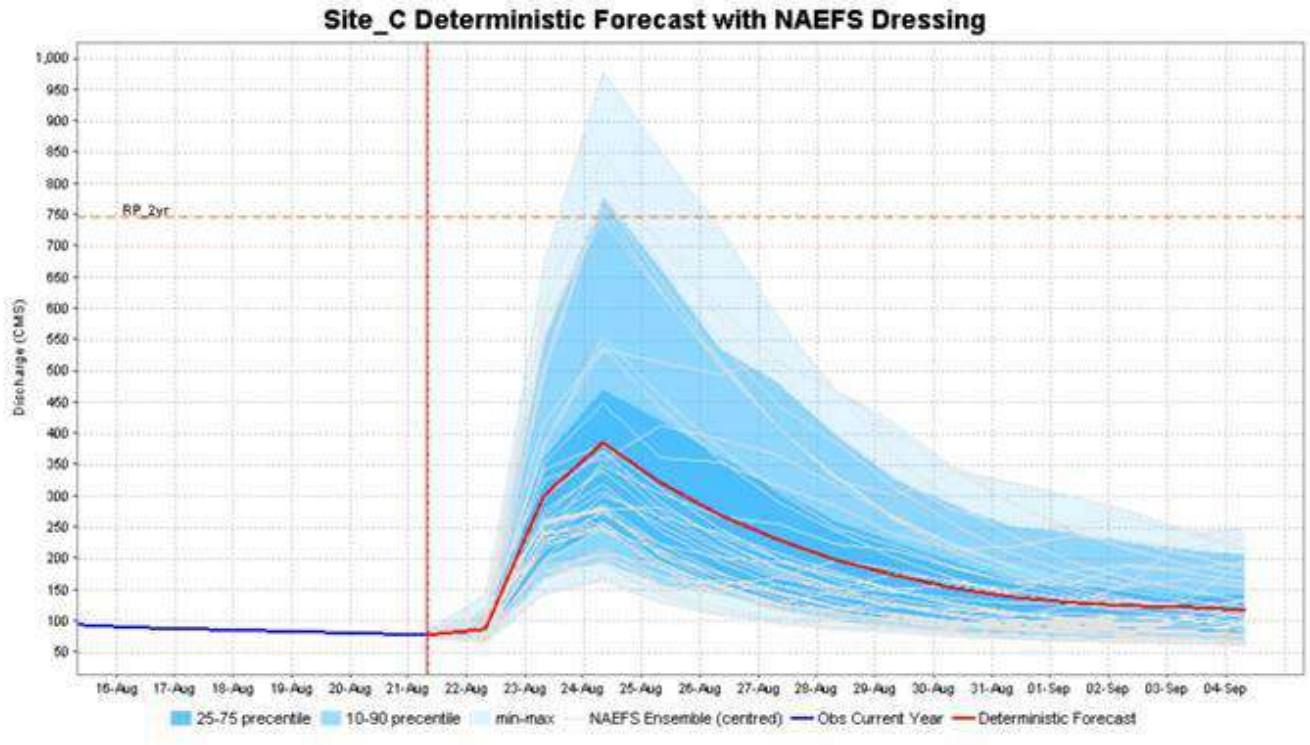
	Est. Water Level at Dam Site	Actions
Storm Start-Aug 21	418.9 m	PCN discharge reduced during 19-21 Aug to manage levels at Site C & Williston Reservoir
Aug 22	418.6 m	Further small PCN discharge reduction
Aug 23 – peak local inflow	418.9 m	Rainfall event complete, PCN discharge increased slightly to manage Williston Reservoir level
Aug 24	419.4 m	PCN discharges increased slightly to manage Williston Reservoir level
Aug 25	419.8 m	PCN discharges increased gradually to manage Williston Reservoir level

Site C Emergency Planning Guide Notifications Table

Communication Action	Type of Forecast	Hours in Advance of Forecast Headpond Level Occurring	Headpond Level (m)
Issue external communications about forecast	High Impact Inflow Scenario	96	433.0
Issue Cofferdam Alert	Expected	72	433.0
Issue Cofferdam Breach notification	N/A	0	>433.0

Site C Local inflow forecast on 21 Aug

– with stochastic weather sequences



High Impact Inflow Scenario:

→ PCN discharge planned to keep the Site C flow < Critical Flow Limit

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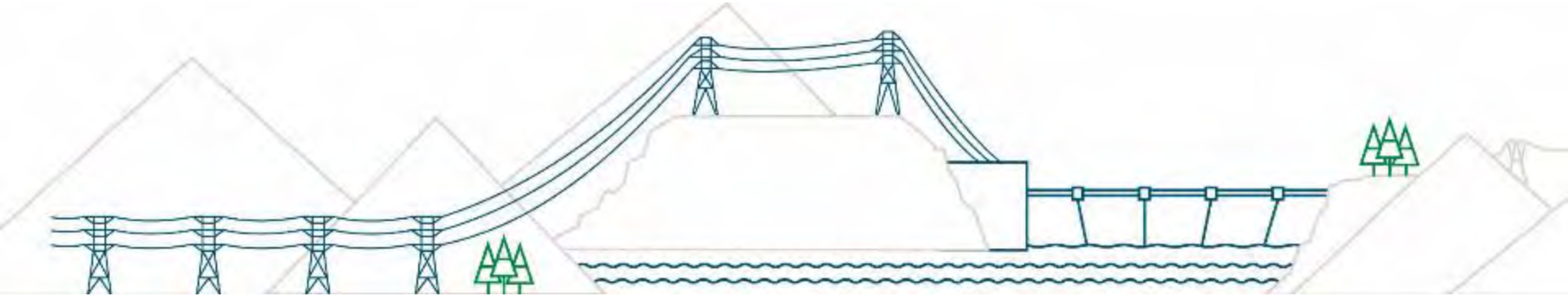
Last Updated: 2020/08/21 11:52:16 PDT

EAC Amendment Update

Karen von Muehldorfer



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EAC Amendments Update

EAC Amendments Issued	EAC Amendments In Progress	Anticipated EAC Amendments
1) Generating Station and Spillway design changes 2) Highway 29 – Halfway River Bridge design change 3) Use of West Pine Quarry as a materials source for Highway 29 realignment and Hudson's Hope berm 4) Selective use of machinery to clear in riparian areas 5) Worker Camp Expansion 6) Highway 29 Cache Creek Revised Alignment 7) Halfway River East Borrow Source	N/A	1) 85th Avenue – hauling material to dam site in event of conveyor maintenance or breakdown 2) Definition of "construction phase" of project

Jobs and business opportunities

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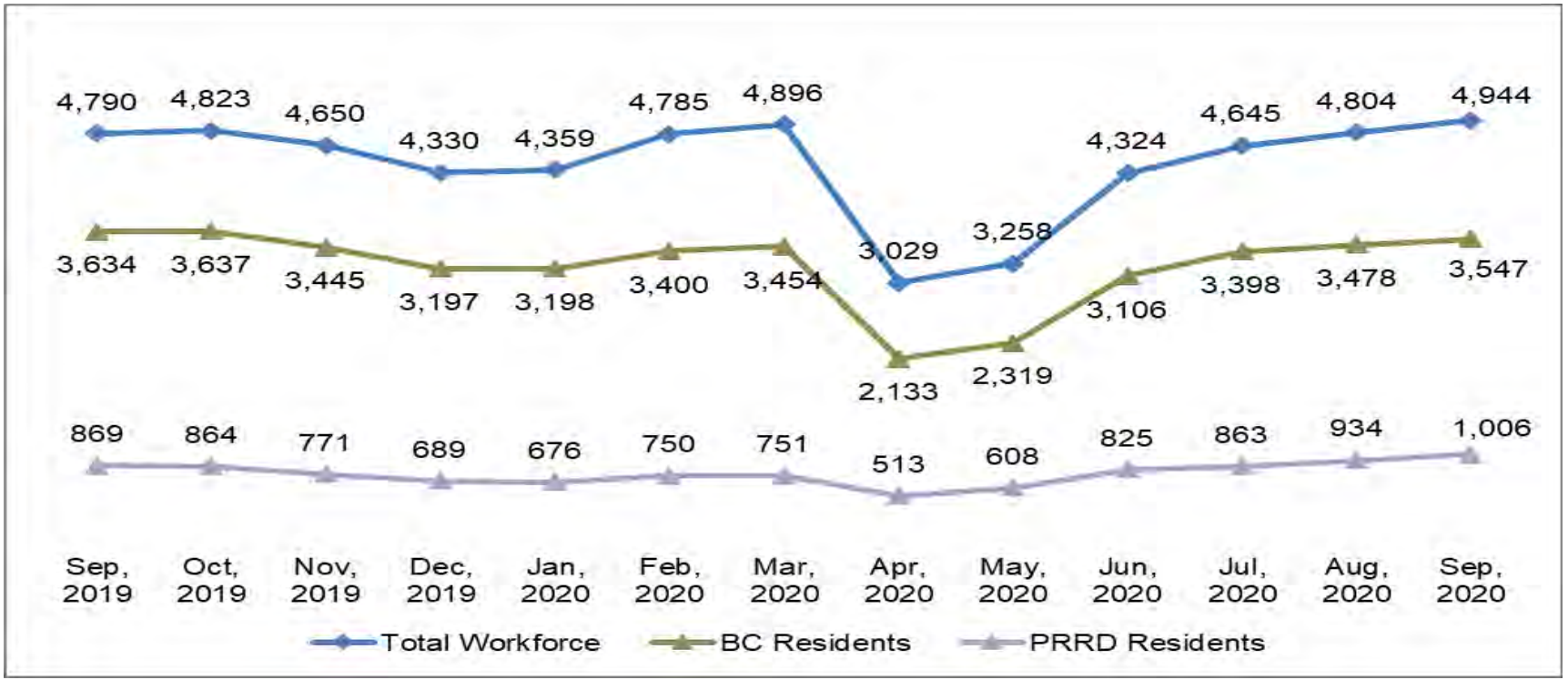
Employment statistics

Note: The September workforce numbers reflect the May 14 decision to gradual resume construction activities on the dam site

- BC Hydro requires all major contractors to report employment information.
- Total of **4,944** workers in September 2020; **3,547** from B.C (72%). Total of **1,006** workers from PRRD (24%).

Site C Employment Statistics – September 2020			
	# of Total Workers	# of BC Primary Residents	% of BC Workers
Construction and Environmental Contractors	4,214	2,864	68%
Engineers and Project Team	730	683	94%
Total Workforce	**4,944**	**3,547**	**72%**

Site C Jobs Annual Trending (September 2020)



2020 Q3 Regional Business Participation

Companies engaged by BC Hydro and Site C contractors to provide goods & services in relation to Site C construction between July – September 2020

Community	Number of Businesses	Community	Number of Businesses
Baldonnel	2	Montney	1
Cecil Lake	1	Pink Mountain	1
Charlie Lake	28	Pouce Coupe	5
Chetwynd	58	Prince George	42
Dawson Creek	44	Rolla	1
Fort Nelson	2	Rose Prairie	2
Fort St. John	479	Taylor	10
Hudson's Hope	10	Tumbler Ridge	4
Mackenzie	2	Wonowon	2
Moberly Lake	8		
Total		**702**	

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