Peace Project Water Use Plan

WILLISTON TARGETED DEBRIS MANAGEMENT

Implementation Year 14

Reference: GMSWORKS-22

Study Period: 2022

CHU CHO ENVIRONMENTAL
1940 3RD AVENUE
PRINCE GEORGE, BRITISH COLUMBIA
V2M 1G7

February 17, 2023

CHU CHO
INDUSTRIES

GMSWORKS#22 – 2022 Final Report

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GMSWORKS#22 – 2022 Final Report: 2022

Prepared For

BC Hydro
6911 Southpoint Drive | Burnaby, BC | V2N 4X8

Prepared By

Cornelia Thomi, RPF
Chu Cho Industries LP
1940 3rd Avenue | Prince George, BC | V2M 1G7

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Signature Page

Chu Cho Industries has prepared this report using sound technical and professional judgment based on our extensive expertise and experience in developing and conducting works of this nature. We have identified and developed this report in order to provide clear and concise information regarding the debris management works completed during the 2022 season.

Cornelia Thomi, RPF – Operations Coordinator, Chu Cho Industries LP

Daniel Pierre –Site Supervisor, Chu Cho Industries LP

Jonathan Kostyshyn- Program Manager, Chu Cho Industries LP

1 Introduction

This report documents the annual operations of the GMSWORKS#22 debris management program. This report provides detail on the scope of work completed during the spring, summer and fall months including the methodologies, timing and cost of the work. Specifically, this report identifies the equipment used, work locations, the total volume of debris managed and the cost per cubic meter to complete the management. This report will also provide descriptions of the archaeological and environmental work that was completed during each stage of operations. GMSWORKS#22 is managed and implemented by Chu Cho Industries LP.

1.1 Overview of Activities

In general, debris management activities included:

- Accessing numerous beaches via truck, crew boat and barge,
- Removing debris from the shores of these beaches using a rock truck, two excavator, butt top and bulldozer,
- Piling the debris at the high-water mark for removal or burning,
- Communication with local stakeholders regarding the extent to which they require/desire debris management in their high use areas,
- Managing amphibians that would be potentially disturbed by moving the debris,
- Managing other environmental issues,
- Managing archaeological and other heritage concerns, and;
- Conducting spill prevention and response measures.

Figure 1 : Dozer being unloaded from barge

1.2 Summary of Measurements

The following Table 1 provides a summary of parameters that describe the program in 2022:

Table 1: Key Parameters Describing 2022 Program

Number of Beaches	Total Volume Piled	Total Number of Piles	Avg. Cost per Pile	Avg. Cost per Cubic Meter
16	197,131.3	466.0	$4,064.03	$14.90

2 Work Locations and Volume of Debris Managed

In 2022, all work was completed in the Finlay Arm and Peace Arm of the Williston Reservoir. Debris removal occurred along 16 beaches in this zone, with work focused on piling the debris above the high-water mark. Chu Cho Industries LP (CCI) developed an Operational Work Plan (OWP) that was revised throughout the season in response to changing water levels and beach accessibility. The OWP describes the order in which beaches are to be managed and the equipment that will be used. The OWP also outlines the environmental and archaeological issues that must be managed at each location.

2.1 Work Locations

The following table details the 16 locations where CCI conducted debris management activities in 2022. The beach names provided in Table 2 are the most commonly used colloquial names.

Table 2: GMSWORKS#22 Work Locations 2022

Location	Equipment Used	Days on Site	Notes:
Teare Creek	1 Excavators, butt n top, 1 Cat DH6 Dozer, rock truck, Barg/Tugboat, Crewboat	11 Days	Mica Creek is included in this work. Muddy beach so moved equipment to Coreless before being done.
Coreless	1 Excavators, butt n top, 1 Cat DH6 Dozer, rock truck, Barg/Tugboat, Crewboat	8 Days	
Bevel	2 Excavators, butt n top, 1 Cat DH6 Dozer, rock truck, Barg/Tugboat, Crewboat	7 Days	Rock truck used to move debris into large piles as not a lot of beach space for piling small piles.
Peace Arm 1,2,3	2 Excavators, butt n top, 1 Cat DH6 Dozer, rock truck, Barg/Tugboat, Crewboat	24 Days	
Strandberg	2 Excavators, 1 butt n top, 1 Rock Truck (A20),	4 Days	Waves were too high and jetboat unable to get to beach for 7 days. Barge went to retrieve

	pickup, Crew Boat, and Barge / Tugboat.		equipment when there was an opening in weather.
Stromquist 1,2,3,4	1 Excavators, 1 butt n top, 1 Rock Truck with fuel tank, Crew Boat, and Barge / Tugboat.	21 Days	Stromquist 2- pulled logs out of a pond.
Factor Ross (Stromquist 5)	1 Excavators, 1 butt n top, 1 Rock Truck, Crew Boat, and Barge / Tugboat.	6 Days	Accessible by Chunamon 80km FSR.
Van Sommer 1, 2	1 Excavators, 1 butt n top, 1 Rock Truck, pickup, Barge / Tugboat.	12 Days	Lowbedded equipment from here to Ruby Red.
Ruby Red	1 Excavators, 1 butt n top, 1 Rock Truck, Crew Boat, pickup and Barge / Tugboat.	4 Days	Lowbed equipment from Van Sommer.
Tsay Keh Dene	2 Excavators, 1 butt n top, 1 Rock Truck, Crew Boat, pickup and Barge / Tugboat.	18 Days	Barge equipment to TKD from Ruby Red.
Billy's Bay	1 Excavators, 1 butt n top, 1 Rock Truck, Crew Boat, pickup and Barge / Tugboat.	5 Days	Barge equipment from TKD to Billy's Bay.
Deserter's Dump	2 Excavators, 1 butt n top, 1 Rock Truck, Dozer, pickup and Barge / Tugboat.	20 Days	Barge equipment from Billy's Bay to Deserter's Dump.

2.2 Volume of Debris Managed

The debris tends to accumulate along the shoreline of the reservoir. Debris is piled using excavators fitted with a rotating grapple (Linkbelt- butt n top) or a bucket and a thumb. The rotating grapple can circle through 360 degrees and can open and shut to grab and move debris, the bucket and thumb are similar but cannot rotate through 360 degrees. The button top loads the rock truck with debris especially in tight areas with a lot of debris but no room for piles. The rock truck moves the debris and unloads it in areas better suited for piling and burning away from the high-water mark of the reservoir. The excavators are used to pile debris after the rock truck is completed or in areas where the rock truck is not needed. The D6 Cat was fitted with a rake blade to push the stray debris towards the center of the pile to pack it tight in order that it burns with greater intensity. This process is simple, proven efficient and was replicated along the shoreline.

After the management of each beach was complete, two technicians visited the beach in order to count and measure the debris piles. The technicians independently counted and measured the piles in order to minimize bias and ensure that the numbers are accurate.

Debris piles are inherently misshapen, porous, and dissimilar. Our team consulted a number of industry professionals as well as primary research sources in search for the best methodology for measuring debris piles and calculating an accurate assessment of the volume of debris contained within. Typically, the technician measuring the debris would envision the pile as a geometric shape to calculate the volume and then use a porosity factor to estimate the actual volume. The shape of the debris varies greatly, depending on the size and homogeneity of the debris. Porosity is a disputed factor amongst professionals who regularly measure debris pile volumes. Porosity factors that practitioners commonly used in debris pile volume estimation ranged from 20% to 39%.

For this project, we have reasoned that estimating the debris piles as rectangular prisms is sufficiently accurate. In order to estimate porosity, we have chosen 25%, which is a rough average of the most commonly used numbers. This is consistent with the recommendations provided by the independent contractor that BC Hydro hired for the project in 2016 (P.Comm J. Kostyshyn, 2017). In 2021 the methodology used was for a technician to measure the Length, width and height dimensions of 5 piles on a given beach. The total volume would be calculated ($V = L \bullet W \bullet H$). Then the average of the five volumes would be calculated ($V_1 + V_2 + V_3 + V_4 + V_5 / 5) = V_{AVG}$. Then V_{AVG} would be multiplied by 75% or (100% - 25%). $V_{AVG} * 0.75 = V_{FINAL}$. Approximately 10% of all the piles for each beach were measured to calculate the volume.

In 2022, CCI created 427 piles of debris on the beaches of the Finlay/ Peace Arm of the Williston Reservoir. Piles ranged in size from 15.8 m^3 to 1145 m^3, the average being approximately 440 m^3. Larger piles were created on flatter wider beaches where conditions allowed the equipment operators to efficiently pile the debris. Smaller piles were created in areas where there was little beach to work with and where the high-water mark was a concern. In general, larger piles are burned more efficiently.

The following table provides the number of piles and volume of debris collected on each beach in 2022:

Table 3: Volume of Debris Managed in 2022

Location	Number of Piles	Volume of Debris (m^3)	Notes:
Teare Creek	35	13,931	
Coreless	45	9,864	
Bevel	10	10,763	
Peace Arm 1,2,3	104	28,779	
Strandberg	11	1,578	
Stromquist 1,2	16	8,283	
Stromquist 3,4	33	23,867	
Factor Ross (Stromquist 5)	18	1,452.4	
Van Sommer 1, 2	32	7,452	
Ruby Red	23	16,906.1	
Tsay Keh Dene	114	64,297.5	
Billy's Bay	20	7,047	
Deserter's Dump *	5	2,913	
TOTALS	466.0	197, 131.3	-

* Note at Deserter's Dump 19 days were spent moving debris from right next to the tree line to the center of the site and creating a fire guard. The volume moved is not included in the cleanup calculation, nor is it included in the cost per beach. So this is why the cost is misleading for this site.

2.3 Estimated Costs

Table 4 provides an estimate of the average cost per beach to manage the debris. The costs are highly variable across beaches and depend on the size of the beach, the density of the debris, the access and the precariousness of the operations (i.e. how close to water, how steep the beach gradient, etc.). The costs presented in the following table were derived using the value on each invoice and the debris pile counts conducted by CCI. The average cost per pile was $4,064.03 and the average cost per cubic meter was $14.92. Compare these values to 2021 where the average cost per pile was $5,640.68 and the average cost per cubic meter was $7.64.

The cost/ per volume doubled due to the scattered debris. Significant time was spent re-piling previous burnt piles on a number of beaches. The debris was more scattered on the previous burned beaches of Teare Creek, Coreless, Strandberg, Stromquist, and Van Sommer 1 which resulted in having an increase in cost/ per volume. Scattered debris can be attributed weather, lake currents, water levels and also the fact that we are making a difference and there is less concentrated debris flows. It could also be influenced by the amount of erosion in specific areas. For example Coreless has a lot of erosion as can be seen by the banks and timber falling into the lake and getting trapped in the Corless bays. Additionally- some debris was scattered due to re-piling previous years piles that were not completely burned.

There was additional standby time for the barge on Coreless, Strandberg, and Stromquist which resulted in a higher cost without more volume being piled. The crew was weathered out on Strandberg for 5 days which was not included in the cost. The crew drove with pickups to Factor Ross for 2 days as otherwise they would have been weathered out also.

Table 4: Debris management cost estimate per beach in 2022.

Location	Total Cost/Beach	Cost/Debris Pile	Cost/Cubic Meter
Teare Creek	$ 180,218.93	$5,149.11	$ 12.94
Coreless	$ 117,240.62	$2,605.35	$ 11.89
Bevel	$ 128,177.63	$ 12,817.76	$ 11.91
Peace Arm 1, 2, 3	$ 224,273.03	$ 2,156.47	$ 7.79
Strandberg	$ 80,449.43	$7,313.58	$ 50.99
Stromquist 1,2	$ 272,066.49	$ 5,552.38	$ 8.46

Stromquist 3,4			
FactorRoss (Stromquist 5)	$ 72,176.77	$ 4,009.82	$ 49.70
Van Sommer 1, 2	$ 101,436.52	$3,169.89	$ 13.61
Ruby Red	$ 57,596.76	$2,504.21	$ 3.41
Tsay Keh Dene	$ 73,110.19	$641.32	$ 1.14
Billy's Bay	$ 36,969.95	$1,848.50	$ 5.25
Deserter's Dump	$ 5,000.00	$1,000.00	$ 1.72
Deserter's Debris Pile	$ 42,541.81	NA	NA

3 Detailed Beach Activities (before and after pictures)

Teare Creek:

Entire debris removal crew (Heavy Equipment Operators/ Supervisor/ EM/ AA) have been doing prework surveys together. No artifacts were found during the pre and post surveys.

Noted lots of cobbles, boom logs, and lost processed wood bundles. Seen moose, bird, porcupine, sandhill cranes, and bear tracks. Marked no go zones where frogs were present and informed HEO to stay clear of area.

The site was quite muddy and after getting the 210 linkbelt unstuck it was decided to leave this beach and bring equipment to another Coreless site which was drier.

Figure 2: Before Debris piling on Tear Creek Recce

Figure 3: Assorted pictures of Debris piling on Teare Creek

Figure 4: Assorted After Debris piling on Teare Creek

Coreless:

Entire debris removal crew (HEO/ Supervisor/ EM/ AA) have been doing prework surveys together. One chance find was collected on June 19th . Waypoint 151-GPS 3. Photos, collection sheet and GPX files submitted to millennial. No other artifacts were found.

Noted moose, wolf, elk, porcupine, and bear tracks and an osprey nest that was over 30m from the work area.

About 30 bundles that were lost from last year's tow to the mill in Mackenzie were noted during debris cleanup on Coreless.

Figure 5: Before Debris piling on Coreless

Figure 6: During Debris piling on Coreless

Figure 7: After Debris piling on Coreless

Bevel:

Archaeology and gpsing were completed July 20th by Charity Rivard, Travis McIsaac and the rest of the debris crew. No artifacts were found during the pre and post walk for this beach.

Leave area were left containing horsetail and willow with the debris starting to decompose. Area doesn't appear to be refloating in the lake as it is protected by a natural berm and rows of willows.

Bear tracks were observed on this beach.

The debris piles are huge as there was a lot of debris, but not a lot of room to put it. The rock truck was used to create these large piles.

Figure 8 :Before Debris piling Bevel

Figure 9 : After Debris piling Bevel

Peace Arm (Point) 1,2,3:

Debris of small and large woody debris was densely packed on this site as per the below pictures. The beach has gravel and sand with enough area to pile well away from the tree line. Towards tree line there is more sand.

Areas were removed from debris clean up that contained pools of water that were vegetated and contained tadpoles and small brown and white birds eating tadpoles.

In a typical day, the crew would leave Collins Bay Camp at 6AM, drive to Ospika, boat to beach, safety meeting and then start work. At the end of the day, they would do maintenance on their machines, boat back, and drive back to Collins Bay Camp.

No artifacts were identified during the pre and post surveys.

Site visit was completed with OFA 3 including training on how to complete equipment inspections.

Wildlife tracks observed were moose, elk, deer, and bear. Wildlife observed were tadpoles, chipmunk, raven, small brown/ white bird.

Couple of days where wind increased, and the reservoir developed whitecaps and crew returned to Collins Bay Camp.

Figure 10 : During Debris piling on Peace Arm 1,2,3

Figure 11 : Assorted After Debris piling on Peace Arm 1,2,3

Strandberg:

No artifacts were found.

The crew was unable to access this beach for about a week due to high winds and waves. The barge was sent to retrieve all the equipment and move it to Stromquist 1 which was located directly across from Davis Bay (an easier crewboat ride) in case the wind picked up.

Figure 12 : Conducting post-debris cleanup Archaeology monitoring

Stromquist 1,2,3,4:

One obsidian artifact was found, recorded, and data sent to Millennia. A buffer of 15 feet was placed on it with red flags. No other artifacts were found during the pre and post walk survey.

Ribboned out habitat leave area for bank stability.

3 bald eagles and a nest were seen next to the beach. There was a porcupine den noted below the eagle nest. There were loon, moose, deer, and bear tracks noted.

Figure 13: Before Debris piling Stromquist 1,2,3,4.

Figure 14 : After Debris piling Stromquist 1,2,3,4.

Factor Ross (Stromquist 5):

This beach is accessible via 80km on the Chunamon FSR. This is a narrow beach with rocky sections.

No artifacts were found. No streams found.

Figure 15 : Before Debris piling Factor Ross Beach.

Figure 16: During Debris piling Factor Ross Beach

Van Sommer 1, 2:

No artifacts were found.

The crew moved from Factor Ross to Van Sommers via the barge.

Figure 17: Van Sommer 1, 2 before debris cleanup

Figure 18: Van Sommer 1, 2 after debris cleanup

Ruby Red:

No artifacts were found.

Barge was used to move equipment from Van Sommer to Ruby Red.

Figure 19: Assorted pictures Ruby Red before debris cleanup

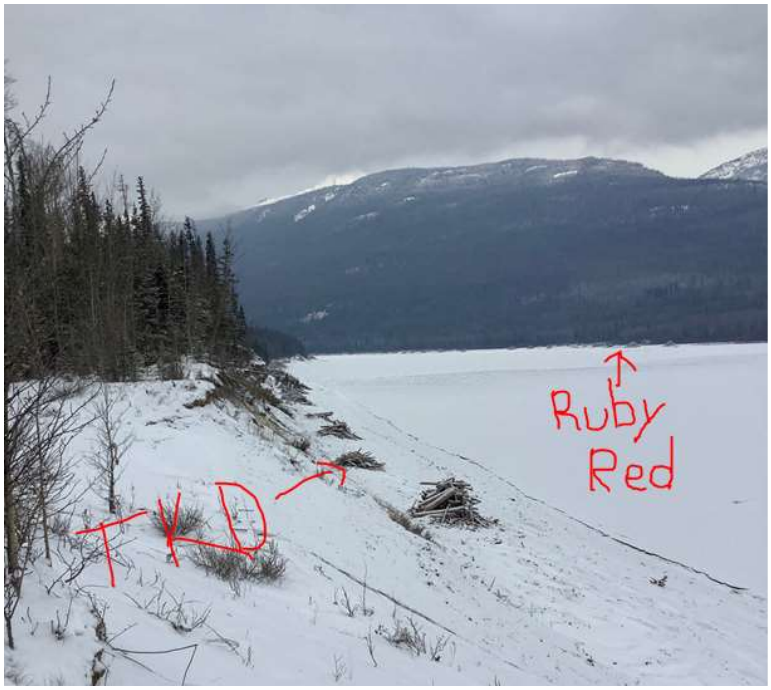


Figure 20: Ruby Red after debris cleanup

Tsay Keh Dene:

No artifacts were found.

There was a lot of new debris on this beach all the way from Hydro Creek to Pelly's dump. As the water was so low, more beach area was accessible compared to previous years. One excavator was used for most of the project with a little help from 2 other machines at the end.

Figure 21: Tsay Keh Dene before debris cleanup

Figure 22: Tsay Keh Dene after debris cleanup

Billy's Bay:

No artifacts were found.

Figure 23: Assorted pictures Billy's Bay before debris cleanup

Deserter's Dump:

No artifacts were found.

During the BC Hydro site visit to Tsay Keh Dene in August 2022, it was determined that the old debris piles at Deserter's Dump should be moved into themselves, and a fire guard placed between them and the timber edge.

Figure 24: Assorted After Debris Cleanup Deserter's Dump-fireguard between timber and debris pile (from previous years)

There were 5 additional piles created on the shores of the Finlay River.

Figure 25: Deserter's Dump during debris cleanup

4 Safety Management

In July, an instructor from the coast flew to Prince George and we drove him to Collins Bay Camp where he instructed 6 CCI employees on the Small Vessel Operations Proficiency (SVOP) and SDS-BV (the old Med A3 class). The CCI jetboat was used after the classroom portion for a mock Man over Board (MoB) Drill and additional hands-on training for people who took the course.

5 Environmental Management

5.1 Environmental Issues

Chu Cho Industries (CCI) provided environmental monitoring services for GMSWORKS#22. The Environmental Management Plan specifies procedures for ensuring that potential environmental issues that might arise due to debris program operations are minimized. This includes standard items such as spill prevention and management and a detailed procedure for amphibian management.

The amphibian management plan is based on avoidance through surveying and flagging no work zones. The avoidance-based plan is meant to reduce the potential harm to amphibians and to avoid all handling. Prior to conducting debris removal, each beach is surveyed for amphibians and reptiles. On a typical beach there may be 5 – 10 zones where amphibians are either found or where there is good amphibian habitat. Where they are found, a no work zone was flagged around them in order to protect the amphibians and or reptiles. In addition to amphibians, other reptiles and wildlife are observed regularly or just their tracks. These include, garter snakes, grizzly bears, black bears, moose, elk, whitetail deer, wolves and other small carnivores. Figure 26 shows an example of a zone flagged for no-work where an amphibian was discovered in the 2019 debris season.

Figure 26 : Pink flagging indicates discovery of an amphibian and marks a no-work zone

Figure 27 : Assorted Pictures of Heavy Equipment Operators/ Arch pre-walk prior to debris cleanup

5.2 Spill Prevention and Management

Spill prevention and management is an ongoing process that CCI takes seriously and goes to great lengths to ensure that there are zero spills to the ground. Good spill prevention management is rooted in good equipment management through maintenance and regular checks. All equipment is inspected before, during and after each shift to ensure that hydraulic lines and other potential leak points are all secure. The equipment inspections are completed using a standard form, which is in each machine. The completed forms are stored in Mackenzie shop/ office for each piece of equipment separately. Regular maintenance occurs before and after each crew shift- daily.

The crews have been using the belly pans and spill pads prior to fueling and when working on quick fixes for the equipment on site. All mechanical work and serving (oil changes) are done at Collins Bay Camp or Ospika Barge Landing.

The following sequence of images shows some examples of good spill prevention management. During the 2022 season, there were no major fluid spills and 1 small reportable spill to water that were cleaned up by CCI. Figure 28 shows the spill kits being used during field-based repairs of the equipment.

Figure 28 : Managing and replacing leaking hoses with spill kit and tray.

While fueling up the jetboat at Collins Bay in September, there was a minor spill of gasoline into the water. BC Hydro and other applicable organizations were notified of the occurrence. A safety meeting and review of the fuel handling procedures were completed following the incident. See Appendix 2 for a copy of the document.

6 Archaeological Management and Chance Finds

6.1 Archaeological Procedures

The archaeological monitor uses a GPS loaded with archaeological site data that were supplied by Millennia Archaeology. The GPS helps the monitor identify areas that are marked as no work zones as well as areas where artifact collection has occurred or where artifacts have been identified but not collected.

Prior to commencing work on any beach, the archaeological monitor has a quick debrief with the management crews to help identify no work zones or areas of potential concern. The archaeological monitoring works ahead of the debris crews to conduct searching and investigation activities to clear the area for work. The debris management work is conducted under the *Heritage Conservation Act* Section 12 Site Alteration Permit number is 2016-0363 was approved on October 27st, 2021and is valid until December 31, 2024

In the fall of 2021, Millennia applied for a 12.2 Heritage Inspection Permit held by Millennia and a 12.4 Alteration permit that will be held jointly by CCI and Millennia. The new permit applications combine all the potential beaches of the Finlay, Parsnip, and Peace reach for both the debris program and the Williston Dust Mitigation program into one application.

7 Debris Pile Burning

Debris pile burning was completed during the winter of 2021/2022 for most of the piles that have been piled in recent years.

Figure 29 : Assorted Pictures of Winter 2022 Pile Burning top Is from Stromquist and bottom Is from Billy's Bay

8 Recommendations

More cleanup from Factor Ross to Coreless of old burned piles (scattered) that did not completely burn.

Look at debris cleanup from Manson Arm next year.

9 Conclusions

The GMSWORKS#22 Debris Management Program piled 197,131.3 m^3 of debris in 466 piles at an average cost of $14.90 per cubic meter. Generally, the 2022 season was successful and CCI is well prepared to initiate the 2023 program in May 2023.

During the reconnaissance flight in May 19, 2022, it was identified that there is lot of debris accumulations all over the reservoir – Ingenika North, Raspberry to Teare Creek, Ingenika South to Factor Ross, Manson Arm operating area 1 and 2, Finlay Forks, and Billy's bay.

Appendix 1:

Fraser Site Inspection and Observation Record

SAFE WORK OBSERVATION REPORT & SUMMARY			
WHEN & WHERE			
Date/Time:	Aug 30, 2022, 07:29:12 am		
Location:	Northern Interior	Nearest Municipality:	Tsay Keh Dene
WHO			
Observer Name:	Fraser McDonald	BCH Responsible Manager:	Teri Neighbour
Observed Contractor Vendor Number:	58039801	Observed Contractor Company Name:	CHU CHO INDUSTRIES LP
Multiple Employer Workplace:	YES	BC Hydro is Prime Contractor:	NO
Prime Contractor Vendor Number:	58039801	Prime Contractor Company Name:	Chu Cho
WORK DETAILS			
Working Environment:	Other Working Environment	Work Order Number:	
Project Number:	GR0024 R594	PPM Subproject:	
Work Description			
Williston Debris Program, ChuCho is Prime, at Collins Camp, weather not cooperating for boat travel. So observed minor related work to Debris program (for example oil change on the crew boat)			
Hazards			
Body Mechanics			

Cut or puncture from sharp objects, Slip, trip or fall - at grade level, Slip, trip or fall - stepping up /down	
Fire and Explosion	
Wildfire	
Gravity	
Struck by collapsing equipment or structure	
Hazardous Environment	
Water, Working alone or in isolation	
Mechanical	
Moving machinery or equipment contact, Struck by object under tension, Vehicle or mobile equipment contact, Mechanical Other	
Transportation	
Boat incident, Motor vehicle incident, Off-road vehicle incident	
SAFETY DISCUSSION	
Summary of Strengths & Feedback	
Did observer attend tailboard? **Comment:** Tailboard attended was the general main for the whole site in the morning.	YES
Tailboard completed fully, signed and understood? **Comment:** Tailboard was written and signed	YES
All pre-use inspections completed? **Comment:** Reviewed pre use inspections of excavator at site, Boat inspections for the barge and tug as well as the crew boat	YES

Did crew identify all applicable 'high hazards' and apply a most effective barrier(s)? **Comment:** Yes	YES
If a multiple-employer workplace, have Prime Contractor duties been carried out? **Comment:** Chu Cho currently has a subcontractor running one excavator and the person has been orientated to site, attends tailboards, provides Chucho with appropriate safety documents as required (completed pre-use checksJHAs)	YES
Required Documentation available? **Comment:** SMP, Company program, First aid docs, certifications of boats and boat operators, JHAs, Tailboard, work procedures.	YES
All workers have training and qualifications required for work underway? **Comment:** First aid cert of the main first aid attendant was present and level of training adequate for the scope of work.	YES
All required PPE worn and in good condition? **Comment:** All PPE observed was in good condition and appropriate for the work	YES
Tools & equipment inspected and ready for service? **Comment:** All hand and power tools were appropriate and in good condition.	YES
Signage and work area barriers in place? **Comment:** All signage on boats and camp facility are appropriate	YES
Vehicles properly set up and equipped for weather conditions? **Comment:** All vehicles observed were appropriate for the conditions of the area	YES
Emergency Response Plan and Rescue Procedures in place? **Comment:** Fire and evacuation procedures are in place and document and through orientation crew members are educated in the procedures	YES

First Aid requirements met? **Comment:** See compliance check. However ETV needs to be cleaned due to it being very dusty on the inside. First Aid Attendant will clean the interior of the ETV to remove dust. This was the first day back for crew and so it wasn't looked at till this morning.	YES
Ergonomic principles followed? **Comment:** Observed some good lifting, as well as team work for lifting a heavy object	YES
Safe driving habits practiced? **Comment:** When being driven to multiple locations around Collins Camp I observed the driver driving appropriately and following best practices for on FSRs and the in the use of Radios	YES
Summary of Opportunities for Improvement and Feedback	
Housekeeping effectively managed? **Comment:** Housekeeping on Barge Deck was appropriate, as well as on crew boat. ETV was very dusty inside and FAA will cleaned. See first aid requirements section	NO
Any other observations? **Comment:** AED, ETV and Oxygen tank monthly were not completed and the FAA not aware of these specific forms. However the FAA was had no issues with completing these document and issue was corrected	NO
Action Taken	
Did observer debrief site supervisor, crew lead and/or crew after observation? **Comment:** Will debrief Site Supervisor and provide the results. Overall it was good one item was noted and it was riding housekeeping of the ETV.	YES
Follow-up Action(s) (if any)	
First Aid Attendant will Clean ETV, First Aid Attendant will complete ETV checklist, Oxygen. tank and AED mon check lists were completed while onsite	
COMPLIANCE CHECKLISTS	

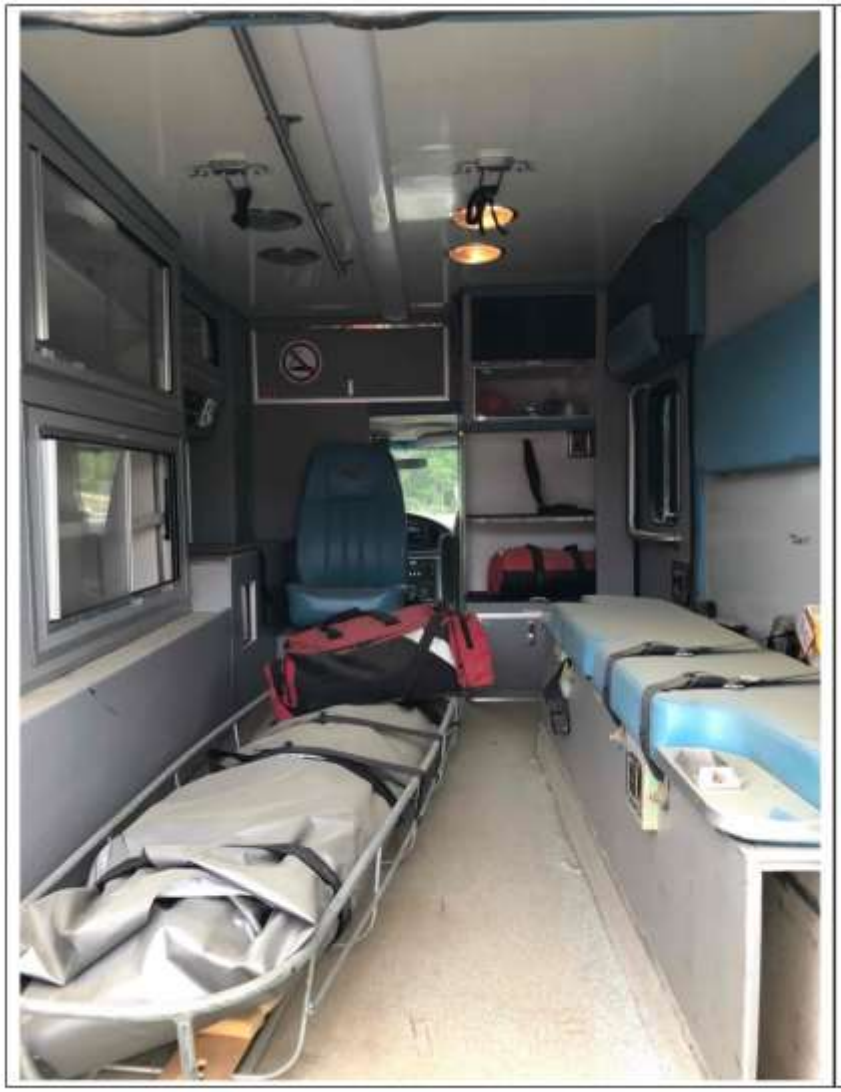
First Aid Compliance	
Was an assessment conducted to determine first aid requirements? **Comment:** Observed the first aid assessment and was observed	YES
Did first aid facilities and equipment meet the minimum requirements based on the first aid assessment? **Comment:** Observed facilities and equipment and was compliant to job site requirements	YES
Were first aid attendants certified to the level required by the first aid assessment? **Comment:** Observed certificate and meets requirements	YES
Was there a process to ensure the first aid inventory is maintained? **Comment:** When item is consumed it is record and a ordered by FAA. It is is then ordered by camp management	YES
Was there a documented procedure for providing first aid that meets regulatory requirements? **Comment:** YEs the procedure is present and is complete and compliant	YES
Was the first aid procedure effectively communicated to all workers?	YES
Were first aid attendants able to promptly respond without delay even if assigned other work duties? **Comment:** Discussed with FAA and went through how the crew is informed on procedure and how the summon first aid	YES
Were first aid records kept for at least three years? **Comment:** It is compliant they showed me the where the records is stored and how long they are to one kept	YES
Prime Contractor Compliance	
Were required Notice(s) of Project (NOPs) submitted and posted on site? **Comment:** Observed the NOP onsite and was appropriate	YES

Did the prime contractor have a system to inform employers and workers of hazards created and address those hazards? **Comment:** Orientations, tailboards,	YES
Did the prime contractor coordinate the safety of activities of employers, workers and other persons at site? **Comment:** Yes was done through the morning tailboard which the contractor attended	YES
Did the prime contractor conduct inspections or checks to ensure compliance with OHSR? **Comment:** Orientations for new and young workers, boats/mobile equipment checks, e inspections tailboards, JHAs. First Aid attendant describe how he/she is to be summoned for a first aid injury	YES
Was ALL information required to be provided by the prime contractor readily available and up-to-date? **Comment:** All documentations provided is up to date and appropriate	YES
Did the prime contractor conduct a workplace first aid assessment that included ALL requirements?	YES
Did the prime contractor meet ALL basic first aid requirements?	YES
Wildfire Compliance	
Was a wildfire risk assessment completed for the job site? **Comment:** documented on board	YES
Was the minimum wildfire firefighting equipment available at the work site and ready to use? **Comment:** All equipment is stored in fire shed and equipment meets the minimum requirements	YES
Were requirements met for engines on site? **Comment:** Observed tools and equipment for excavators	YES

Was emergency preparedness including evacuation routes, fire response and fire reporting, assessed and discussed prior to start of work? **Comment:** yes and is documented	YES
Was smoking limited to designated smoking areas equipped with non-combustible containers and fire suppression equipment? **Comment:** yes there are designated areas for smoking and receptacles for containing the cigarette butts and ash	YES

IMAGE	DESCRIPTION
	Barge and Tug Boat.jpeg

Bear spray is stored in separate containers.jpeg



ETV with dusty interior.jpeg

Barge Operator cert.jpeg

Appendix 2:

Spill Report into water

BRITISH COLUMBIA
Ministry of Environment and Climate Change Strategy

Update to Minister/End-of-Spill Report Form

Environmental Emergency Program
SpillReports@gov.bc.ca

This report template can be completed to satisfy the requirements of either the End-of-Spill Report or the Update to Minister Report. Please specify which report you are completing in section I of this form. If any of the fields of this form are not applicable to the spill for which this form is being completed, indicate 'N/A' in the field; reports with incomplete fields will be sent back to the responsible person.

End-of-Spill Report: Section 6 of the Spill Reporting Regulation outlines the requirements for the End-of-Spill Report. Responsible persons must submit a written End-of-Spill Report to the Ministry of Environment and Climate Change Strategy within 30 days following the emergency response completion date of a spill as outlined in section 6 (1) of the Spill Reporting Regulation. Responsible persons must submit a written report to the Ministry of Environment and Climate Change Strategy as soon as practicable if either of the following two conditions are present:

1. The spill entered, or was likely to enter, a body of water as defined in the Spill Reporting Regulation
2. The quantity of the substance spilled was, or was likely to be, equal to or greater than the listed quantity for the listed substance as outlined in the Spill Reporting Regulation

Update to Minister Report: Section 5 of the Spill Reporting Regulation outlines the requirements for the Update to Minister Report. Responsible persons must submit a written report to the Ministry of Environment and Climate Change Strategy as soon as practicable if any of the following three conditions are present:

1. On request of the Minister
2. At least once every 30 days after the date that the spill began
3. At any time that the responsible person has reason to believe that information previously reported in the Initial Report has become inaccurate or incomplete

Complete this form and submit it by email to SpillReports@gov.bc.ca. For additional information, please visit the British Columbia Environmental Emergency Program Report a Spill webpage.

Dangerous Goods Incident Report (DGIR) number:

Section I: Type of report **Sections 5 and 6 of Spill Reporting Regulation**	
This form is completed to satisfy the requirements of the:	
☐ Update to Minister Report	☑ End-of-Spill Report

Section II: Contact information **Section 6 (2) (a) of the Spill Reporting Regulation**	
Details for person filling out the report	Name of company representative: Cornelia Thomi
	Company name: Chu Cho Industries LP.
	Email: cornelia@chuchoindustries.ca
	Address: #201, 1940 3rd Ave Prince George, BC V2M 1G7
	Telephone number: 250-617-8135

Details for responsible person	Name of company representative:
Same as above ☒	Company name:
	Email:
	Address:
	Telephone number:
Details for owner of the substance spilled	Name of company representative:
	Company name:
Same as above ☒	Email:
	Address:
	Telephone number:

Section III: Timing of the spill
Section 6 (2) (b) of the Spill Reporting Regulation

Date of spill: Sept 15, 2022 Time of spill: 14:25 Duration of the spill (days): 1 Day
Date reported: Sept 15, 2022 Emergency response completion date[1]: Sept 15, 2022

Section IV: Site description
Section 6 (2) (c) (d) of the Spill Reporting Regulation

Provide a description of the spill site and the sites affected by the spill. The description of the spill site may include a description of the receiving environment, the proximity to a nearby city/town/roadway, the type of vegetation in the area, how densely populated the area is, accessibility to spill site, nearby waterways, and any other defining characteristics of the area. Collins Bay next to Collins Bay Camp.

Latitude: Degrees 56° Minutes 26' Seconds 6.29064" N
Longitude: Degrees 124° Minutes 23' Seconds 58.34557" W
or
Site civic address or location: Street
City Postal Code
or
DLS or BCNTS (if applicable): Site ID number (if applicable):

Section V: Description of the source, type, and quantity of the spill Section 6 (2) (e) (f) of the Spill Reporting Regulation	
Description of the source of the spill (pipeline, rail, truck, facility, etc.):	Fueling up Jetboat
Type of substance spilled (common name):	Gasoline
United Nations (UN) number of substance spilled (if applicable):	
Item number from the table in the Schedule in the Spill Reporting Regulation:	amt amount into water.
Quantity (in litres or kilograms) of the substance spilled – if the quantity is unknown, provide a reasonable estimate and explain why the quantity is unknown and cannot be determined:	2 L into water

Section VI: Description of the circumstances, cause, and impacts of the spill Section 6 (2) (g) (i) (ii) (iii) of the Spill Reporting Regulation	
Provide a description of the activity during which the spill occurred (transportation, transfer of cargo, fuelling, cleaning, maintenance, etc.):	Fuelling a jetboat
Provide a description of the incident leading to the spill (tank rupture, overfill, collision, rollover, derailment, fire, explosion, etc.):	overfill
Provide a description of the underlying cause of the spill (human error, external conditions, organizational or management failure, etc.):	human error

Section VII: Impacts to human health, the environment, and infrastructure Section 6 (2) (g) (iv) (v) of the Spill Reporting Regulation	
Describe any adverse effects of the spill on human health (please state 'N/A' if there were no adverse effects on human health):	NA
Number of people evacuated:	0 / NA
Number of fatalities:	0 / NA
Number of people injured:	0 / NA
Describe any adverse impacts on infrastructure[2] (please state 'N/A' if there were no adverse impacts to infrastructure):	NA
Impacts to water	
Was there an impact to a body of water?	⊗ Yes ○ No

Description of impact:
2 Liters of gasoline onto water, then disappeared

Describe the body of water (stream, aquifer, fish habitat, naturally formed body of water, ditch, lake, etc.):
Collins Bay

Name of body of water: Williston Reservoir

Impacts to the environment

Was there an impact on flora (vegetation)? ◯YES ⊗NO	If yes, list the common and species names:

Provide a description of the impact on flora (oiled, removed, etc.):
NA

Was there an impact on fauna (animals)? ◯YES ⊗NO	If yes, list the common and species names:

Provide a description of impact on fauna (include injured, dead, etc.):
NA

Was there an impact on aquatic and/or terrestrial habitats? ◯YES ⊗NO	If yes, list the type of habitat (riparian, breeding ground, etc.):

Provide a description of impact on aquatic and terrestrial habitats, including response actions taken to restore any of the impacts listed:
NA.

Section VIII: Spill response actions
Section 6 (2) (h) of the Spill Reporting Regulation

Action taken to comply with section 91.2 of the *Environmental Management Act 2003*	Who took the action (company, person, contractor, etc.)	Date that the action was taken (click the arrow or enter the date using the format YYYY-MM-DD)
Soaked spill with absorbent pads	Chu Cho Industries	2022-09-15
Reported to 1-800-663-3456	Cornelia Thomi	2022-09-15
Reported to BC Hydro client Rep - Teri Neighbour	Cornelia Thomi	2022-09-15
Fill out End of Spill report	Cornelia Thomi	2022-10-12

Section IX: Waste disposal (please state 'N/A' if no waste was produced)
Section 6 (2) (i) of the Spill Reporting Regulation

List the type of waste	Method of disposal	Location of disposal
soiled absorbent pads	bagged	Mackenzie, BC

Section X: Attached reports, maps, and photographs
Section 6 (2) (j) (k) of the Spill Reporting Regulation

Report of results of sampling, testing, monitoring, and/or assessing carried out during spill response actions (including reports from Qualified Professionals), if applicable	Copy attached ☑
Map of the incident site and areas surrounding the incident site (required)	Copy attached ☑
Photographs of the spill (required), cleaned up only.	Copy attached ☑

Section XI: Agencies on scene or notified
Section 6 (2) (l) (m) of the Spill Reporting Regulation

List the names of all agencies that were at the incident site:
Chu Cho Industries LP.

List the names of other persons or agencies that were advised about the spill:
Report a Spill = 1-800-663-3456
BC Hydro → Teri Neighbour

Section XII: Additional comments

Section XIII: Verification of information provided

I confirm that the above information is true and complete. Yes

Name of person completing form: Cornelia Thomi

Date completed (YYYY-MM-DD) 2022-10-12

Name of responsible person (person or company): Chu Cho Industries LP

Date completed (YYYY-MM-DD) 2022-10-12

Section XIV: Approval - For internal use only

Reviewed by:

Date completed (YYYY-MM-DD)

Save Reset Form