B.C. HYDRO

HAT CREEK PROJECT

1981 SITE INVESTIGATION PROGRAM

ENVIRONMENTAL REPORT

HAT CREEK PROJECT
ENVIRONMENTAL DEPARTMENT

Report No. HC19

December 1981

1981 SITE INVESTIGATION PROGRAM

ENVIRONMENTAL REPORT

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SUMMARY

Geotechnical studies and related activities of the 1981 Site Investigation Program resulted in habitat alienation (human activity, noise and removal of habitat) and limited soil erosion. Survey and seismic lines, 1 to 2 inches wide, and access trails, 4 to 5 m wide, were cleared by removing underbrush and trees. Site preparation and access were minimal in level open terrain, however, in level treed areas work sites and access roads were cleared with hand tools, leaving surface vegetation intact. In rough terrain, heavy equipment was required to prepare roads and level work sites. New roads were required to improve access to the powerplant site and to provide access to the limestone quarry and the project access road. At the completion of the geotechnical studies all disturbed areas were contoured, scarified, seeded and fertilized. Slash was removed, piled and burned in the fall to prevent the spread of disease and insect infestation. Debris was removed, test pits, drill holes and scraps were backfilled with excavated material and tamped.

SECTION 1.0 - INTRODUCTION

The 1981 site investigation program included ten detailed geotechnical studies to determine the design and layout of the various components of the Hat Creek Project. The programs involved drilling, test pitting, and trenching in three major areas namely powerplant, mine and offsites, (Fig. 1). Initial surveying commenced in December 1980 and geotechnical investigations began on 2 February 1981. The following geotechnical programs which were all completed by 23 October 1981, were included in the site investigation program:

1. Thompson River Cooling Water Supply - Intake/Cofferdam Drill Program,

2. Thompson River Cooling Water Supply - Pipeline Drill and Test Pit Program,

3. Powerplant Foundation Drill, Test Pit, and Trench Program,

4. Construction Water Supply Drill Program,

5. Construction Aggregate Supply Drill and Test Pit Program,

6. Hat and Finney Creek Diversion Drill and Test Pit Program, and Division Tunnel Portal Drilling,

7. Headworks and Pit Rim Dam Drill and Test Pit Program,

8. Project Access Road Test Pit Program,

9. Limestone Quarry Drill, Test Pit and Trench Program, and

10. Bonaparte River Bridge Drill Program.

HAT CREEK PROJECT
SITE INVESTIGATION PROGRAM
1981
PROGRAM ARRANGEMENT
FIGURE 1

Environmental protection measures were developed by B.C. Hydro's Hat Creek Project Environmental Department in consultation with the Project's Powerplant and Mining Departments and several resource related government agencies prior to commencing the geotechnical studies. These measures ensured that operations undertaken during the site investigations program would be carried out with a minimum of disruption to the environs of the Hat Creek Valley and the Thompson River. Environmental officers assigned to the site investigation program were responsible for preparing plans to prevent or minimize disturbances and to attend to unforeseen problems as they arose. The protective measures were developed to:

- minimize land disturbance to reduce soil erosion from access roads, borrow areas, drill sites, test pits and trenches,

- prevent sedimentation of creeks by reducing land disturbances and ensure the use of pits to contain drilling mud,

- prevent the removal of substrates from the water courses and maintain the environs as close to the natural conditions as possible,

- prevent spillage of petroleum products or any deleterious materials into the water courses,

- minimize habitat alienation due to human activity, noise, and the removal of habitat, i.e. clearing trees, draining pond or lake water,

- minimize off road travel by all vehicles to reduce soil erosion and the spread of noxious weeds, i.e. 4 wheel drives going cross country, tracked vehicles crossing creeks.

This report describes the environmental impacts resulting from the above field programs. In order to eliminate repetition, disturbances

are discussed by type, for example; roads, drill sites, test pits, and others even though any one program may include more than one of these types. The report also includes a description of the rehabilitation and reclamation procedures undertaken to restore disturbed areas.

SECTION 2.0 - THOMPSON RIVER COOLING WATER SUPPLY INTAKE, COFFERDAM AND BONAPARTE RIVER BRIDGE

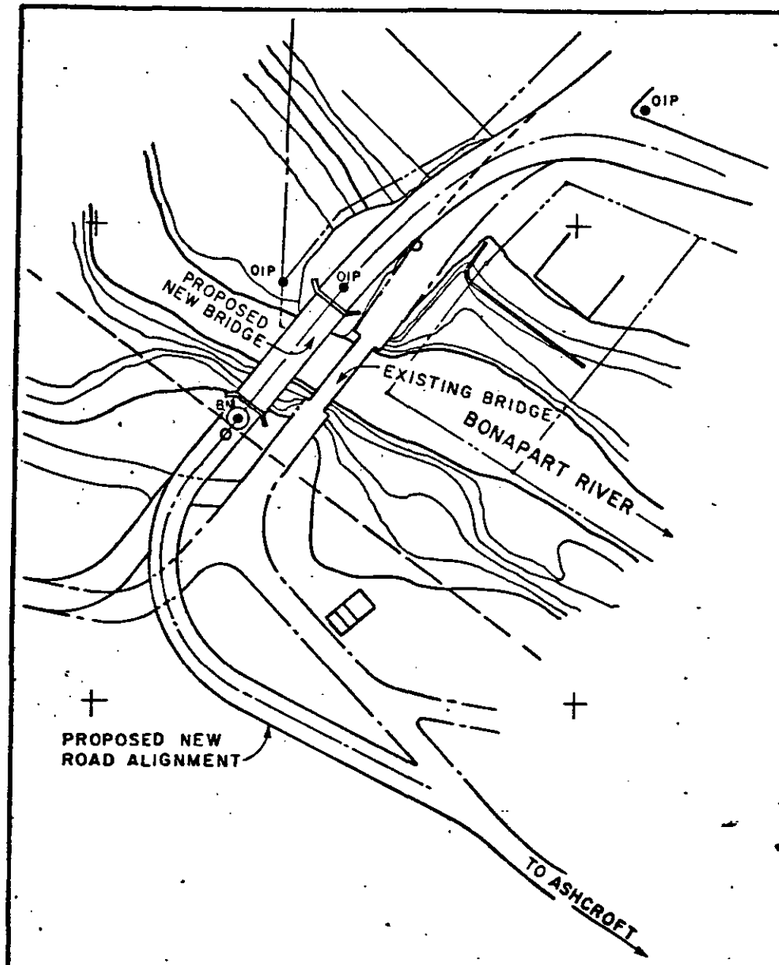
2.1 INTRODUCTION

The scope of the work entailed a sonar survey to establish bottom contours, surveying to establish locations of drill holes, and in-river geotechnical drilling to confirm foundation conditions for the construction phase cofferdam and intake proper. In addition, geotechnical conditions near the present Bonaparte River Bridge were investigated to assess foundation material for the abutments of a new construction access bridge.

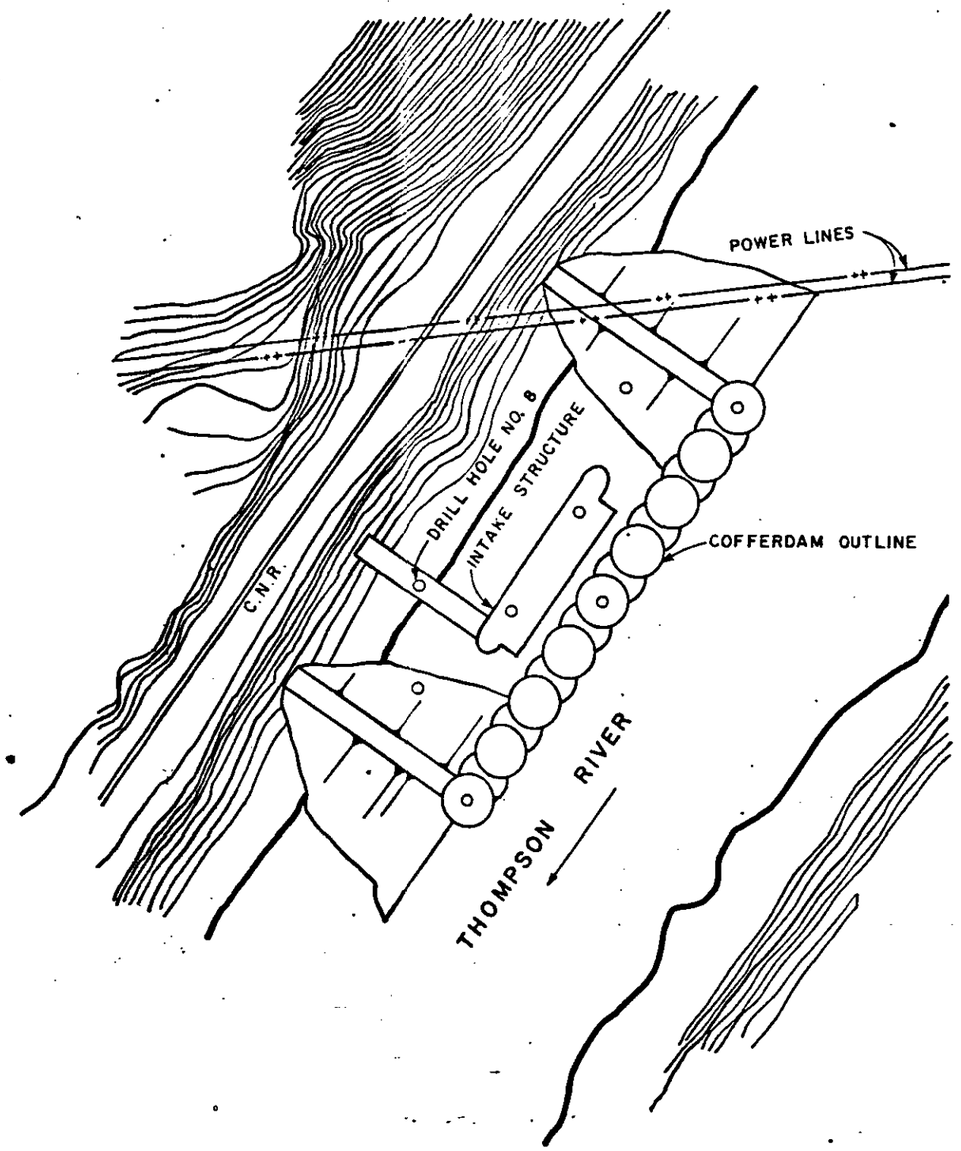
The study areas were located 3 km north of Ashcroft approximately 200 m upstream of the confluence of the Thompson and Bonaparte rivers, (Fig. 2). The Thompson River and lower reaches of the Bonaparte River are used by Pink salmon during the autumn of odd numbered years to spawn. This field work was designed to be undertaken during the winter months following an even numbered year thus avoiding any disturbance to fish eggs or fry. An additional benefit of winter work was that flows on the Thompson River were at their lowest levels and velocities.

As mentioned above, environmental officers were assigned to the site investigation program to develop and implement environmental protection measures to minimize or prevent the following potential impacts or actions in the Thompson River; to prevent sedimentation by limiting land disturbances and by reducing the discharge of drill cuttings, lubricants, petroleum products or any other deleterious materials into the river and to prevent the removal of salmonid spawning substrates from the river.

Application was made to the Federal Department of Fisheries and Oceans on 25 November 1980 for approval to work in the Thompson and Bonaparte rivers. Approval was obtained on 9 December 1980, with the following



BONAPARTE RIVER BRIDGE PROGRAM
SECTION 2



INTAKE SITE PROGRAM
SECTION 1

LEGEND

- Drill Holes
- OIP Old Iron Pins
- BM Bench Mark
- Property Line

20 0 20 40 60 80 Metres

THOMPSOM RIVER INTAKE & BONAPARTE RIVER BRIDGE DRILL PROGRAMS

SECTIONS 1 & 2

FIGURE 2

1:1000

conditions, "that there be no deposition of fine materials into the river, other than washings from the drill holes, and no deposition of deleterious materials such as petroleum products". See Appendix A for a copy of the letter of approval.

2.2 THOMPSON RIVER INTAKE/COFFERDAM SITE

The Thompson River Intake/Cofferdam Site is located on the west bank of the Thompson River, 200 m, upstream of the confluence of the Thompson and Bonaparte rivers. Access to the site was on existing roads, along the Eastern bank of the river and the drill barge was launched from an existing boat ramp on the shore opposite the intake site. Boat traffic to the barge also took place to and from the boat launch ramp. Photo 1 shows the boat launch ramp - before, while Photo 2 shows the area at the completion of activities. Note that the area was reclaimed after the drill barge was removed from the river.

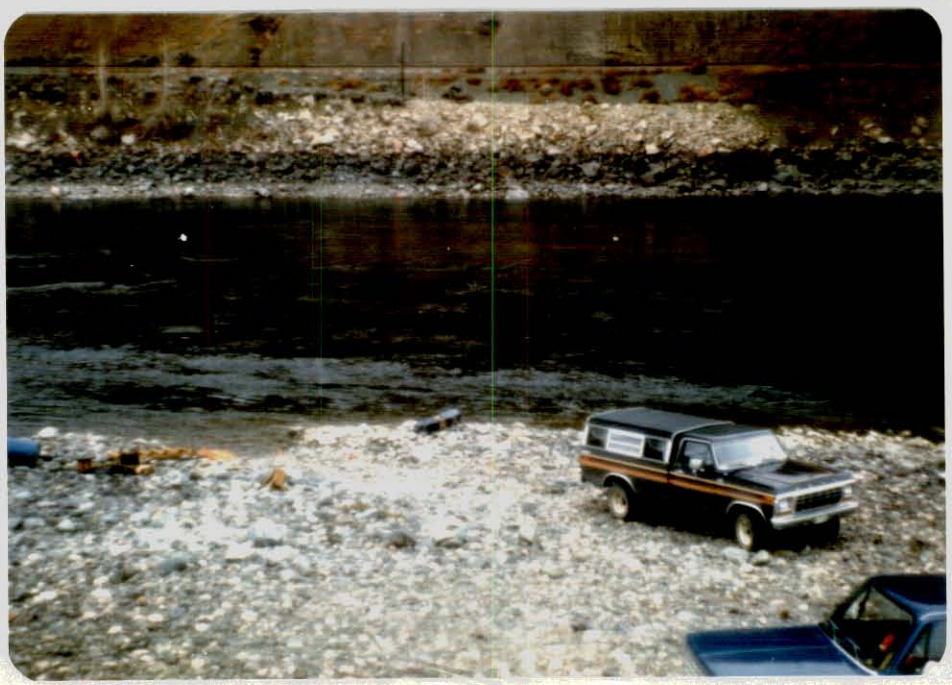


Photo 1. Thompson River boat launch ramps - before.

Photo 2. Thompson River boat launch ramp - after.

Site investigations began in December 1980. Land based surveying located the in-river drill sites while sonar surveys conducted from boats on the river developed bottom contours to show the depth at which the holes were drilled. This portion of the program was completed in January 1981. There were no physical disturbances as a result of these activities.

Geotechnical studies in the Thompson River began on 2 February 1981 with a barge mounted Longyear 34 diamond drill. The 8 m x 4 m drill barge was launched on 6 February by a rubber-tired Case 580C backhoe. The barge was positioned and anchored to both banks by four buoyed cables both up and downstream of the barge.

Drilling began on 7 February, and continued to 1 March and the program was run 7 days a week, during daylight hours. A total of 8 holes were drilled to an average depth of 11.2 m. All drill holes were cased with 15 cm steel casing in the loose surficial material to prevent the loss of lubricant and drill cuttings into the river. The steel casing was

removed at the completion of each hole. River water without chemical additives was used as a single pass lubricant at a rate of 10 gpm. Expended lubricant and drill cuttings were discharged on to the barge deck for inspection. Drill cuttings that were not washed from the deck were disposed of on shore when the barge was demobilized on 1 March. A rubber-tired front end loader was required to remove the barge from the river and to rehabilitate the boat launch ramp to its original condition.

Daily observations of the Thompson River were made for suspended sediments downstream of the barge. Observations were made from a vantage point atop nearby hoodoos to the north of the Thompson River. On 28 February and 1 March a light brown plume was observed extending from the drill barge approximately 30 m downstream of drill hole 8. At the surface the plume tapered from the width of the drill barge, 4 m, to zero, 30 m downstream, (Photo 3). As can be seen from the photo the natural turbidity of the Thompson River only allowed observation of the plume at the surface.

Photo 3. Plume downstream of the drill barge.

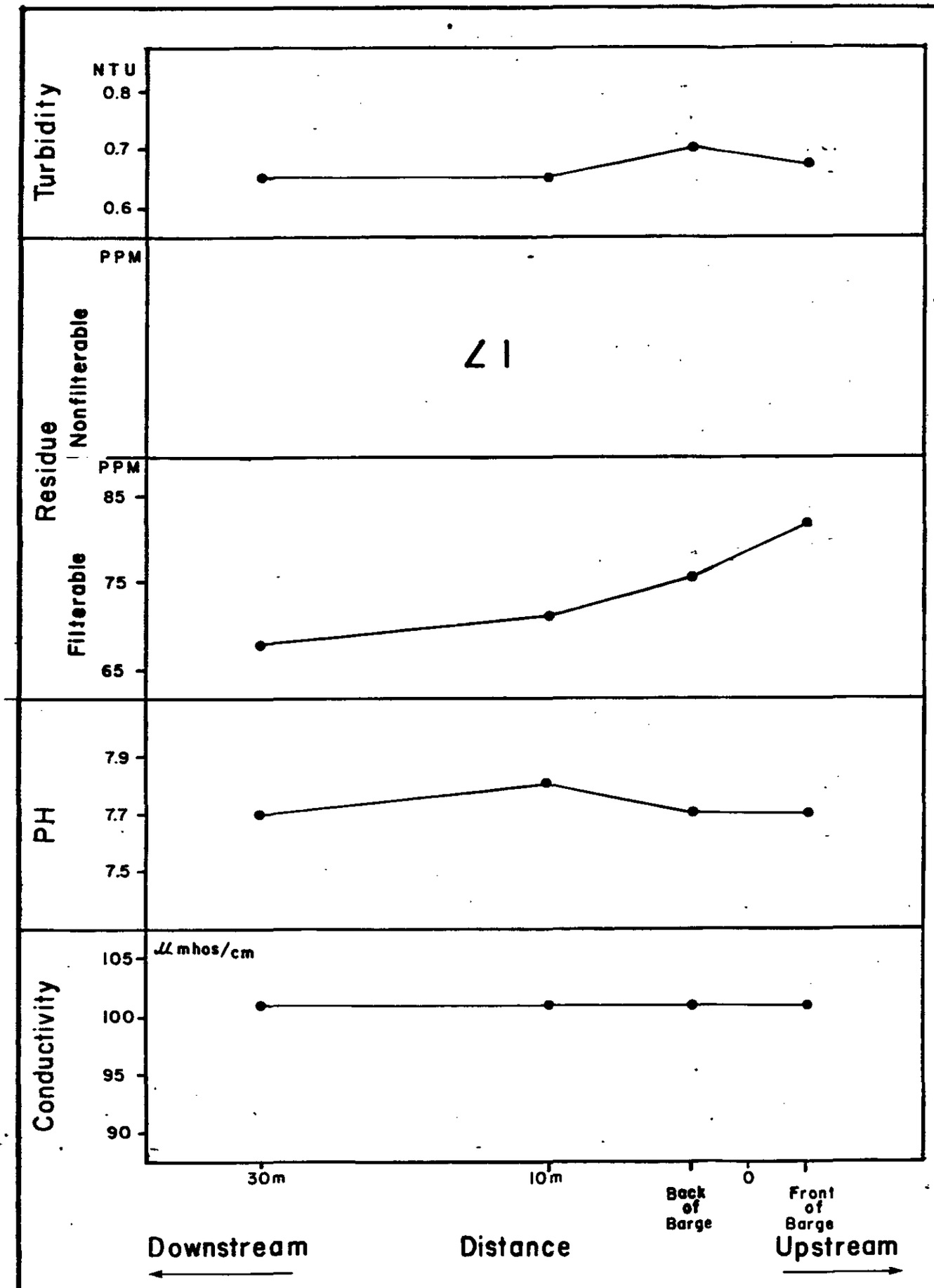
Water samples were collected at four locations while the rig was drilling namely immediately upstream and downstream of the drill barge and 10 m and 30 m directly downstream, (Fig. 3). Samples were obtained with a Van Doren sampler operated at a depth of 0.5 m. The water samples were sent to Beak Consultants Ltd. Chemistry Lab in New Westminister to be analysed for the following; conductivity, pH, filterable and nonfilterable residue and turbidity.

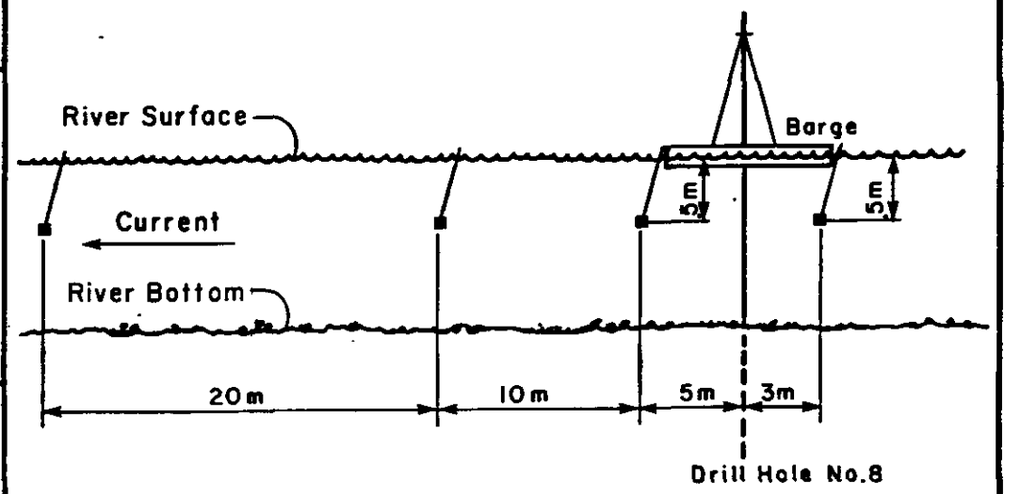
These data are summarized graphically in Fig. 3. From these data it can be seen that the turbidity shows a small increase immediately downstream of the barge and returns very rapidly to its original value, measured upstream of the barge. It was concluded that the impact was negligible.

2.3 BONAPARTE RIVER BRIDGE

The Bonaparte River Bridge drill sites were located 150 m upstream of the confluence of the Thompson and Bonaparte rivers, (Fig. 2). Access to the site was on existing roads. The area surrounding the Bridge was surveyed and mapped in February 1981, and did not require any clearing or slashing. The two drill sites were located on the north side of the road, approximately 10 m from the existing road bridge. As the sites were level and near existing roads they did not require any preparation or access.

On 18 August 1981 a Becker Air Hammer mobilized, setup at the site and drilled two holes, one on either side of the Bonaparte River. The drill used compressed air to drive in and, following completion, to remove 15 cm diameter steel casing. Compressed air was also used as a lubricant to remove drill cuttings. Drill cuttings did not present a dust problem as they were removed from the air in a cyclone separator.





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GRAPHICAL SUMMARY OF BEAK WATER QUALITY DATA & WATER SAMPLING STATION

FIGURE 3

2.4 REHABILITATION AND RECLAMATION

The Intake/Cofferdam and Bridge drilling programs and associated activities had very little impact on the aquatic and terrestrial resources of the Thompson and Bonaparte rivers. Sonar, topographic and locational survey's were in open grasslands or on the Thompson River and did not require clearing. Drilling in the Thompson River and at the Bonaparte River bridge required neither access roads nor site preparation.

At the completion of the Thompson River drill program, as the drill barge was removed, the boat launch ramp was disfigured. The rubber-tired front end loader used to remove the drill barge was also used to recontour the boat launch ramp, (Photo 2), to its original condition.

Drilling at the road bridge left two drill holes and a depression 0.3 m deep by 1 m x 0.5 m at the roadside. The drill holes were plugged and covered with large rocks while the shallow depression was backfilled with drill cuttings and gravel. This site was not revegetated as the vegetation at the roadside was sparse and the area involved was approximately 1 m^2.

SECTION 3.0 - HAT CREEK VALLEY - GEOTECHNICAL STUDIES

3.1 INTRODUCTION

The geotechnical studies were designed to determine the requirements from the design, layout and foundations of the powerplant, diversion canals and tunnel, headworks and pit rim dams and cooling water supply pipeline. Programs were also undertaken to determine the quality and quantity of aggregate and water available for construction and also limestone available for flue gas desulphurization. Data was obtained to characterize the following:

1. type and depth of overburden,

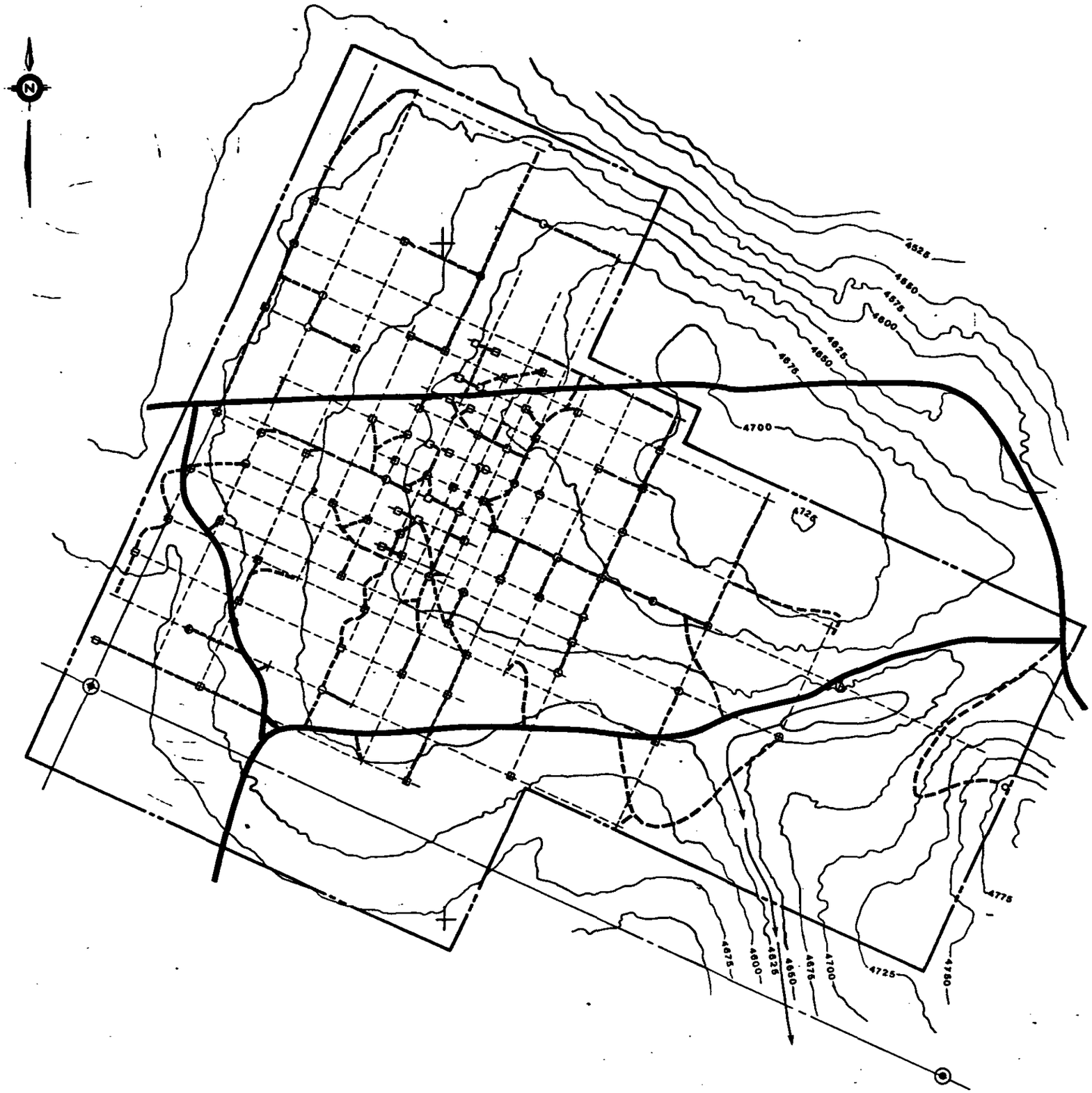
2. levels, recoverable quantities and quality of water in the Hat Creek and Marble Canyon aquifers,

3. strength, compressibility, shearability and faulting of the bedrock, and

4. quality and quantity of limestone.

Nine geotechnical programs of test pits, trenches and drilling commenced on 26 May and completed on 23 October 1981. These programs included the following sites:

1. Powerplant (Fig. 4)
2. Hat and Finney Creek Diversion Canals (Fig. 1)
3. Diversion Tunnel (Fig. 1)
4. Headworks and Pit Rim Dams (Fig. 5 A&B)
5. Limestone Quarry (Fig. 1).
6. Cooling Water Pipeline (Fig. 1)
7. Access Road (Fig. 1)



LEGEND

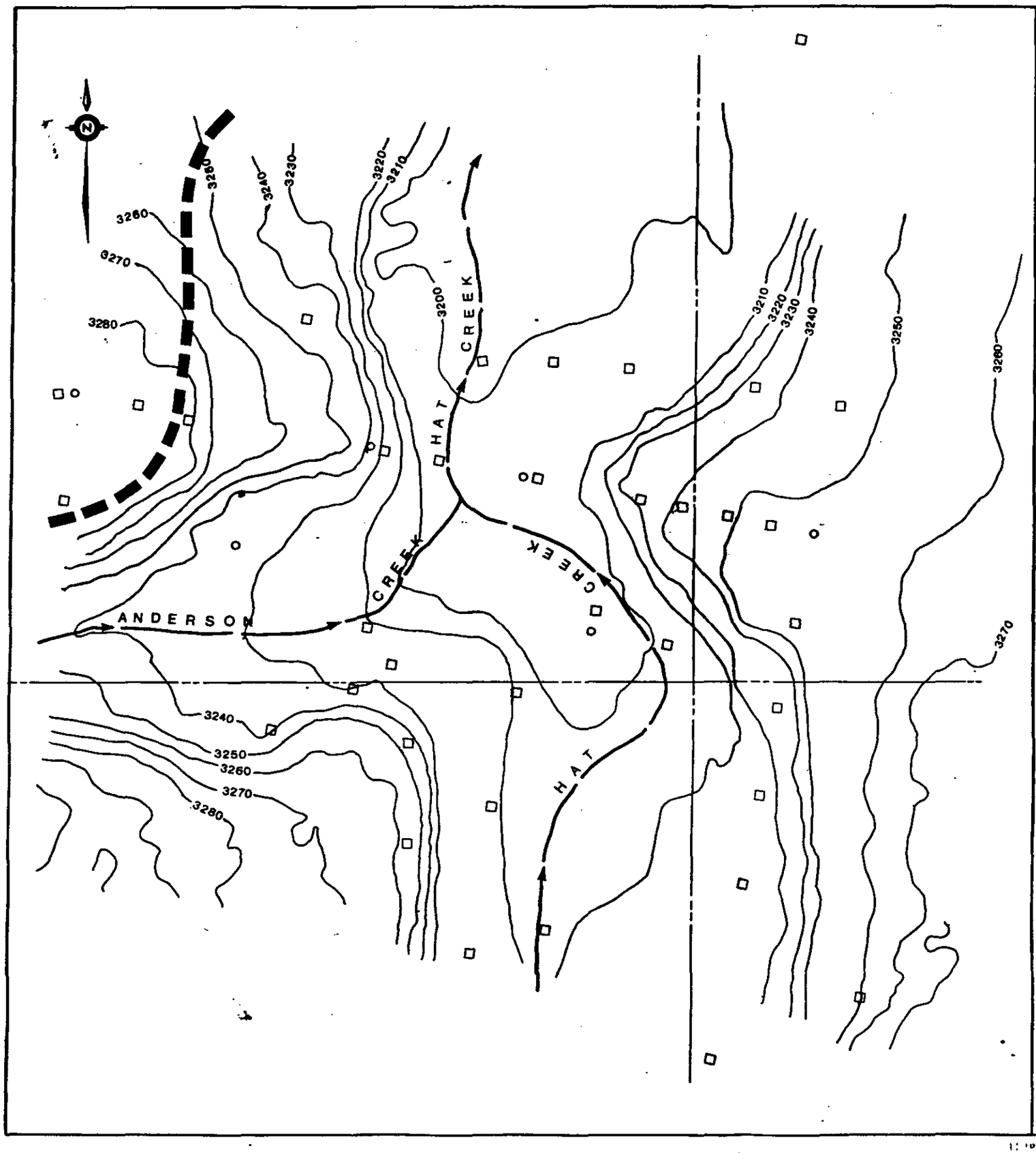
- ○ Drill Holes
- ▫ Test Pits
- ——— Existing Roads
- - - - - - - Access Trails
- ◉ Monuments

100 0 100 200 300 400 Metres

DETAIL OF POWERPLANT FOUNDATION DRILL, TEST PIT & TRENCH PROGRAMS

SECTION 4

FIGURE 4



LEGEND

- o Drill Holes
- □ Test Pits
- ■ Existing Road

20 0 20 40 60 80 Metres

DETAIL OF HAT CREEK VALLEY DRILL & TEST PIT PROGRAMS

A) DIVERSION HEADWORKS AREA

SECTION 7

FIGURE 5

HAT CREEK

MEDICINE CREEK

3000

3050

LEGEND

- Drill Holes
- Test Pits
- Eisting Road

Scale 20 0 20 40 60 80 Metres

DETAIL OF HAT CREEK VALLEY DRILL & TEST PIT PROGRAMS

B) PIT RIM DAM AREA

SECTION 7

FIGURE 5

8. Aggregate Supply (Fig. 1)
9. Construction Water Supply (Fig. 1)*

Environmental protection measures were developed prior to the site investigation program to prevent or minimize the following impacts; land disturbances, soil erosion, sedimentation of and the introduction of deleterious materials into the water courses, removal of substrates from the creeks, habitat alienation, and cross country travel.

Disturbances were minimized by selecting sites and access roads in areas that required the least modification, by reducing the size and numbers of work sites and by minimizing the lengths and widths of access roads, survey and seismic lines. Equipment was also selected to minimize the amount of site and access road preparation and to minimize damage while the equipment was being operated. Rubber-tired vehicles were preferred to track or skid mounted equipment.

Disturbances were rehabilitated and reclaimed by contouring leveled and cleared sites, scarifying, seeding and fertilizing. The seed mix used, (Table 3-1), was approved by the British Columbia Forest Service (BCFS) prior to the fall rehabilitation and reclamation program. See Appendix A for letters of approval. This mix was used for all revegetation work.

The type of disturbance was related to the various geotechnical and related activities; line cutting, test pitting, trenching, drilling roads and gravel borrow areas. The following sections summarize the programs as to the types of disturbances common to each activity. Initially the type of disturbance is described, followed by the measures to rehabilitate and reclaim disturbed areas.

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* Evaluation of long term pumping of groundwater for construction supply has been evaluated by Beak Consultants Limited. See "Assessment of the Impact of Construction Water Supply: Long Term Pump Test Program on Ground and Surface Water Resources". 1 February 1982.

TABLE 3-1

REVEGETATION SEED MIX

Species	Composition (% by wt)	Application Rate (kg/ha)
Nordan Crested Wheatgrass *Agropyron desertorun* var. Nordan	29	7.25
Manchar Brome *Bromis inermis* var. Manchar	27	6.75
Drylander Alfalfa *Medicago media* var. Drylander	24	6.0
Streambank Wheatgrass *Agropyron riparium* var. Sodar	20	5.0
TOTAL	100	25.0 kg/ha

Fertilizer (13-16-10 or 11-48-16) was applied at a rate of 120 kg/ha.

3.2 ACCESS ROADS

(a) Road Building and Improvements

Road construction during the 1981 Site Investigation Program was kept to a minimum. Existing roads, when available were upgraded to provide access to the program areas, however, new roads were constructed to provide access to program areas where there were no existing roads. Disturbances were minimized by providing access over the shortest possible route, clearing a trail only wide enough to accommodate the equipment being used, and leaving as much as possible of the natural vegetation and terrain intact to provide a surface for the roadway.

Existing roads on site were improved by ditching, culverting, resurfacing with gravel and grading when required. Culverts were installed to increase the flow of water away from the roads, stabilizing the road surface. Cattle guards were installed at the boundaries of grazing leases that had a constant flow of traffic.

New roads were constructed to gain access to the limestone quarry, the project access road from Highway 12 to the powerplant site and to improve access to the powerplant site for the test pit program a trail was constructed in areas of rugged terrain along the length of the project access road. A new segment of road near the powerplant was constructed to improve access by reducing grades and eliminating sharp bends.

Access to individual work sites was determined by vegetation and terrain. In rough sloped terrain a tracked D6D bulldozer was used to clear 4 m wide trail. Roads built that caused a disturbance over an incline were designed to disperse runoff to minimize problems associated with soil erosion. In less rugged terrain access to the sites involved clearing the brush and tree cover and if necessary leveling with a rubber-tired front end loader. Whenever possible the ground cover was left intact.

Cross country travel was possible in level open grasslands. Vehicular traffic was restricted to the edge of these open areas. When traffic was repetitive damage was done to the vegetation cover and the soils were compacted resulting in the establishment of ruts. A problem that may arise from these roads is the introduction of unauthorized vehicular traffic into otherwise inaccessible areas, leading to more widespread degradation of these grazing areas by habitat alienation, soil erosion or the introduction of noxious weeds. In the event that this occurs it may be necessary to institute restrictive measures to prevent access, for example, falling trees across the path where no alternative route is available.

(b) Rehabilitation and Reclamation

Road preparation varied from program to program. At the Powerplant site, terrain was uniformly level. Power saws were used to clear 4 m wide trails. All slash was removed piled and burned in the fall to prevent the spread of diseases and insect infestations. Heavy equipment was not required and initial disturbances were minimized leaving the ground cover intact.

At the Powerplant, access roads to individual work sites deteriorated rapidly with the constant traffic and in the wet weather. It was necessary to contour and scarify the roads prior to seeding and fertilizing at the completion of the Powerplant geotechnical activities.

Other programs required access roads to be constructed using heavy equipment. A tracked D6D bulldozer or a rubber-tired front end loader was used to clear and level a 4 m wide path to provide access for the drill rigs. During the final stages of the program all slash was removed, piled and burned. At the completion of the geotechnical programs the access roads were contoured, scarified, seeded and fertilized and returned to as natural a condition as possible.

The Cooling Water Supply Pipeline and Construction Water Supply Programs did not require access roads to be constructed. Access was through open grassland near the treed edge. These access trails were not rehabilitated nor reclaimed due to the minimal amount of damage, (Photo 4). However, if unauthorized vehicular traffic persists it will be necessary to prevent access and to scarify seed and fertilize these trails to prevent further erosional problems from arising.

Photo 4. Access trail through open grasslands.

3.3 SURVEYING AND SEISMIC EXPLORATION

(a) Line Cutting

Surveys requiring line cutting were necessary at the Powerplant site, (Fig. 4), and on the pipeline route west of Highway 1. Underbrush and trees on line were cleared, (Photo 5), so that a line could be established by transit and chain.

Surveys outlining the project access road from Highway 12 to the powerplant and the Hat and Finney Creek Diversion Canals were limited to flagging and chaining. Hence, it was only necessary to trim branches and clear dense underbrush; no trees were felled.

Photo 5. Cleared survey line.

Lines slashed and cleared for surveying at the powerplant site were also used for a seismic exploration program. Seismic crews carrying portable electronic equipment walked through areas of dense underbrush without additional clearing and slashing. Three pound charges of gelignite, set a maximum of 0.3 m in the soil at 50 m intervals, were detonated in series. Each detonation resulted in a crate approximately 0.3 m deep and 1 m in diameter. Due to the shallowness and gradual slope of these holes they presented no hazard to cattle or wildlife and were not backfilled or rehabilitated as they would recover quickly because of closely surrounding undisturbed land.

(b) Rehabilitation and Reclamation

Survey and seismic lines approximately 1-2 m wide were slashed and cleared at the Powerplant site and on the Cooling Water Supply Pipeline. All slash was removed and burned to prevent the spread of bark beetle and other diseases.

Seismic exploration resulted in approximately 75 craters 0.3 m deep and 1 m in diameter, every 50 m along 3.6 km of cleared line. Similarly to the previous ones these craters were not back-filled or reclaimed as they did not pose any danger to the cattle or wildlife in the area.

3.4 TEST PIT PROGRAMS

(a) Site Preparation

The site investigation test pit programs were undertaken to determine; the layout of the Cooling Water Supply pipeline, the Hat and Finney Creek Diversion Canals, and the Project Access Road, the location, quality and quantity of Construction Aggregate and Limestone, and the foundation conditions for the Powerplant and the Headworks and Pit Rim Dams.

Two types of machines were required to excavate test pits. A rubber-tired Case 580 C backhoe was used to dig test pits to a depth of 6 m in the loose surficial materials. A P & H 418 tracked hoe excavated test pits to a depth of 10 m, into the fractured bedrock below the loose surficial materials. The larger tracked hoe was required to dig into the bedrock at the Powerplant and Limestone Quarry sites to obtain block samples for future laboratory testing.

The P & H 418 tracked hoe excavated test pits at the Powerplant and Limestone Quarry. At the Powerplant, site locations were specified and therefore immovable. Site preparation involved only the vegetation cover, since the terrain was uniformly level. Sites 10 m in diameter were cleared of trees and underbrush to ground level and Photos 6, 7 and 8 show a test pit site before, during and after the site activities.

Site preparation was not necessary for the rubber-tired Case 580 C backhoe. Test pit location was not critical and could vary according to the terrain and vegetation, (Photo 7). The small size and manoeuvreability of this machine and the terrain and vegetation cover allowed this backhoe into areas that did not require clearing, leveling, or road access.

Test pit depth varied with the depth of overburden and the fracturability of the bedrock. Depths varied from 1 m to a maximum of 10 m. Test pit width depended on the depth of the pit and the stability of the soil and bedrock.

Photo 6. Cleared test pit site - before.

Photo 7. Test pit during excavation.

Photo 8. Test pit site - after, not reseeded.

During the test pit programs trenches were excavated at the Powerplant, Limestone quarry, Hat Creek Diversion Canal and the Pit Rim Dam to expose longer expanses of the surficial geology. Whenever possible trenches were opened while upgrading roads, utilizing the exposed bank as the trench face. The trenches were excavated with a P & H 418 tracked hoe or a tracked D6D bulldozer. All the trenches except for two, one at the powerplant (5 m x 20 m x 1 m deep) and one at the limestone quarry (5 m x 10 m x 1 m deep), were backfilled and contoured for rehabilitation and reclamation in the fall. The two trenches left exposed for further study were fenced off to prevent cattle from possible danger and will be backfilled, rehabilitated and reclaimed at a later date.

(b) Rehabilitation and Reclamation

The amount of rehabilitation and reclamation for test pit sites depended on site preparation and the machinery used to excavate the test pits. For the Powerplant program, slash was cleared, piled and burned during the fall. As site preparation for the other test pit programs was not required, the only impact was the exposed soil, (Photo 8). Top soils were separated from the subsoils and weathered bedrock and were replaced and contoured on the exposed surface of the backfilled test pits. At the completion of the geotechnical studies, work sites were scarified, seeded and fertilized. Areas disturbed, rehabilitated and reclaimed are summarized in Table 3-2.

TABLE 3-2

REHABILITATION AND RECLAMATION SUMMARY

Program	Survey lines (m)	Access Roads length (m)	Access Roads area (m^2) disturbed	Access Roads % reclaimed	Work Sites test pit area (m^2) disturbed	Work Sites test pit % reclaimed	Work Sites drill pads area (m^2) disturbed	Work Sites drill pads % reclaimed
1) Hat and Finney Creek Diversion Canals	0	2 880	17 560	100	5 845	100	3 420	100
2) Pit Rim Dam	0	455	2 500	100	600	100	1 000	100
3) Headworks Dam	0	900	3 830	100	3 440	100	2 030	100
4) Project Access Road	0	3 850	20 100	100	2 325	100	0	-
5) Construction Aggregate Supply	0	940	5 000	100	4 540	100	3 440	100
6) Cooling Water Supply-Pipeline	7 500	225	2 000	100	1 570	100	0	-
7) Limestone Quarry	0	1 230	6 775	100	7 150	99+	800	100
8) Powerplant	11 600	7 550	41 550	100	14 440	99+	3 780	100
9) Medicine Creek Road	0	2 400	12 000	100	0	-	0	-
10) Construction Water Supply	0	100	500	100	0	-	2 000	100
11) Gravel Borrow Areas	0	0	0	-	70 000	40*	0	-
12) Tunnel Portals	0	750	4 500	80**	-	-	1 800	70**

\+ 1 trench left open for future study
* Active borrow areas not reseeded
** Drill activity until snow, remainder to be reclaimed in 1982.

3.5 DRILL PROGRAMS

(a) Site Preparation

The site investigation drill programs were undertaken to determine; the quantity and quality of aggregate and water required for construction, limestone required for flue-gas desulphurization, the foundation conditions at the Powerplant and the Headworks and Pit Rim dams and the Hat Creek Division Tunnel.

The degree of disturbance involved in site preparation depended on site location, terrain, vegetation, drill type, and lubricant disposal. Sites were located by minimizing disturbances and potential environmental problems, prior to rehabilitation and reclamation, for example, surface contouring was done to prevent runoff causing soil erosion leading to siltation and sedimentation of nearby water courses.

Photo 9. Prepared drill site.

Drill rigs, having a high centre of gravity, are unstable and required site leveling in uneven terrain. A level working area, approximately 10 m in diameter, was required, (Photo 9). In rough terrain it was necessary to use a tracked D6D bulldozer or a rubber-tired front end loader to clear away trees before leveling the drill site. In level terrain clearing was all that was required, whenever possible sites were cleared using power saws leaving the ground cover intact. The following types of disturbances were involved in preparing drill sites:

1. No site preparation - In level open terrain the only disturbance was the drill hole and a drilling mud pit if required.

2. Site preparation involving clearing - Trees and underbrush were cleared using power saws leaving the ground cover intact.

3. Site leveling in open areas - A tracked D6D bulldozer or a rubber-tired front end loader was required to level the site. Vegetation was removed exposing the soil.

4. Site preparation involving clearing and leveling - A tracked D6D bulldozer or a rubber-tired front end loader was used to clear and level the site. The disturbance involved removing trees and underbrush, exposing the soil.

(b) Rehabilitation and Reclamation

Site preparation for the drilling programs involved varying degrees of clearing and leveling with a tracked D6D bulldozer or a rubber-tired front end loader. Likewise, rehabilitation and reclamation efforts varied by the degree of the disturbance.

Slash was cleared, piled and burned during the fall. Merchantable timber was stockpiled for future use. Lubricant sumps, if present, were covered over when the sites were contoured. If sumps were not required, drill cuttings were distributed over the site while scarifying, (Photo 10). Sites were then seeded and fertilized.

Photo 10. Reclaimed drill site, not reseeded.

SECTION 4.0 - ENVIRONMENTAL OBSERVATIONS

4.1 WILDLIFE AND FISH MONITORING

A record of wildlife sightings was initiated to gain an understanding of population sizes and locations in the Hat Creek Valley (to aid in proposed aerial censusing). Sightings were recorded from the Thompson and Bonaparte River Valleys and the Hat Creek Valley, starting in February and continuing through October 1981. Site personnel were requested to report all sightings of mammals, birds and fish and these were recorded as to location, date, species, sex, age, size and condition.

4.2 WATER LEVELS AND TEMPERATURES

Water temperatures and levels were monitored on the Bonaparte River and Hat and Medicine creeks to gain an understanding of the temperature regime of Hat Creek and to augment data from previous surveys (summers of 1979 and 1980). The program was started in April and continued to the end of the site investigation program.

The monitoring sites were located on; the Bonaparte River at the Highway 12 bridge, lower Hat Creek at the Water Survey of Canada (WC) Station #08LF015, upper Hat Creek near Trench B, and Medicine Creek at WSC Station #08LF082. These data are incorporated in the 1981 Environmental Field Studies.

B.C. HYDRO

APPENDIX A

LETTERS OF APPROVAL

HAT CREEK PROJECT
ENVIRONMENTAL DEPARTMENT

Report No. HC19

December 1981

APPENDIX A

LETTERS OF APPROVAL

CONTENTS

CONTENTS - (Cont'd)

APPENDIX A

LETTERS OF APPROVAL

A.1 FEDERAL DEPARTMENT OF FISHERIES AND OCEANS - 9 DECEMBER 1981

GLM

Government of Canada / Gouvernement du Canada

Fisheries and Oceans / Pêches et Océans

Fisheries - Pacific Region
1090 West Pender Street
Vancouver, B.C.
V6E 2P1

Pêches - Région du Pacific
1090 rue West Pender
Vancouver (C.-B.)
V6E 2P1

Your file / Votre référence

Our file / Notre référence
5903-85-H78

December 9, 1980.

Mr. G.L. March, Ph.D.,
Environmental Manager,
Hat Creek Project,
B.C. Hydro & Power Authority,
Box 12121,
555 West Hastings Street,
Vancouver, B.C.
V6B 4T6

Dear Sir:

Re: Proposed Drilling in Thompson River

This is to advise that the Department of Fisheries and Oceans has no objection to the work outlined in your letter of November 25, 1980 at the Thompson and Bonaparte River sites. However, we request that there be no deposition of fine materials into the river, other than washings from the drill holes, and no deposition of deleterious materials such as petroleum products.

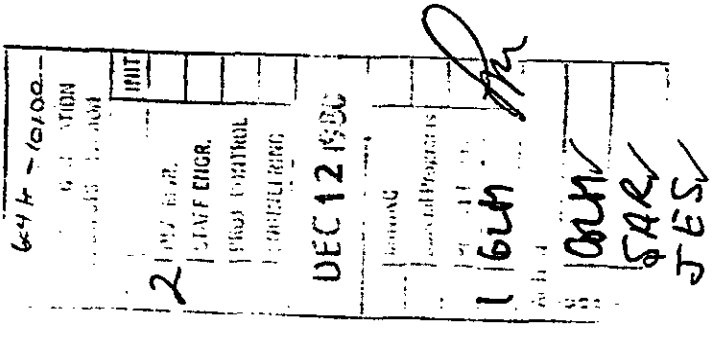
Your co-operation in this matter is sincerely appreciated.

Yours truly,

R. Bell-Irving, Chief
Water Use Unit,
Habitat Protection Division,
Field Services Branch.

RAR/tc

cc: L.C. Goodman,
Dist. Supervisor,
Kamloops + attachment



A.2 FEDERAL MINISTRY OF TRANSPORTATION - 14 JANUARY 1981

Transport Canada
Transports Canada

P.O. Box 10060
700 West Georgia St.
Pacific Centre
Vancouver, B.C.
V7Y 1E1

Telephone: (604)666-1109
Telex: 04-53235

Your file Votre référence

Our File Notre référence

8212-15

January 14, 1981

B.C. Hydro & Power Authority
970 Burrard Street
Vancouver, B.C.
V6Z 1Y3

Attention: Mr. David Austin
Legal Department

Dear Sir:

Re: Navigable Waters Protection Act Application by B.C. Hydro for approval of exploratory drilling in the Thompson River near Ashcroft, B.C.

Your letter dated December 17, 1980 and the enclosed drawings have been received in this office.

This Department's examination of the proposal is being made under the Navigable Waters Protection Act which limits our jurisdiction to assessing the impact of the proposed work on the public right of navigation. The Minister's approval is not a building permit nor will it constitute authority to occupy land or water. The approval or otherwise will be couched in these terms.

604H-00565
604H-10100

If we can be of further assistance, please contact the Senior Navigable Waters Protection Act Officer.

Yours truly,

Thomas J. Kew, P. Eng.
Regional Manager
Aids and Waterways
Canadian Coast Guard - Western

Your application has also been referred to the following agencies who will be reviewing the portion of your application within their area of responsibility. For further information you are advised to contact them directly:

Mr. B. Heskin
Department of the Environment
Kapilano 100, Park Royal

Mr. D. Snider
Regional Director
Ministry of Lands, Parks & Housing

A.3 FEDERAL MINISTRY OF TRANSPORTATION, TELEX, - 29 JANUARY 1981

B.C. Hydro VCR

MOT CT GRD OTT
29/01/81

Mr. David Austin
Solicitor and Counsel
B.C. Hydro and Power Authority
970 Burrard Street
Vancouver, B.C.

Rurlet Dec. 17/80 Directed to our regional office in Vancouver. Requesting approval to conduct exploratory drilling in the Thompson River upstream of Bonaparte River at Ashcroft, B.C. This department has no objections to the program and you may proceed accordingly provided (1) barge is marked with lights during periods of darkness (2) mooring cables are marked with buoys (3) warning signs are posted both upstream and downstream (4) debris is not allowed to become waterbourne. Understand drilling operation will continue for approximately four weeks. Please advise this office once work has been completed.

G. N. Ballinger, P.Eng.
Director Aids and Waterways
Coast Guard
For Minister of Transport

A.4 PROVINCE OF BRITISH COLUMBIA, MINISTRY OF FORESTS - 2 JUNE 1981

Province of British Columbia Ministry of Forests FOREST SERVICE

FREE-USE PERMIT
(Mining)

No. 10523

B. C. HYDRO ("Permittee") June 2, 19 81

900 - 1045 Howe Street (Address)

Vancouver B.C. V6Z 2A1

The Permittee applies for a Free-Use Permit having the following terms and conditions:

1.00 *Grant of Rights*

1.01 Subject to this Free-Use Permit and in consideration of the Permittee's covenants in it, the Regional Manager of the Kamloops Forest Region (the "Regional Manager") grants to the Permittee the right to cut timber from the area(s) described in paragraph 1.02 and shown on the map attached to this Free-Use Permit.

1.02 The purpose of this Free-Use Permit is

(a) to authorize the Permittee to cut timber for use during the development stage of a mining operation for stulls and props for underground use or for the construction of buildings, from the following Crown land and in the following volumes:

(or)

(b) to authorize the Permittee to cut timber from the following mineral property(ies) and for the following exploration and development operations:

Name of Property(ies)	Record or Lot No.	Mining Division
Power Plant Site		
Portions of	NE 1/4 Sec 16	
	SE 1/4 Sec 21	
	SW 1/4 Sec 22	
	NW 1/4 Sec 15	
	All of TP 21	Rg 26 W6M.

F.S. 145A(Page 1)—o as authorized by the Ministry of Lands, Parks and Housing letter of Consent dated May 7, 1981. - files 3401446, 3401409, 3-21-24.

Exploration and Development Operations

(i) 10,000 ± (m) of lines for technical surveys to be cut by use of hand-held tools,

(ii) Clearing of N/A (ha) for a camp-site,
(not to exceed 0.4 ha)

(iii) Clearing of N/A (ha) for a portal site,
(not to exceed 0.4 ha)

(iv) Clearing of N/A (ha) of mineralized areas,
(not to exceed 0.4 ha)

(v) Clearing of 122 drill-sites,
(not to exceed 0.2 ha each)

(vi) Clearing of an access road 1.6 Km (length),
(not to exceed 1.6 km)

(vii) Clearing of access trails 4.8 Km (length),
(not to exceed 4.8 km)

(viii) Clearing of access roads that will be public roads when completed.

1.03 This Free-Use Permit will come into effect on June 8, 19 81 and, unless the Regional Manager cancels it before then by giving 30 'days' notice to the Permittee, will expire on December 31, 19 81.

2.00 *Conditions and Cancellation*

2.01 In operations carried on under this Free-Use Permit

(a) the Permittee will cut or use timber under this Free-Use Permit only for the purposes specified in paragraph 1.02,

(b) the Permittee will comply with the *Forest Act* and amendments made to it and regulations made under it, from time to time,

(c) the height of stumps shall be as low as practicable, and in no case higher than 30 cm,

(d) dead timber, standing and down, shall be used, where available, and

(e) slash resulting from operations carried on under this Free-Use Permit will be disposed of as follows:

See conditions attached

2.02 In operations carried on under this Free-Use Permit, the Permittee will not permit

(a) a lake, stream or spring that supplies water for any purpose to be rendered unfit for that purpose, or

(b) trees, logs, logging debris or any polluting substance to be deposited into a lake, stream, or spring, unless authorized by a Forest Officer, or

(c) logs to be skidded or equipment to be operated below the high-water mark of a lake or stream, unless authorized by a Forest Officer, or

(d) any obstruction, gravel, or fill to be placed below the high-water mark of a lake or stream, unless authorized by a Forest Officer, or

(e) a landing to be located within 40 m of a lake or stream or in an area that is not designated for harvesting in this Free-Use Permit, unless authorized by a Forest Officer, or

(f) slash to be burned closer to a lake or stream than the distance specified by a Forest Officer.

2.03 In operations carried on under this Free-Use Permit, the Permittee will

(a) remove logging, milling and road-building debris deposited in and on the banks of lakes and streams,

(b) direct falling and yarding of timber away from lakes and streams and their banks,

(c) protect natural growth in and on the banks of lakes and streams from damage from logging and burning,

(d) build a bridge or install a culvert at every stream crossing, designed to accommodate the maximum flow of the stream and to permit unobstructed fish passage, and

(e) schedule the construction of stream crossings,

as directed by a Forest Officer.

2.04 (Additional Provisions)

See conditions attached

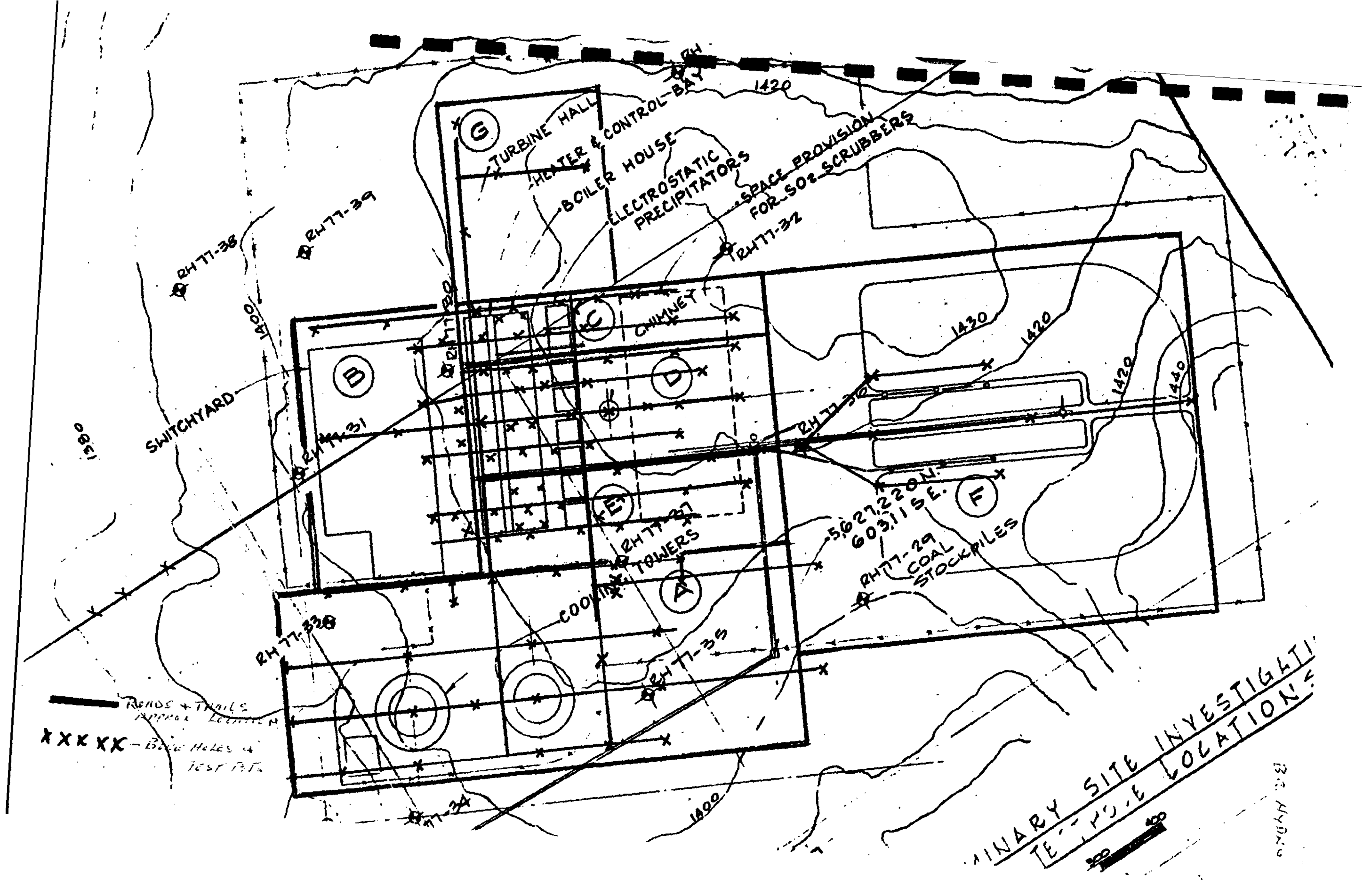
2.05 If an obligation set out in this Free-Use Permit is not performed, the Regional Manager may, without notice, suspend this Free-Use Permit, or cancel it, or both.

Application accepted and Free-Use Permit
entered into on behalf of the Crown, by

B.C. Hydro
SR. LAND Supervisor
T.A. Dussault

Permittee

for Regional Manager



TURBINE HALL
HEATER & CONTROL BAY
BOILER HOUSE
ELECTROSTATIC PRECIPITATORS
SPACE PROVISION FOR SO2 SCRUBBERS
CHIMNEY
SWITCHYARD
COOLING TOWERS
COAL STOCKPILES
5,627,220 N.
603,115 E.
RH77-39
RH77-38
RH77-32
RH77-31
RH77-30
RH77-37
RH77-33
RH77-35
RH77-29
1420
1430
1440
1400
1380
ROADS + TRAILS APPROX LOCATION
XXXXX - BORE HOLES & TEST PITS
...INARY SITE INVESTIGATI...
...E LOCATION...

A.5 PROVINCE OF BRITISH COLUMBIA, MINISTRY OF FORESTS - 10 SEPTEMBER 1981

604-151.0(2)

11.0

515 Columbia St.,
Kamloops, B.C. V2C 2T7

File: 800-12-8

September 10, 1981

British Columbia Hydro and Power
Authority,
Hat Creek Project,
Cache Creek, British Columbia.
V0K 1H0

Attention: Mr. Harry Adams

Dear Sir:

Re: Site Investigation Program - 1981
Hat Creek Project

Your letter of August 19, 1981 relative to Free Use Permit (Mining) #10523 and Condition 8.00 therein is acknowledged.

The seed mixture as outlined in your letter to be used in conjunction with site rehabilitation on the Hat Creek Project has been discussed with Mr. Jim White, Agrologist with the District Managers' Office, Kamloops District.

Please be advised the seed mixture as specified is hereby approved.

Yours truly,

A. B. Robinson,
Regional Manager.

MEL/sc

c.c. British Columbia Hydro and Power Authority
900 - 1045 Howe Street,
Vancouver, B.C. V6Z 2B1

Attention: J. Durrant

c.c. Kamloops District - Attention: Jim White

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY
HAT CREEK PROJECT
Box 760
Cache Creek, B.C.
V0K 1H0

Ministry of Forests
515 - Columbia Street
Kamloops, B.C.
V2C 2T7

August 19, 1981

Attn: Mr. Bert LeDuc

Dear Sir:

Re: Site Investigation Program - 1981
Hat Creek Project

I am writing you in regards to our Free-Use Permit # 10523 - condition 8.00.

We have on hand a seed mixture consisting of:
29% Crested wheat grass
27% Smooth Brome grass
24% Drylander alfalfa
20% Steamband wheatgrass.

We have had considerable success with the above mix and request your approval to use it for our 1981 Reclamation Program.

Sincerely yours

H. L. Adams.

Harry Adams

c.c. J. Durrant
P. Amada

A.6 PROVINCE OF BRITISH COLUMBIA, MINISTRY OF LANDS, PARKS AND HOUSING - 2 JANUARY 1981

File 604 151 (6) 2 ~~PT~~ ~~AF~~ 15.1B

Province of British Columbia

Ministry of Lands, Parks and Housing

Lands and Housing
Regional Operations Division
District Land Manager
(Clinton)
348 Tranquille Road
Kamloops, B.C. V2B 3G6
Phone: 554-3144

Our File: Uns. Thompson River

January 2, 1981

B.C. Hydro and Power Authority
Properties Division
900 - 1045 Howe Street
Vancouver, B.C.
V6E 2B1

Attention: J.A. Durrant

Dear Sir:

Reference is made to your request for permission to undertake an exploratory drilling program on land described as Unsurveyed Foreshore being the bed of the Thompson River located in the vicinity of Section 34, Township 20, Range 24, West of the Sixth Meridian, Kamloops Division of Yale District.

Under Section 10 (a) of the Land Act, permission is hereby granted to undertake an exploratory drilling program on the area described above and more particularly shown outlined in red on the attached sketch. This permission is granted for a period of 6 months commencing January 1, 1981 and is subject to the following conditions:

The drilling is to be undertaken using a barge and no fill or structures are to be put in place in the bed of the river.

You will follow the requirements of Federal Fisheries as outlined in their letter of December 9, 1980 which is attached to this permission.

The permission granted only covers Crown lands being the legally defined bed of the Thompson River. Any activity outside the Crown land should only be undertaken with the permission of the owner of the lands. It is your responsibility to ensure the location of the legal boundaries and obtain any needed permission from the upland owners. Our records indicate the upland in the vicinity of your proposed launching site is owned by the Canadian Pacific Railway.

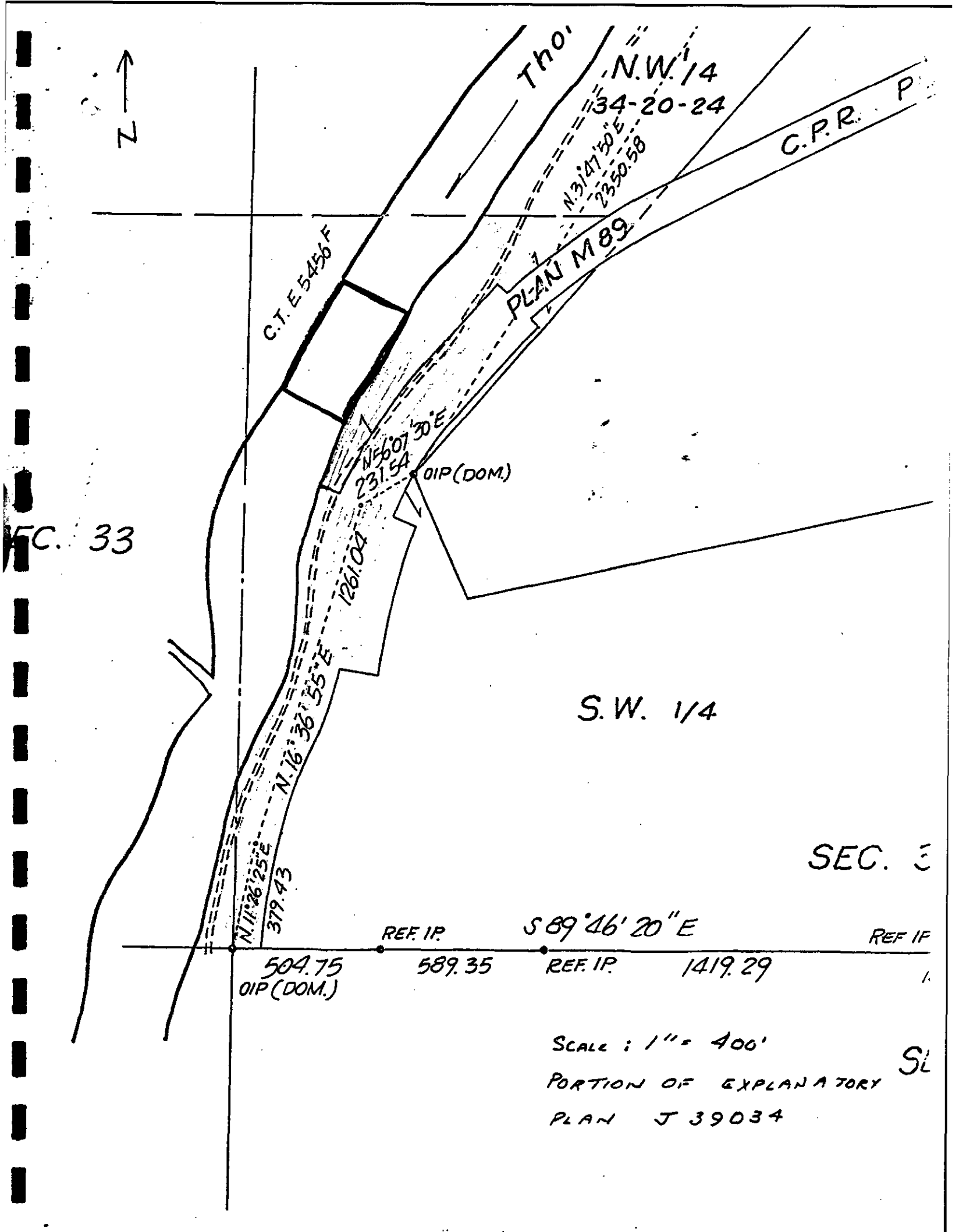
That B.C. Hydro will indemnify and save harmless Her Majesty the Queen in the Right of the Province from and against all actions, claims and damages whatsoever that may be brought or made against the Crown Provincial by reason of anything done or omitted to be done by B.C. Hydro, its servants, workmen or agents, in the exercise, or purported exercise of the rights, powers and privileges hereby granted or anyway arising out of or connected with, the granting of this permission.

Yours truly,

H. Hess
District Land Manager

HH/mm

Enc.


N
Tho'
N.W. 1/4
34-20-24
C.P.R.
P
N.3°47'50"E
2350.58
PLAN M89
C.T. E 5456 F
N56°07'30"E
231.54
OIP (DOM.)
126.04
N.16°36'55"E
SEC. 33
S.W. 1/4
SEC.
N11°26'25"E
379.43
REF. IP.
S 89°46'20" E
REF IP
504.75
OIP (DOM.)
589.35
REF. IP.
1419.29
SCALE : 1" = 400'
PORTION OF EXPLANATORY
PLAN J 39034

A.7 PROVINCE OF BRITISH COLUMBIA, MINISTRY OF LANDS, PARKS AND HOUSING - 7 MAY 1981

604-151.02) IX A

Province of
British Columbia

Ministry of Lands,
Parks and Housing

Lands and Housing
Regional Operations Division
Regional Director
348 Tranquille Road
Kamloops, B.C.
V2B 3G6
Phone: 554-3144

Our Files: 3401446
3401409
3-21-24

81-05-07

British Columbia Hydro and Power Authority
Properties Division
900 - 1045 Howe Street
Vancouver, B.C.
V6Z 2B1

604-151.02)
PT VII A
PT. IX A

Attention: Mr. J.A. Durrant

Dear Sir:

Reference is made to your request for a Letter of Consent to carry out exploration and testing on the areas shown outlined in red on the attached sketch.

Under Section 10(a) of the Land Act permission is hereby granted to undertake an exploration program involving excavating test pits, drilling test holes and hand sampling subsurface material. This exploration is for investigations necessary for the power plant site, proposed water pipeline, proposed road, proposed water storage reservoir and proposed aggregate sites associated with development of the Hat Creek coal deposits. Permission is also given to construct short trails for equipment and access to drill and excavation sites. This permission is granted for a period of one year commencing May 1, 1981 and is subject to the following conditions and constraints.

-This permission applies only to those areas within the red outlined portions of the map which are unreserved Crown land. It is your responsibility to ensure status and ownership of testing sites. For further information we refer you to correspondence with our Ministry on your request for a reserve for water pipeline and road purposes on this area.

-The general program and procedure for the exploration is to be consistent with your document entitled, "Site Investigations Program - 1981 - Powerplant - Offsite Facilities - Mine" prepared by S.A. Ridley September 24, 1980.

12 May 81
Copy to Ridley. Sent.
H Adams To Meet
with F.S on 14 May 81
JPP

British Columbia Hydro and Power Authority
Properties Division
MAY 12 1981
Vancouver, B. C.

British Columbia Hydro and Power Authority 81-05-07

-All drill and excavation sites are to be restored to a natural contour consistent with the surrounding land upon completion of the activity.

-All disturbed areas are to be reseeded to the satisfaction of the District Manager, Ministry of Forests, Kamloops.

-All fencing affected by the exploration is to be maintained in a state satisfactory to control cattle at all times and slip gates are to be constructed where necessary.

-Liaison is to be maintained with the Range permitees and with the Range representatives of the Ministry of Forests.

-No timber is to be cut without permission from the Ministry of Forests.

-Road construction is to be kept to a minimum width and distance. Use of hand held equipment such as portable augers are preferred where feasible.

-British Columbia Hydro will indemnify and save harmless Her Majesty the Queen in the Right of the Province from and against all actions, claims and damages whatsoever that may be brought or made against the Crown Provincial by reason of anything done or omitted to be done by British Columbia Hydro, its servants, workmen or agents, in the exercise, or purported exercise of the rights, powers and privileges hereby granted or anyway arising out of or connected with the granting of this permission.

Yours truly,

D.G. Podmore
Regional Director

A.8 PROVINCE OF BRITSH COLUMBIA, MINISTRY OF LANDS, PARKS AND HOUSING - 14 JULY 1981

Province of
British Columbia

Ministry of Lands,
Parks and Housing

Lands and Housing
Regional Operations Division
Regional Director
348 Tranquille Road
Kamloops, B.C.
V2B 3G6
Phone: 554-3144

Files: 3401446, 3401409,
3-21-24

81-07-14

British Columbia Hydro and Power Authority
Properties Division
900-1045 Howe Street
Vancouver, B.C. V6Z 2B1

Attention: Mr. J.A. Durrant

Dear Sir:

Reference is made to your request for a Letter of Consent to carry out exploration and testing on the areas shown outlined in red on the attached sketch.

Under Section 10(a) of the Land Act permission is hereby granted to undertake an exploration program involving excavating test pits, drilling test holes and hand sampling subsurface material. This exploration is for investigations necessary for the power plant site, proposed water pipeline, proposed road, proposed water storage reservoir and proposed aggregate sites associated with development of the Hat Creek coal deposits. Permission is also given to construct short trails for equipment and access to drill and excavation sites. This permission is granted for a period of three months commencing June 1, 1981 and is subject to the following conditions and constraints.

- This permission applies only to those areas within the red outlined portions of the map which are unreserved Crown land. It is your responsibility to ensure status and ownership of testing sites. For further information we refer you to correspondence with our Ministry on your request for a reserve for water pipeline and road purposes on this area.

- The general program and procedure for the exploration is to be consistent with your document entitled, "Site Investigations Program - 1981 - Powerplant - Offsite Facilities - Mine" prepared by S.A. Ridley September 24, 1980.

- All drill and excavation sites are to be restored to a natural contour consistent with the surrounding land upon completion of the activity.

- All disturbed areas are to be reseeded to the satisfaction of the District Manager, Ministry of Forests, Kamloops.

- All fencing affected by the exploration is to be maintained in a state satisfactory to control cattle at all times and slip gates are to be constructed where necessary.

- Liaison is to be maintained with the Range permittees and with the Range representatives of the Ministry of Forests.

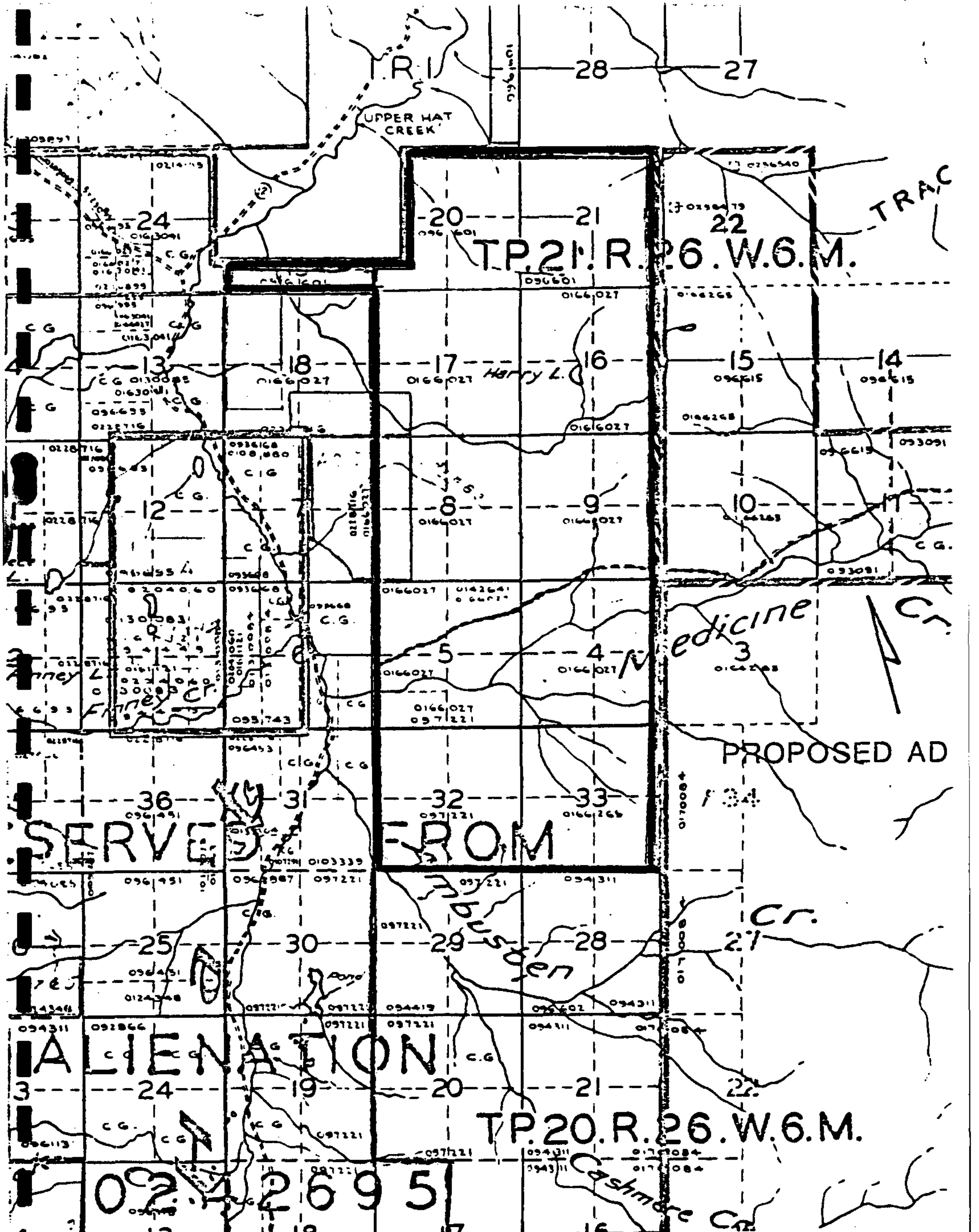
- No timber is to be cut without permission from the Ministry of Forests.

- Road construction is to be kept to a minimum width and distance. Use of hand held equipment such as portable augers are preferred where feasible.

- British Columbia Hydro will indemnify and save harmless Her Majesty the Queen in the Right of the Province from and against all actions, claims and damages whatsoever that may be brought or made against the Crown Provincial by reason of anything done or omitted to be done by British Columbia Hydro, its servants, workmen or agents, in the exercise, or purported exercise of the rights, powers and privileges hereby granted or any way arising out of or connected with the granting of this permission.

Yours truly,

D.G. Podmore
Regional Director


UPPER HAT CREEK
TRAC
TP.21. R.26. W.6. M.
Harry L.
Medicine Cr.
PROPOSED AD
SERVED FROM
ALIENATION
TP.20. R.26. W.6. M.
Cr.
02 42695

A.9 PROVINCE OF BRITISH COLUMBIA, MINISTRY OF LANDS PARKS AND HOUSING - 10 SEPTEMBER 1981

Province of British Columbia

Ministry of Lands, Parks and Housing

Lands and Housing
Regional Operations Division
Regional Director
348 Tranquille Road
Kamloops, B.C.
V2B 3G6
Phone: 554-3144

File: 3401446, 3401409
3-21-24

81-09-10

604-151-0 (2) PT IXA

B.C. Hydro and Power Authority
Properties Division
900 - 1045 Howe Street
Vancouver, B.C.
V6Z 2B1

Attention: J.A. Durrant
Senior Land Supervisor

Dear Sir:

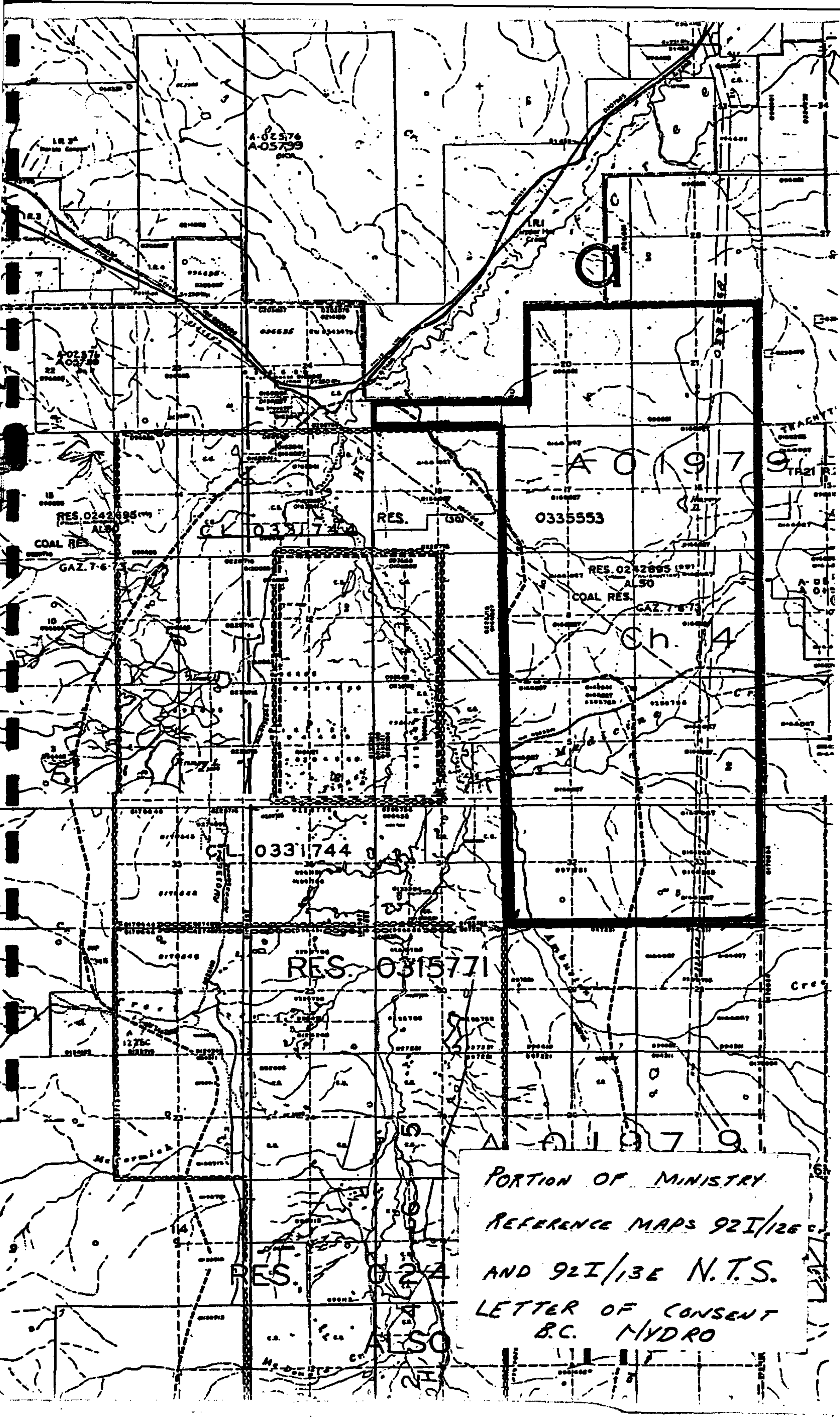
As per your request of August 28, 1981 the letter of permission for exploration and testing issued on the area outlined in red on the attached sketch is hereby extended until October 31, 1981.

All terms and conditions of the original letter will remain in effect.

Yours truly,

D.G. Podmore
Regional Director

Copies sent to
S Ridley
P Devonshire
M Adams
21/9/81



A-025.76
A-05799
I.R.1
A-02576
A-05799
A 0 1 9 7 9
0335553
RES. 0242695
ALSO
COAL RES.
GAZ. 7-6-73
CL 0331744
RES.
RES. 0242895
ALSO
COAL RES.
GAZ. 7-6-73
Ch. 14
CL 0331744
RES. 0315771
A 0 1 9 7 9
RES. 024
ALSO
PORTION OF MINISTRY
REFERENCE MAPS 92I/12E
AND 92I/13E N.T.S.
LETTER OF CONSENT
B.C. HYDRO

A.10 PROVINCE OF BRITISH COLUMBIA, MINISTRY OF TRANSPORTATION AND HIGHWAYS - 5 AUGUST 1981

Province of
British Columbia

Ministry of
Transportation
and Highways
HIGHWAYS

P.O. Box 460,
Lillooet, B.C.,
V0K 1V0

phone: 256-4255

YOUR FILE .....

OUR FILE 26-21-2

August 5th, 1981

B. C. Hydro & Power Authority,
Properties Division,
600 -1045 Howe Street,
Vancouver, B.C.,
V6Z 2B1

Dear Sirs:

Re: Application for Geological
Test Drilling, Ashcroft, B.C.

Attached is Permit No 26-33-81 as per your application dated July 10, 1981. You will notice that this permit covers only that area lying outside the boundaries of the Village of Ashcroft. It will be necessary for you to obtain permission from the Village of Ashcroft to proceed with drilling on the South West side of the Bonaparte River.

Thank you.

Yours truly,

R. L. Chapman,
District Highways Manager

per: Enrol C Redman

E. C. Redman,
District Technician

FEMcD/bh
attachment.

H 21 (revised July 1977)

Permit No. 26-33-81

GOVERNMENT OF BRITISH COLUMBIA

File No. 149

MINISTRY OF HIGHWAYS AND PUBLIC WORKS

Letter No. B

Electoral District Yale-Lillooet

PERMISSION TO CONSTRUCT WORKS WITHIN CROWN LANDS

The works comprising of drilling for geotechnical assessment of the site of proposed replacement bridge across the Bonaparte River near Ashcroft, B.C. on the property legally known as S/E ¼, Sec 33 lying to the West of the Thompson River and North of D.L. 378, Tp 20, Rnge 24, W6M, KDYD as per drawing #9282-00-001 - dated July 3, 1981.

are hereby approved in so far as they relate to the use of Crown lands, interference with public works, or other matter under the jurisdiction of the Minister of Highways and Public Works, and permission to construct, use, and maintain the said work is hereby granted to B. C. Hydro & Power Authority

The said approval and permission to construct, use, and maintain works is, however, at all times subject to the following conditions:

1. That the construction and maintenance of the said works is carried out to the satisfaction of the Chief Engineer.

2. That, before opening up any highway or interfering with any public work, intimation in writing of the intention to do so must be given to the District Official at least seven clear days before the work is begun.

3. That any person appointed by the Chief Engineer for that purpose shall have free access to all parts of the works for the purpose of inspecting the same.

4. That the construction of the said works shall be commenced on or before the August 5, 1981, and shall be prosecuted with due diligence and to the satisfaction of the Chief Engineer, and shall be completed on or before the November 5, 1981.

5. (*a*) The highway must at all times be kept open to traffic. The roadway must be completely restored for traffic as soon as possible. At all times the permittee must safeguard the travelling public.

(*b*) That, unless with the consent of the Chief Engineer, no more than forty-five (45) metres of pipe-track or other excavation in any public highway is to be kept open at any one time.

(*c*) All trenches and excavations shall be shored, if necessary, according to the Workers' Compensation requirements. Care shall be taken to protect adjacent property.

(*d*) That all excavations shall be carefully back-filled with suitable material, which is to be tamped into place, and that the permittee shall restore the surface of the road and shoulders and ditches at his own expense. All surplus material is to be removed from the Provincial Crown lands, or deposited where and as required by the District Official of the Ministry of Highways and Public Works. The permittee is financially responsible for any maintenance work required on said ditch for a period of one year. The Ministry will carry out the necessary remedial work and invoice the permittee monthly.

(*e*) The pipeline crossing installation is to be placed by drilling and (or) jacking in such a manner as to afford minimum grade settlement. No water jetting will be permitted. That where, in the opinion of the District Official, an excavation or opening for a pipeline crossing installation could be made which would not be detrimental to the highway or its users, permission will be granted for said works. On throughways, freeways, and main highways no open cuts will be allowed.

(*f*) That all pipelines in excess of a nominal diameter of 5 cm., whether gas, oil, water, pressure sewers, conduit, etc., shall be installed where indicated by the District Official, encased in a steel casing-pipe or conduit-pipe of sufficient strength to withstand all stresses and strains resulting from the location, such casing to extend the full width of the highway right-of-way if deemed necessary to the District Official. The ends of the casing-pipe shall be suitably sealed and, if required, properly vented above the ground with vent-pipes not less than 5 cm. in diameter, and extending not less than 1.2 metres above ground surface. Vent-pipes shall be connected 30 cm. from the ends of the casing-pipe, and the top of each vent shall be fitted with a turn-down elbow, properly screened and equipped with identification markers.

All pipelines of non-rigid material, i.e., plastic or copper, of any diameter, shall be cased, or embedded in sand.

The inside diameter of the casing-pipe shall be at least 25 per cent larger than the outside diameter of the pipeline. The casing-pipe shall be installed with an even bearing throughout its length, and in such a manner so as to prevent leakage, except through the vents.

The top of the casing-pipe, or the pipeline where casing is not required, shall be located as directed by the District Official, and shall in no case be less than 1.2 metres below the surface of the highway and not less than 60 cm. below the highway ditches. Pipelines must not obstruct drainage structures or ditches or interfere with traffic on the highway or with highway maintenance.

6. That where the work for which permission is hereby granted comes in contact with any bridge, culvert, ditch, or other existing work, such existing work must be properly maintained and supported in such manner as not to interfere with its proper function during the construction of the new work, and on the completion of the new work the bridge, culvert, ditch, or other existing work interfered with shall be completely restored to its original good condition.

7. That when necessary all excavations, materials, or other obstructions are to be efficiently fenced, lit, and watched, and at all times every possible precaution is to be taken to ensure the safety of the public.

8. That the person or persons for whom these works are being constructed, or by whom these works are maintained, shall at all times accept full responsibility for any accident that may occur or damage that may be done to any person or property whatsoever caused directly or indirectly by these works, and shall save harmless and keep indemnified the Crown from all claims and demands whatsoever in respect of the works.

9. That the permission herein granted to use and maintain the works is only granted for such time as the land or public work in, upon, or over which the said works are constructed is under the jurisdiction of the Minister of Highways and Public Works. This permission is not to be construed as being granted for all time, and shall not be deemed to vest in the permittee any right, title, or interest whatsoever in or to the lands upon which the works are constructed. Should the lands affected at any time be included within that of an incorporated municipality or city, this permission shall become void, unless the works are on a highway duly classified as an arterial or primary highway pursuant to Part III of the *Highway Act*.

10. That after receiving notice in writing of the intention on the part of the Provincial Government to construct, extend, alter, or improve any public work, the person or persons responsible for the maintenance of the works for which permission is hereby granted shall within six weeks move or alter such work at his or their own expense to such new position or in such manner as may be necessitated by the construction, extension, alteration, or improvement proposed to be carried out by the Provincial Government.

(OVER)

11. That while reasonable care will be taken on the part of the Provincial Government to do as little damage as possible to any private work in the carrying-out of the construction, extension, alteration, improvement, repair, or maintenance of any public work adjacent thereto, the Provincial Government can accept no responsibility of any kind for such damage.

12. That the permission hereby granted to construct, use, and maintain work is granted without prejudice to the provisions of the *Highway Act* and *Department of Highways and Public Works Act*, or other Acts governing Crown lands and public works or their use by the public.

13. That this permission shall be in force only during such time as the said works are operated and maintained by the applicants, to the entire satisfaction of the Chief Engineer.

14. That the Ministry will not be responsible for grade changes on accesses caused by reconstruction of any Provincial highway.

15. This permit is valid only for the specific works stated herein. Any alterations or additions must be covered by a separate permit.

16. This permit may be cancelled, at the discretion of the Minister, without recourse, should the permittee fail to comply with all the terms of the permit. Thirty days' notice will be given before cancellation.

17. When the requirements of the Ministry necessitate use of the said lands for Provincial purposes, at the discretion of the Minister, this permit may be cancelled.

18. That these works shall be identified with this permit number, namely, "H. 26-33-81" in a manner satisfactory to the District Official of the Ministry of Highways and Public Works.

Ministry of Highways and Public Works

P.O. Box 460,

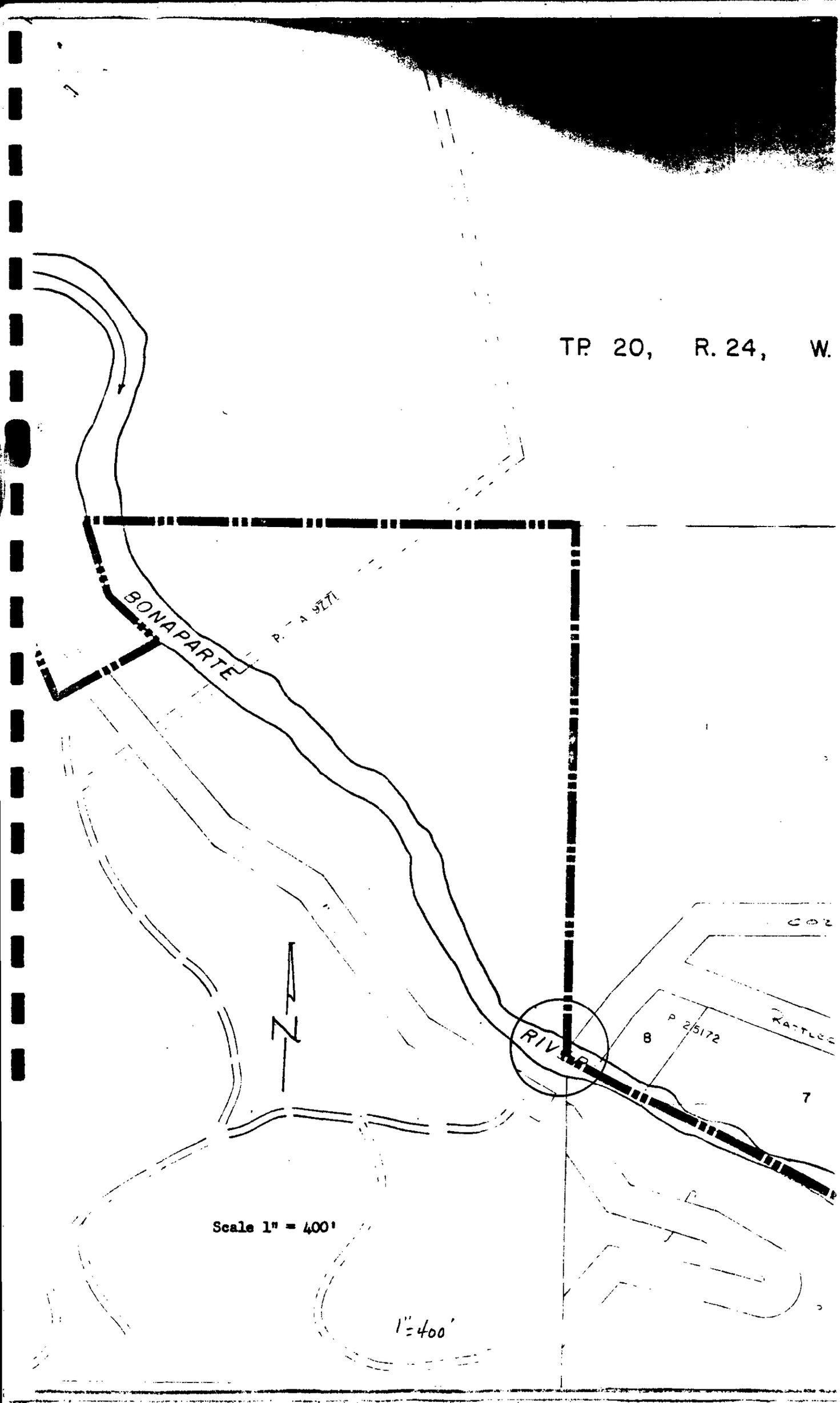
Lillooet, B.C. V0K 1V0

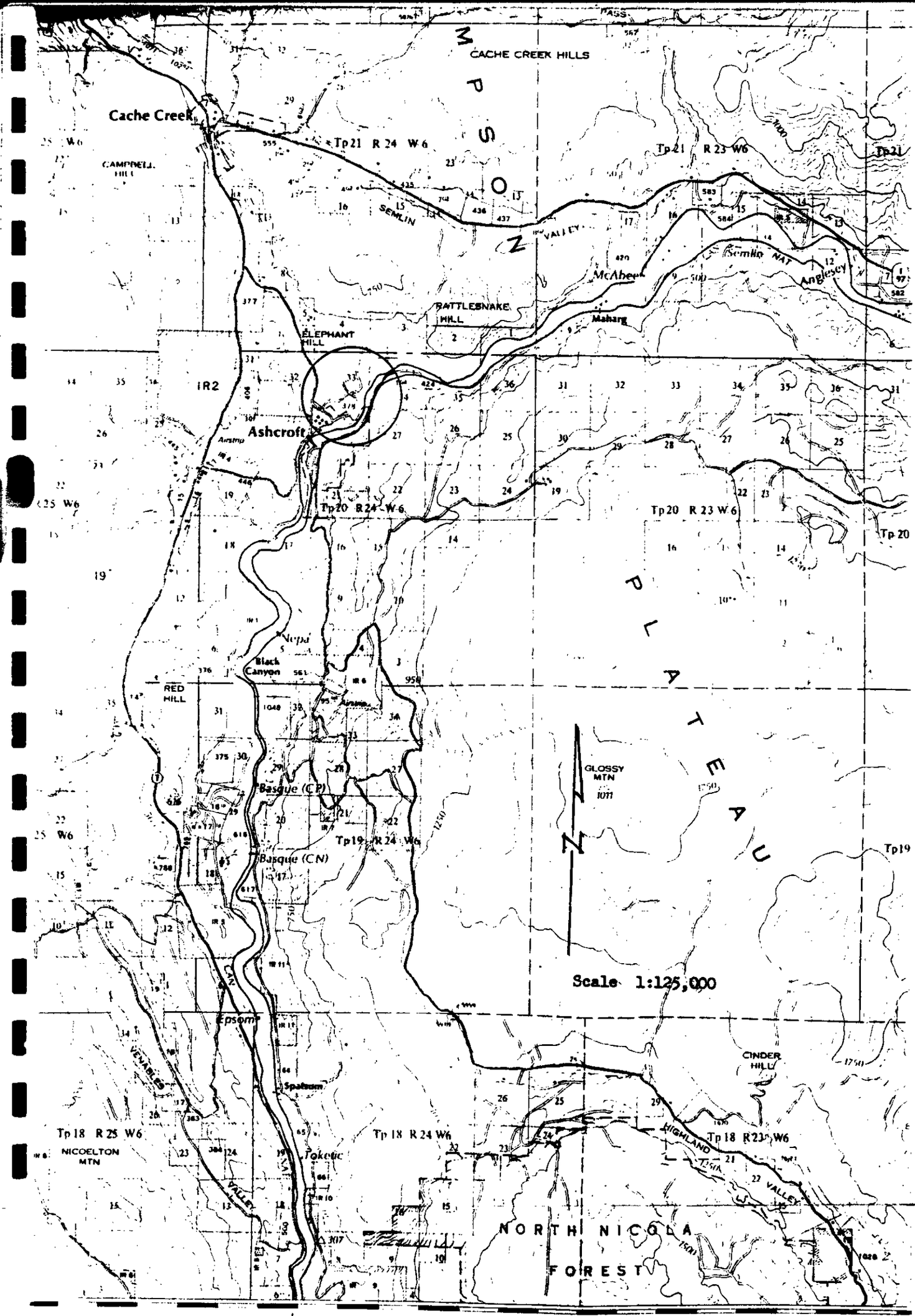
Erwin C. Redman

E. C. Redman, District Technician

For Minister of Highways and Public Works

August 5th, 1981

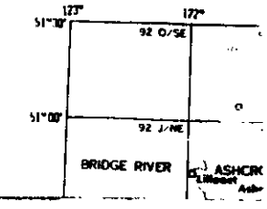

TP. 20, R. 24, W.
BONAPARTE
P. - A 9171
RIVER
P 2/5172
8
7
Scale 1" = 400'
1"=400'



REFERENCE

Roads: Hard Surface
Loose Surface, Main
Loose Surface, Secondary
Rough (may be private, closed or unusable)
Trail
Highway Route Number
Railway
Power Line, Main

INDEX TO ADJ



A.11 CANADIAN INDUSTRIES LTD., BOX 10 MONTREAL QUEBEC, TELEX - 16 DECEMBER 1980

BCHYDRO VCR

DS 714 MTL

CIL GTV309 161047 EST

604-151-0(2)

15.1A

DEC 16/80
LEE ENGAR BC HYDRO
VCR.
RE: CIL ASHCROFT SITE: PERMISSION FOR ACCESS TO EASTERN BANK AREA OF THE THOMPSON RIVER.

THIS IS TO CONFIRM OUR MEETING AT ASHCROFT SITE ON DEC 4 1980
B C HYDRO HAVE REQUESTED PERMISSION TO USE THE DIRT ROAD LEADING TO THE EASTERN RIVERBANK SITUATED BETWEEN THE POINT WHERE THE BC HYDRO LINES CROSS THE RIVER AND THE FARMHOUSE GATE INTERSECTS THE PRIVATE ROAD.
THE ACCESS TO THE RIVERBANK WOULD BE USED TO LAUNCH A SMALL BARGE AND POWERBOAT AND ACCESORY EQUIPMENT USED TO PERFORM TEST DRILLING AND SEISMIC SURVEYING OF THE THOMPSON RIVERBED. THIS SURVEYING TO BE CONDUCTED DURING THE MONTHS OF DECEMBER 1980 AND JANUARY * 1981. THE SURVEYING IS PART OF THE PRELIMINARY CONSTRUCTION DATA REQUIRED FOR THE WATER INTAKE STATION FOR THE BC HYDRO HAT CREEK POWER PROJECT.
CIL INC. EXPLOSIVES DIVISION HEREBY GIVE BC HYDRO RESPRESENTATIVES AND THEIR SUB-CONTRACTORS PERMISSION TO USE THE AREA ALONG THE RIVERBANK TO LAUNCH THEIR SURVEY CRAFT AND EQUIPMENT. THIS PERMISSION IS PROVISIONAL UPON BC HYDRO'S AGREEMENT TO CARRY OUT THEIR WORK ALONG THE RIVERBANK AND NOT APPROACH OR GAIN ACCESS TO THE EXPLOSIVES MAGASINES AREA
B C HYDRO MUST ALSO MOVE ITS EQUIPMENT AND RELATED PERSONNEL OFF THE SITE WITHOUT UNDUE DELAY AFTER THE END OF THE SURVEYING PERIOD OR BY JANUARY 31 1980.
BC HYDRO MUST ALSO UNDERTAKE TO INDEMNIFY AND HOLD CIL INC HARMLESS FROM ANY AND ALL CLAIMS WHICH MAY ARISE FROM BC HYDRO OPERATIONS ON CIL PROPERTY.
WE TRUST THAT THIS IS AN ACCURATE RECORD OF THE TERMS AND CONDITIONS DISCUSSED BY MR ENGAR AND MR ROBICHAUD AND THAT THEY ARE FOUND ACCEPTABLE BY B C HYDRO
THE FORMAL LETTER OF UNDERSTANDING IS BEING FORWARDED TO YOUR OFFICE BUT PLEASE CONSIDER THIS TELEX AS AN IMMEDIATE CONFIRMATION OF OUR PERMISSION FOR YOUR ACCESS TO THE THOMPSON RIVERBANK ALONG CIL PROPERTY
SINCERELY YOURS
D.M ROBICHAUD

BCHYDRO VCR

* Dec 17/80 Mr Robichaud phoned and apologized for the error he will correct the date to ...

A.12 CANADIAN INDUSTRIES LTD., TELEX - 16 FEBRUARY 1981

+
BCHYDRO VCR

CIL HO MTL
FEB 16/81
M. LEACH ENGAR

SITE ACCESS TO CIL ASHCROFT PROPERTY. THIS IS TO CONFIRM EXTENSION OF (1) ONE MONTH TO CLAUSE 6 IN BC HYDRO POWER AUTHORITY CIL INC LETTER OF AGREEMENT. PERMISSION TO ENTER CIL PROPERTY ON EASTERN BANK THOMPSON RIVER WILL N BE CONTINUED UNTIL MARCH 31 1981.
AFTERWHICH EQUIPMENT SHOULD BE VACATED FROM XXX SITE WHITOUT DELAY
REGARDS
D H ROBICHAUD
PRODUCTION ASSISTANT
+
BCHYDRO VCR

CIL HO MTL

British Columbia Hydro and Power Authority
Properties
FEB 16 1981
Division
Vancouver, B.C.

COIL ICL 0.2 1
VIIA

cc: S. Padley

A.13 CANADIAN INDUSTRIES LTD. - 5 MARCH 1981

C·I·L Inc.

C·I·L House
Box 10, Montreal, Quebec, Canada
H3C 2R3
(514) 874-3000

March 5, 1981

Ref: File 220/Ashcroft

Mr. L. B. Engar
Properties Division
B.C. Hydro
900 - 1045 Howe Street
Vancouver, B.C.

Dear Mr. Engar:

Subject: Site Access to C-I-L Inc. Property at Ashcroft B.C.

This is to confirm that C-I-L Inc. have approved the terms and conditions listed in the attached copy of the letter of understanding. Please note that as discussed in our meeting of February 26, the C-I-L signing officers have initialled the change to clause number 6. We were sorry to hear of the fatal incident on the Thompson River and would appreciate any news resulting from the police accident inquiry.

I would like to take this opportunity to thank H. Adams, J. Durrant and yourself for the kind cooperation and generous hospitality extended during my visit. Should you have any further questions or comments, please feel free to call.

Sincerely yours,

David M. Robichaud

D. M. Robichaud
Production Assistant
Explosives Division

jb
att.

LETTER OF UNDERSTANDING

BETWEEN

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY

AND

C-I-L INC.

Re: British Columbia Hydro and Power Authority use of part of C-I-L Inc. Ashcroft Site, B.C.

Whereas British Columbia Hydro and Power Authority (hereinafter called: B.C. Hydro) have asked the permission of C-I-L Inc. (hereinafter called: C-I-L) to use a dirt road located on C-I-L's property leading from the paved road to gain access to the Thompson River to conduct waterbed surveys, this letter of understanding outlines the conditions agreed to regarding such access and use on C-I-L's property:

1. B.C. Hydro, its representatives and its sub-contractors shall have the right to drive a few pickup trucks onto the east bank of the Thompson River for the launching of a small barge and power-boat and accessory equipment.

2. At no times, B.C. Hydro, its officers, employees, representatives or sub-contractors shall approach or gain access to C-I-L's principal explosives storage area or the entrance gate which were indicated to B.C. Hydro. Any work associated with such access to the property is to be carried out outside the minimum safety distances of 1,450 feet from the existing explosives magazines in accordance with the Explosives Act of Canada and its applicable regulations, failing which this letter shall become automatically null and void.

3. B.C. Hydro will consequently be held responsible to ensure that its employees and those of its sub-contractors, associated with the work, adhere to all rules and regulations as set down by C-I-L and the Department of Energy, Mines and Resources necessary because of the storage, handling and transportation of explosives on C-I-L's property.

4. B.C. Hydro undertakes to indemnify and hold C-I-L harmless from any and all claims which may arise from B.C. Hydro's or C-I-L's operations on the property.

5. Any damage to the property shall be made good at B.C. Hydro's expense as soon as possible after termination of this letter of understanding.

6. The present letter of understanding will terminate at either the completion of B.C. Hydro work or March 31, -- 1981 whichever is the earlier. Non-respect of any of the conditions mentioned above shall automatically terminate these presents.

PLEASE INITIAL

This Letter of Understanding is subject to the clarification of its terms contained in the attached telexes.

The Corporate Seal of British Columbia Hydro and Power Authority was hereunto affixed in the presence of

Authorized Signatory

Authorized Signatory

14321

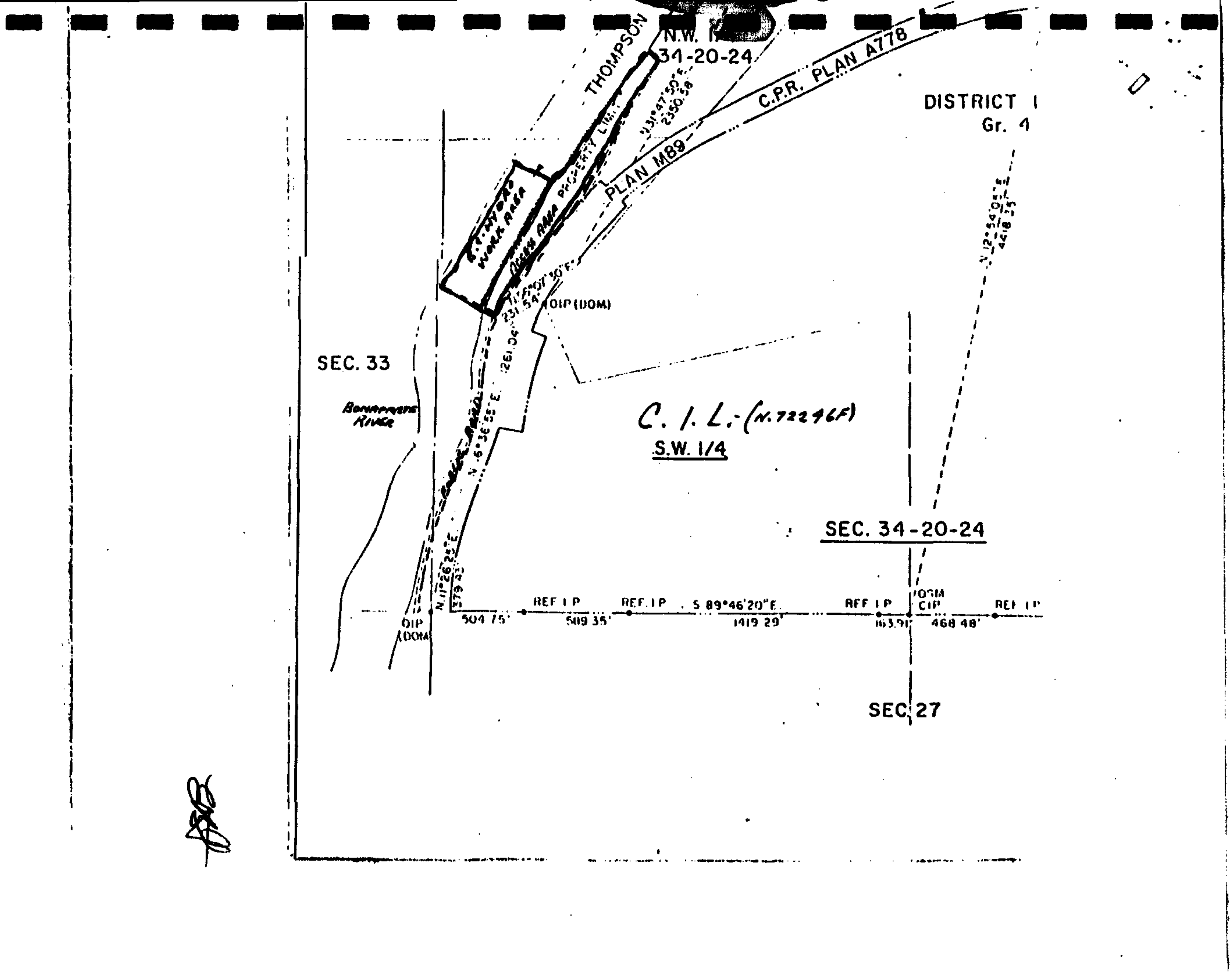
APPROVED as to form only
Solicitor
B.C. Hydro and Power Authority

APPROVED
Manager
Properties Division

The Corporate Seal of C-I-L Inc. was hereunto affixed in the presence of

Senior Vice-President

Assistant-Secretary


THOMPSON
N.W.
34-20-24
C.P.R. PLAN A778
PLAN M89
DISTRICT
Gr. 4
PROPERTY LIMIT
N.31°47'50"E.
2350.58
WORK AREA
OIP (DOM)
SEC. 33
River
C. I. L.-(N.72246F)
S.W. 1/4
SEC. 34-20-24
N.12°54'05"E.
N.6°36'55"E.
N.11°26'25"E.
REF. I.P.
S.89°46'20"E.
OSM
CIP
504.75'
509.35'
1419.29'
468.48'
OIP
(DOM)
SEC. 27

A.14 VILLAGE OF ASHCROFT - 9 DECEMBER 1981
(released for work undertaken in the village)

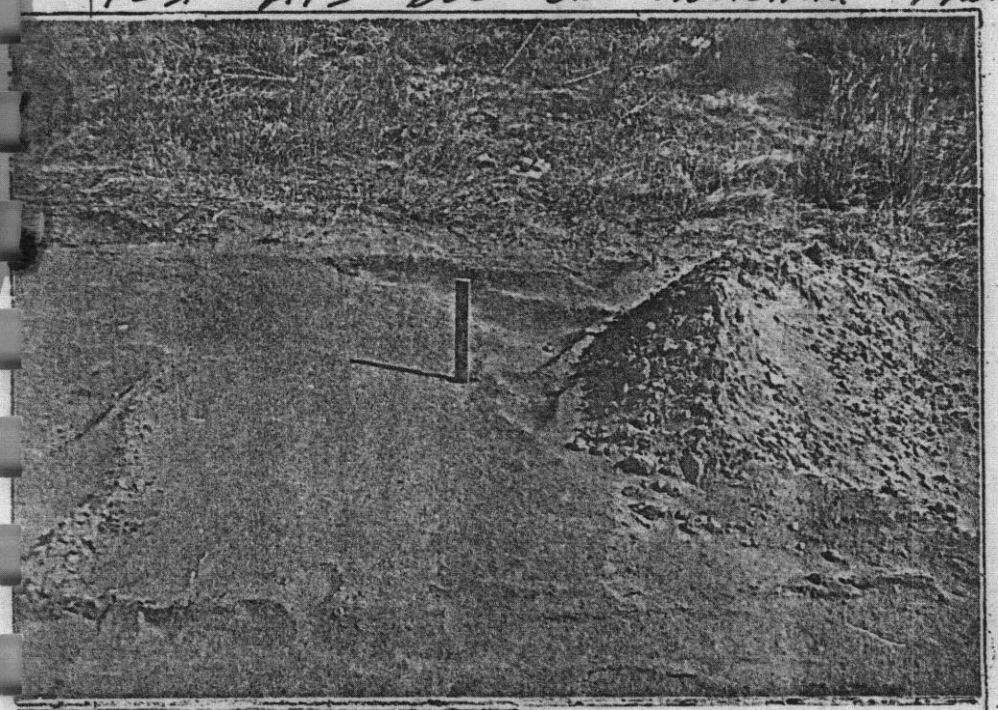
Inter-office memo ⊕ B.C.Hydro

TO: MR. J. DURRANT — 9- DEC 1981

FROM: H. ADAMS — FILE: 604-151.0(2) 15.7

SUBJECT: PIPELINE TEST PIT PROGRAM.

VERBAL RELEASE GIVEN TODAY BY MR. CLYVE HARPER, ASHCROFT MUNICIPAL ENGINEER COVERING OUR TEST PITS DUG ON MUNICIPAL PROPERTY.



BACKFILLED HOLES # 10 & # 11 DUG ON MUNICIPAL ROAD ALLOWANCE.

26th AUGUST 1981 PHOTOS TAKEN

H. L. Adams.