

SECTION 8

Technical Aspects

JBNQA, s. 8

A. corr.

8.1 Project descriptions

8.1.1 Definitions

- a) *Definition of MSL*: Elevations referred to as “above MSL” for the purposes of this Section of the Agreement shall mean “above mean sea level geodesic” as determined by official surveys.
- b) *Definition of Elevations*: All elevations designated in this Section of the Agreement are referenced to present bench marks and shall be subject to adjustment should later official surveys modify the elevations of above MSL of said bench marks provided such adjustments do not alter the real levels intended for the purposes of this Section of the Agreement.
- c) *Definition of Crees and Inuit*: For the purposes of this Section, Crees shall mean those persons who qualify as Crees in Section 3 of the Agreement as well as the Inuit ordinarily resident in Fort George, and Inuit shall mean those persons who qualify as Inuit in Section 3A.
- d) *Schedules*: Schedule means a document attached to this Section and forming part thereof as if repeated at length in the body of the text of this Section.
- e) *SOTRAC*: SOTRAC means a corporation established in Sub Section 8.9 known under the French name of “La Société des Travaux de correction du Complexe La Grande” and under the English name of “La Grande Complex Remedial Works Corporation”.
- f) *Société d'énergie de la Baie James* means La Société d'énergie de la Baie James and/or Hydro-Québec.
- g) *Grand Council of the Crees (of Québec)* means the Grand Council of the Crees (of Québec) or the Cree Regional Authority.
- h) *Northern Quebec Inuit Association* means the Northern Quebec Inuit Association or its successor.
- i) *Fort George Island* means the island where the Fort George community is presently located.

JBNQA, par. 8.1.1

A. corr.

Compl. A. no. 18, sch. 1, s. 16

8.1.2 Le Complexe La Grande (1975)

La Société d'énergie de la Baie James and Hydro-Québec may construct, operate and maintain Le Complexe La Grande (1975) substantially as described herein, in whole or in part, with or without LA 1 and EM 1, at their option.

The components of Le Complexe La Grande (1975) which are constructed shall substantially conform to and be those components contemplated by the Description Technique – Le Complexe La Grande (1975) dated October 20, 1975 attached hereto as Schedule 1 of this Section of the Agreement.

The parties to the Agreement acknowledge that the Le Complexe La Grande (1975) is already under construction and therefore shall not be subject to the environmental regime established by the Agreement and further agree not to take any actions whatsoever which would prevent the construction of the said complex.

No dam or powerhouse shall be constructed on the La Grande River between the estuary and the LG 1 powerhouse site on the said river without the consent of the Fort George Band Council. However, this

shall not prevent the construction of dams or river works as remedial works for potential negative impacts of Le Complexe La Grande (1975).

Notwithstanding the four (4) preceding sub-paragraphs of this paragraph 8.1.2, la Société d'énergie de la Baie James and/or la Commission hydroélectrique de Québec (Hydro-Québec) may, at its option, construct, operate and maintain a revised LG 1 power plant and the accessories thereof as described in Schedule R1, attached hereto, hereinafter referred to as LG 1, Revision 1, at or about mile 23 on La Grande River, instead of the LG 1 power plant at mile 44 on La Grande River as described in Schedule 1 of Section 8 of the James Bay and Northern Québec Agreement.

JBNQA, par. 8.1.2
Compl. A. no. 4, s. 2

8.1.3 Other projects

It is recognized that there exists a possibility of future hydroelectric developments in the Territory. Studies are being carried out in relation to the N.B.R. Complex dealing with the development of the Nottaway, Broadback and Rupert Rivers hereinafter referred to as the N.B.R. Complex and in relation to the Great Whale Complex for the development of the Great Whale, Little Whale and Coast Rivers hereinafter referred to as the Great Whale Complex.

It is agreed that these known projects and any additions and/or substantial modifications to Le Complexe La Grande (1975), if built, shall be considered as future projects subject to the environmental regime only in respect to ecological impacts and that sociological factors or impacts shall not be grounds for the Crees and/or Inuit to oppose or prevent the said developments.

Notwithstanding the land regime established in Section 5 of the Agreement, the following provisions shall apply to the said developments, if built and the interested parties agree to execute the necessary documents to give effect to such provisions as may be required from time of time.

a) Mistassini Lake Area

The Mistassini Lake may be used as a reservoir for the N.B.R. Complex.

The land required at the outlet of Mistassini Lake at or near the source of the Rupert River for control structures, channel works, if required, and appurtenant works including construction facilities, quarries and borrow pits may be used by La Société d'énergie de la Baie James, Hydro-Québec, Québec or their nominees as if such land were Category III lands for the purpose of constructing, operating and maintaining the N.B.R. Complex.

b) Waswanipi Area

The lakes listed herein and their surrounding land can be used as part of reservoirs and forebays within the N.B.R. Complex, but these respective lakes can only be raised to the following upper limits above MSL:

Lake	Maximum Water Level
Goeland	930
Waswanipi	930
Chensagi	930
Maicasagi	930
Opataouaga	910
Poncheville (Lady Beatrix)	910

The parts of said lakes and their surrounding lands which form part of Category II lands, which shall be flooded by the reservoirs and forebays of the N.B.R. Complex, shall become ipso facto Category III lands

as and from the moment La Société d'énergie de la Baie James and/or Hydro-Québec forward to the Crees a written notice of a resolution by the Board of Directors of either of said corporations that they are proceeding to build the N.B.R. Complex.

Such Category II lands shall be replaced in accordance with the provisions of the land regime applicable to Category II lands provided that the conversion of such Category II lands into Category III lands shall not be a grounds for opposition by the Crees to the project nor shall the Crees be entitled to require any delay in preparation for and construction of the N.B.R. Complex on account of such lands.

Such lands to be converted in accordance with the procedure set forth hereinabove from Category II to Category III lands may by the same procedure be increased or decreased in accordance with the plans for the N.B.R. Complex as revised from time to time.

For the purpose of constructing, operating and maintaining transmission lines, two (2) corridors of approximately 750 feet wide each for the N.B.R. Complex and one (1) corridor of approximately 250 feet wide for the purpose of inter-connection may cross the Waswanipi Category I lands without land replacement or compensation provided that such corridors are located at least three (3) miles from the center of the new Waswanipi settlement at the time of construction of the first transmission line.

The parties hereto undertake to sign all documents necessary to give effect to the foregoing.

Notwithstanding the above, the land required in the Waswanipi area for the construction of the N.B.R. Complex may be maintained as Category II lands at the option of the Crees provided that all works carried out by or on behalf of La Société d'énergie de la Baie James and/or Hydro-Québec for the purpose of construction, operation and maintenance of said complex shall be considered as if carried out in Category III lands and provided that the land used will not be replaced.

c) Rupert House Area

The N.B.R. Complex may include up to a maximum of six (6) powerhouses and dams along the Rupert River west of the Matagami road.

These powerhouses and dams may be built in the river and/or on the adjacent Category I and Category II lands with their appurtenant works, roads, transmission lines, sub-stations, switching stations, construction facilities, quarries and borrow pits in the same manner as if such works were located in Category III lands it being understood that the Category I and Category II lands shall be limited by the shore line of the future forebays, subject to the following provisions:

- i) the powerhouse and dam hereafter referred to as R 1 nearest the present Rupert House settlement shall be located at a distance of at least two (2) miles from the center of the present Rupert House settlement;
- ii) no living quarters for workers nor temporary settlement for staff and families shall be located within a radius of ten (10) miles of the center of the present Rupert House settlement and no permanent non-native community, town or settlement shall be built within a radius of forty (40) miles of the center of the present Rupert House settlement for the purpose of the N.B.R. Complex;
- iii) there shall be a strict control of access during the construction of the N.B.R. Complex between the camps, temporary villages for staff and families and the construction sites on one hand and the Rupert House settlement on the other;
- iv) permanent facilities for maintenance and operation of the N.B.R. Complex shall not be located in the vicinity of the R 1 powerhouse and dam except for the purpose of operating and maintaining the R 1 powerhouse and dam only.

La Société d'énergie de la Baie James and the Rupert House Band may by mutual agreement modify the special provisions dealt with in this sub-paragraph 8.1.3 c).

Should La Société d'énergie de la Baie James choose to build part of the N.B.R. Complex along the Broadback River instead of along the Rupert River, all provisions relating to the Rupert River powerhouses and dams mentioned in this sub-paragraph 8.1.3 c) shall apply *mutatis mutandis* to the powerhouses and dams that shall be built on the Broadback River if they are built there instead of on the Rupert River.

The land required within Category I and Category II lands for the purpose of the construction, operation and maintenance of the said powerhouses and dams and appurtenant works, hereinabove mentioned in this sub-paragraph 8.1.3 c) shall not be subject to replacement nor compensation.

The construction schedule of the N.B.R. Complex shall provide for the construction of the R 1 powerhouse and dam last of the powerhouses and dams of the Complex unless ecological reasons make it preferable to build said powerhouse and dam earlier.

La Société d'énergie de la Baie James and/or Hydro-Québec undertake that construction, operation and maintenance of the N.B.R. Complex shall not require the re-location of the Rupert House settlement.

d) Nemiscau Area

It is acknowledged that some of the members and former members of the Nemaska Band temporarily residing in the Rupert House and Mistassini settlements intend to return to the vicinity of their original settlement and consequently the parties to the Agreement consent to the establishment of a new settlement for such persons, subject to the conditions set forth below and elsewhere in the Agreement.

No Category I lands shall be chosen for the Nemaska Band in the area planned to be used for the powerhouse, forebay, dam and dykes to be located in the Nemiscau Lake Area;

If the said powerhouse, forebay, dam and dykes are located in part in Category II lands, such lands shall be replaced in accordance with the provisions of the lands regime applicable to Category II lands provided that the conversion of such Category II lands into Category III lands shall not be a grounds for opposition by the Crees to the project nor shall the Crees be entitled to require any delay in preparation for and construction of the N.B.R. Complex on account of the said conversion of such lands.

e) Great Whale Complex

For the purpose of the Agreement, the Great Whale Complex shall be defined as follows:

– downstream of the Coast River, the water of the Great Whale River is raised and diverted in a westerly direction through secondary valleys; this water is combined with the water diverted from the Little Whale River and discharged directly into Hudson's Bay through a powerhouse hereafter referred to as GB 1 situated approximately twenty (20) miles north of the Great Whale settlement.

– two (2) other powerhouses hereafter referred to as GB 2 and GB 3 are contemplated on the Great Whale River.

– Bienville Lake may be used as a reservoir.

No Category I lands shall be chosen for the Crees and Inuit of Great Whale in the area planned to be used for the powerhouses, forebays, dams and the reservoirs to be located in the vicinity of Great Whale unless by mutual agreement. For the purpose of the Agreement, even though studies of the project are

preliminary, Hydro-Québec or its nominee undertakes that any dam and powerhouse built in that vicinity shall not raise the water level above the following Elevations above MSL:

Powerhouse and reservoir	Maximum Elevation
GB 1	650
GB 2	960
GB 3	1 280
Bienville	1 315

If the said powerhouses and reservoirs, and their appurtenant works, are located in part or wholly in Category II lands, such lands shall be replaced in accordance with the provisions of the land regime applicable to Category II lands provided that the conversion of such Category II lands into Category III lands shall not be grounds for the Crees or the Inuit to oppose the project nor shall the Crees and Inuit be entitled to require any delay in the preparation for and the construction of the said Great Whale Complex on account of such lands.

f) Remedial measures

The special provisions of sub-paragraphs 8.1.3 a) to 8.1.3 e) shall not eliminate the reasonable mitigating measures required to minimize effects of the projects on the hunting, fishing and trapping by the native people and there shall be remedial works for these projects. Nothing herein shall prevent La Société d'énergie de la Baie James and/or Hydro-Québec from entering into agreements with the Crees and/or the Inuit for the purpose of establishing joint or separate remedial work activities.

JBNQA, par. 8.1.3

A. corr.

8.1.4

- a) Hydro-Québec and the Société d'énergie de la Baie James, upon a special resolution of their respective board of directors, renounce to the benefit of the words "in relation to the N.B.R. Complex dealing with the development of the Nottaway, Broadback and Rupert Rivers hereinafter referred to as the N.B.R. Complex and" in the introductory part of paragraph 8.1.3 of the James Bay and Northern Québec Agreement;
- b) Hydro-Québec and the Société d'énergie de la Baie James renounce in the same manner to the benefits conferred on them by sub-paragraphs a), b), c) and d) of paragraph 8.1.3 of the James Bay and Northern Québec Agreement;
- c) The Cree Regional Authority accepts these renunciations.

Compl. A. no. 13, ss. 2 and 3

8.1.4.1 Le Complexe La Grande (1975)

Le Complexe La Grande (1975) as described in the James Bay and Northern Québec Agreement shall include the following Projects:

1.1 The LG 1 (1986) Project

The LG 1 (1986) Project shall consist of the LG 1, Revision 1 Project as described in Complementary Agreement No 4 to the James Bay and Northern Québec Agreement with the following changes (plates 1 and 2) in the number of units, the total installed capacity and the maximum discharge through the units:

	LG 1, R1	LG 1 (1986)
Number of generating units	10	12
Total installed capacity in MW	1 140	1 368
Maximum discharge through units		
– in cubic feet per second	152 000	210 130
– in cubic meters per second	4 304	5 950

List of plates for the LG 1 (1986) Project

Plate 1 : Agencement général des ouvrages

Plate 2 : Coupe transversale dans l'axe d'un groupe de la centrale

LG (1986) Project

Agencement général des ouvrages

See plan no. 20 Plate 1 Agencement général des ouvrages (Complementary Documents)

CARTE LG (1986) Project

Coupe transversale dans l'axe d'un groupe de la centrale

See plan no. 21 Plate 2 Coupe transversale (Complementary Documents)

1.2 The LG 2A Project

The LG 2A Project comprises additional generating facilities at the La Grande 2 Reservoir, consisting of a new 6-unit powerhouse and appurtenant works.

The new LG 2A powerplant is located about one kilometer west of the existing LG 2 powerplant (plate 3) and consists of water intake works, an underground powerhouse, discharge works, an underground transformer substation, a surface switching station and a 315 kV transmission line (plate 4). The existing La Grande 2 Reservoir and spillway also serve for the operation of the LG 2A powerplant.

The water intake works comprise an approach channel formed by two dykes, an intake structure and six penstocks.

The approach channel is approximately 600 meters long and 145 meters wide. The dykes are of rockfill with a glacial till core. The crest lengths are respectively 550 and 535 meters and the total volume of fill is about 325 000 cubic meters.

The intake structure for the six penstocks is located downstream of the existing D-6A dyke of the La Grande 2 Reservoir. This dyke acts as an upstream cofferdam during construction of the intake structure. Each of the six openings in the intake structure is equipped with a set of trashracks and a vertical lift wheel gate.

Six parallel penstocks, each approximately 200 meters long, excavated in the rock, connect the intake to the turbines. The sloping sections of the penstocks are concrete-lined while the horizontal sections are steel-lined.

LG 2A is an underground powerplant, excavated in rock and similar in design to the existing LG 2 powerplant. The machine hall is approximately 221 meters long, 23 meters wide and 50 meters high with

six turbine-generator units of 333 MW each. The installed capacity is 1998 MW and the design maximum discharge is 1620 cubic meters per second. The net maximum head is 137 meters.

The discharge works comprise six draft tubes connected to a surge chamber and two tailrace tunnels approximately 1330 meters long, 15 meters wide and 20 meters high.

The transformer substation has six 13.8-315 kV transformers and is located in an underground chamber excavated in the rock immediately upstream of the main machine hall. Two shafts for the isolated phase bus ducts connect the transformer substation to the surface switching station.

The LG 2A powerhouse is connected to the Radisson Substation through a double-circuit 315 kV transmission line. This transmission line is approximately 16 kilometers long.

The four existing 735 kV transmission lines, leaving the LG 2 powerplant, are relocated north of the present alignment.

List of the plates for the LG 2A Project

Plate 3 : Agencement général des ouvrages

Plate 4 : Coupe longitudinale des aménagements

LG 2A Project

Agencement général des ouvrages

See plan no. 22 Plate 3 Agencement général des ouvrages (Complementary Documents)

LG 2A Project

Coupe longitudinale des aménagements

See plan no. 23 Plate 4 Coupe longitudinale (Complementary Documents)

1.3 The Brisay Project

The Brisay Project consists of a powerplant with 460 MW installed capacity and a 315 kV transmission line to the Tilly Substation at LG 4 via the site of the future “Nikamo” collecting substation.

The powerplant is located adjacent to the existing Brisay Control Works which include the intake structure for the powerplant on the common approach canal from the Caniapiscou Reservoir (plate 5). The intake structure has two gates and is connected to the two head race tunnels of which the upstream 100 meters also were constructed concurrently with the Brisay Control Works (plate 6).

The two head race tunnels are approximately 500 meters long, excavated in rock, and are connected through penstocks of approximately 90 meters long to the spiral cases of the turbine generator units.

The powerplant will receive its water from the Caniapiscou Reservoir where the maximum and minimum operating levels will remain at elevations 535.5 and 522.6 meters (1760 and 1717 feet) respectively as described in Section 8 of the James Bay and Northern Québec Agreement.

The powerplant is located above ground. At the generator floor level the powerhouse is approximately 105 meters long and 38 meters wide. It contains two generating units of 230 MW each driven by a Kaplan turbine with steel spiral casings (plate 6). The total installed capacity is 460 MW and the design maximum discharge through the powerplant will be approximately 1133 cubic meters per second. The nominal head is 38.4 meters (plate 7).

The discharge works consist of two draft tubes and a tail race connected to the discharge canal of the Brisay Control Works.

The transformer/switching station is located partly on the roof of the powerhouse and partly on the adjacent rock.

A double circuit 315 kV transmission line connects the Brisay powerplant to the Tilly Substation via the site of the future “Nikamo” collecting substation (plate 8).

The generating units for the Brisay powerplant may, at Hydro-Québec’s option, be changed to three or four units of a total installed capacity of 460 MW within generally the same structural configuration, in lieu of the two 230 MW units described above. Such change shall not require an amendment to this Agreement, but the Cree Regional Authority shall be notified in writing of such change.

List of the plates for the Brisay Project

Plate 5 : Complexe hydroélectrique de La Grande Rivière – Plan de situation

Plate 6 : Agencement général

Plate 7 : Coupe transversale dans l’axe d’un groupe

Plate 8 : Ligne de transport d’électricité à 315 kV, Brisay-Poste Tilly : Corridor et alignement préférentiels
Brisay Project

Complexe hydroélectrique de La Grande Rivière – Plan de situation

See plan no. 24 Plate 5 La Grande Rivière Plan de situation (Complementary Documents)

Brisay Project

Agencement général

See plan no. 25 Plate 6 Agencement général (Complementary Documents)

Brisay Project

Coupe transversale dans l’axe d’un groupe

See plan no. 26 Plate 7 Coupe transversale (Complementary Documents)

Brisay Project

Ligne de transport d’électricité à 315 kV, Brisay-Poste Tilly : Corridor et alignement préférentiels(*)

See plan no. 27 Plate 8 Ligne de transport (Complementary Documents)

1.4 The RND Project

The 450 kV DC transmission line between Radisson Substation and the 49th parallel will be approximately 600 km long, on steel towers anchored by guy wires spaced approximately 500 meters.

A few rigid-type towers will be used (2%) as well as some guy-supported angular towers (6%), which will occupy surface areas of approximately 60 meters x 70 meters. The standard guyed towers will each occupy surface areas of approximately 24 meters x 30 meters. Two main conductors (four-wire bundles), supported by “V” type insulators, will have a minimum ground clearance of 13.2 meters.

The right-of-way will be 60 meters wide and in general will be cleared only 52 meters.

1.4.1 Radisson Substation

The substation site is the same as that of the Radisson Substation referred to in the James Bay and Northern Québec Agreement.

The Radisson Substation will, in addition to the features described in the James Bay and Northern Québec Agreement, consist of three 735-315 kV power transformers, six 735 kV transmission line startup facilities, four 315 kV transmission line startup facilities, a power converter of approximately 2000 MW and the 450 kV DC transmission line startup facility.

Total additional space required is approximately 394 000 square meters, of which 130 000 square meters will be used for the converter facility. The 735 kV section will be used mainly as a switching facility for the three LG 2 to Nemiscau transmission lines. The 315 kV section will be used for transforming and integrating into Hydro-Québec's James Bay grid the power generated by the LG 2A and LG 1 (1986) powerhouses.

1.4.2 Looping of the three LG 2 – Nemiscau 735 kV transmission lines

The switching system for feeding the 2 000 MW power converter requires the looping of the three LG 2 – Nemiscau lines between the LG 2 Switching Station and the Radisson Substation.

The loops for the first and second lines require seven new towers on a 2.5 km long new right-of-way and the loop for the third line requires thirteen new towers on a 2.5 km long new right-of-way.

Technical specifications of these loops are identical to those of the three LG 2 – Nemiscau lines.

1.4.3 Grounding electrode

A grounding electrode is required to maintain the neutral terminal of the converter at ground potential.

The electrode will consist of a steel conductor placed on a coke bed at a depth of 3.5 meters in ground saturated with water and with minimal electrical resistance.

The actual site for the grounding electrode is still under study. The Cree Regional Authority shall be notified in writing of the actual site of the grounding electrode and the alignment of the transmission line described in 1.4.4 when these are determined.

1.4.4 Transmission line from Radisson Substation to the grounding electrode

The grounding electrode and the Radisson Substation will be linked by a 2-conductor transmission line on wood pole structures spaced an average of 100 meters occupying approximately 8 meters x 8 meters of land including guy wires.

RND Project

Agencement général – Poste Radisson et lignes – Territoire CBJNQ

See plan no. 28 Plate 9 Agencement général - Poste de Radisson (Complementary Documents)

Compl. A. no. 7, ss. 1 and 17

8.1.4.2 The inclusion of the LG 1 (1986), LG 2A, Brisay and RND Projects in the description of Le Complexe La Grande (1975) shall not apply to paragraphs 8.9.1 to 8.9.4 and to subsections 8.10 and 8.17 of the James Bay and Northern Québec Agreement.

Compl. A. no. 7, ss. 2 and 17

8.1.4.3 Le Complexe La Grande (1975), as described in the JBNQA, shall include the following projects :

1.1 LA 1 Project

The LA 1 Project consists principally of a powerhouse, spillway and temporary diversion tunnel as well as two dams and eighty dykes for reservoir closure, and related works.

The powerhouse is located on the right bank of the Laforge River. It has six turbine/generator units with a total installed capacity of 852 MW. The design flow is 1,613 m³/s and the rated head is approximately 57,3 m. The powerhouse is fed by a channel heading to an intake control structure with six gated openings. Six penstocks link the intake with the scrollcases in the powerhouse. The tailrace channel is approximately 500 m long; its width varies from 135 m at the outlet of the powerhouse to some 100 m at the river. The transformer and switching substation is located on the roof of the powerhouse and has six bays, one for each generating unit.

The spillway is located on the right bank of the Laforge River upstream of the powerhouse at the west end of the main dam. It has two openings, each 11 m wide, and its discharge capacity with the reservoir at its maximum level of 439 m is 2,450 m³/s.

The Laforge 1 development also includes two dams, one on the Laforge River and the other on the Vincelotte River, and eighty dykes. These works allow the formation of the reservoir which includes a part of Lac des Oeufs; the reservoir at its maximum level has an area of approximately 1,288 km². The annual drawdown of the reservoir is limited to approximately 3 m. However, it is possible that once every ten years, on average, the drawdown reaches 8 m.

The main dam is approximately 985 m long and 66 m high. Its construction requires the placement of approximately 2,397,000 m³ of fill materials.

The dam closing the Vincelotte River has a maximum height of approximately 28 m and a length of approximately 1,178 m. Its construction requires the placement of 1,080,000 m³ of fill materials.

Eighty dykes are required to close the reservoir. They contain a total volume of approximately 4,225,000 m³ of fill materials and they have a total crest length of some 19,575 m.

List of the plates for the LA 1 Project:

Plate 1: Plan de situation

Plate 2: Agencement général de la centrale LA 1 et des ouvrages connexes

Plate 3: Agencement général du barrage LA 1 et des ouvrages connexes

Aménagement Laforge 1

Plan de situation

See plan no. 29 Plate 1 Plan de situation LA 1 (Complementary Documents)

Aménagement Laforge 1

Agencement général de la centrale LA-1 et des ouvrages connexes

See plan no. 30 Plate 2 Agencement de la centrale LA 1 (Complementary Documents)

CARTE Aménagement Laforge 1

Agencement général du barrage LA-1 et des ouvrages connexes

See plan no. 31 Plate 3 Agencement du barrage LA 1 (Complementary Documents)

1.2 LA 2 Project

The LA 2 Project consists principally of a combined powerhouse and intake, spillway, an earthcore-rockfill embankment abutting these structures at both ends, a closure dyke and related works.

The LA 2 powerhouse is built behind dyke KD-14, at the outlet of the existing Fontanges reservoir.

The “run-of-the-river” powerhouse is located at the lowest point of the valley, to the south of the Fontanges channel. It incorporates two turbine/generator units having a total installed capacity of 310 MW. The design flow is 1,200 m³/s and the rated head is approximately 26,9 m. The two intakes are served by a short intake channel and are integrated into the powerhouse. The 13,8 – 315-kV transformers are located on the draft tube deck and the substation is located on the roof of the powerhouse. Two three-phase 315-kV power lines link the substation to the switching station located some 100 m south of the powerhouse.

Each intake is 32 m wide and is divided into three passages provided with separate sets of guides for the trashracks, bulkhead gates and intake gates. The semi-spiral cases are of concrete. The tailrace is approximately 935 m long and its width varies from 64 m to 40 m at the draft tube outlets and reaches approximately 225 m at Lake Toqué. Between Lake Toqué and Lake Des Espoirs, the natural riverbed is deepened along the left bank in order to increase the head.

The spillway is located on the north side of the powerhouse and linked to it by a concrete gravity dam of approximately 20 m in length. It has two bays, each approximately 11 m wide, and its discharge capacity is 2,300 m³/s when the reservoir is at a normal level of some 481 m. The spillway discharge is returned to the water body below the Fontanges channel.

To the south of the powerhouse and to the north of the spillway a rockfill embankment dam with a moraine core completes the impoundment. The main dam south of the powerhouse is approximately 644 m long and its maximum height is 22 m.

The north dam has a maximum height of 17 m and is some 321 m long. A concrete gravity wall which supports the moraine core permits the change of alignment between the north dam and the spillway.

The existing Fontanges channel, which is used for diversion during the entire construction period, is closed after breaching the dyke KD-14 by a homogeneous dyke built upstream from the existing control weir. This dyke is approximately 229 m long and has a maximum height of 8 m.

The total surface area of the existing Fontanges reservoir at its normal level of operation is approximately 240 km².

List of the plates for the LA 2 Project:

Plate 4: Plan de situation

Plate 5: Aménagement général des ouvrages

Plate 6 : Centrale et évacuateur – plan et coupes

Aménagement Laforge-2

Plan de situation

See plan no. 32 Plate 4 Plan de situation LA 2 (Complementary Documents)

Aménagement Laforge-2

Aménagement général des ouvrages

See plan no. 33 Plate 5 Aménagement des ouvrages LA 2 (Complementary Documents)

Aménagement Laforge-2

Centrale et évacuateur – plan et coupes

See plan no. 34 Plate 6 Centrale et évacuateur LA 2 (Complementary Documents)

1.3 2nd 315-kV transmission line Project between LG 2A and Radisson

The 2nd 315-kV transmission line between the Radisson substation and the LG 2A powerhouse will be approximately 16 km long and requires both guyed and self-supported (rigid) towers.

The minimum and maximum surface areas of the guyed towers (including guys) will respectively 23 m x 23 m and 32 m x 32 m. For the self-supported towers, the minimum and maximum areas occupied will be 11 m x 11 m and 24 m x 24 m.

The towers support six bundled conductors (two per bundle), supported by I-type string insulators which conductors will have a minimum ground clearance of 7,9 m, and one overhead ground wire. The overhead ground wire will include optical fibers.

The right-of-way will be 83 m wide. The total right-of-way will be 148 m wide for the two LG 2A – Radisson lines and will be entirely cleared.

Plate for the 2nd 315-kV transmission line Project between LG 2A and Radisson:

Plate 7 : Plan de situation

2^e ligne à 315 kV La Grande-2A – Radisson

Plan de situation

See plan no. 35 Plate 7 Plan de situation La Grande 2A - Radisson (Complementary Documents)

1.4 3rd 735-kV transmission line Project between Lemoyne and Tilly

The 3rd 735-kV transmission line between the Tilly substation, located near the La Grande 4 powerhouse, and the Lemoyne substation, located west of River De Pontois will be approximately 116 km long and requires both guyed and self-supported (rigid) towers.

The minimum and maximum surface areas of the guyed towers (including guys) will be respectively 30 m x 40 m and 38 m x 55 m. For the self-supported towers, the minimum and maximum areas occupied will be 18 m x 18 m and 24 m x 24 m.

The towers support three phases of four-wire bundles, supported by V and I-type suspension assemblies and two overhead ground wires, one of which will include optical fibers. The conductors will have a minimum ground clearance of 13,6 m.

The right-of-way will be 90 m wide and only partly cleared when the height of the tree cover permits.

In addition to the transmission line, the Project includes connections to the Lemoyne and Tilly substations.

The connection to the Lemoyne substation requires changes to the lines north of the substation and changes to the line connecting the Lemoyne substation to the Chissibi substation to the west. The enlargement required for the new outgoing line will occupy a surface area of 3,1 ha. A 20 m-wide strip circling the substation will be set aside for drainage and landscaping purposes.

The connection to the Tilly substation requires the rerouting of outgoing lines; no enlargement of the site is necessary.

Plate for the 3rd 735-kV transmission line Project between Lemoyne and Tilly:

Plate 8: Plan de situation

3^e ligne 735 kV Lemoyne-Tilly

Plan de situation

See plan no. 36 Plate 8 Transmission line Lemoyne et Tilly (Complementary Documents)

1.5 12th transmission line Project

The 12th 735-kV transmission line starts at the Chissibi substation, located near the La Grande 3 powerhouse and ends at the limit of the JBNQA Territory, a distance of approximately 560 km. The cables are supported by two types of towers: guyed and self-supported (rigid).

The normal width of the right-of-way is 90 m but this will be reduced to a width of 59 m or 76 m if the line runs parallel to an existing line.

The minimum and maximum surface areas of the guyed towers (including guys) will be respectively 30 m x 40 m and 38 m x 55 m. For the self-supported towers, the minimum and maximum areas occupied will be respectively 9 m x 9 m and 24 m x 24 m.

These towers support three phases of four-wire bundles, supported by V-type and I-type suspension assemblies and two overhead ground wires, one of which will include optical fibers. The minimum ground clearance of the conductors is 12,6 m.

In addition to the transmission line, the Project includes connection to the Chissibi, Albanel and Chibougamau substations, requiring additional structures and related equipment required for the operation of the network.

List of the plates for the 12th transmission line Project:

Plate 9: Plan de situation – partie nord

Plate 9A : Plan de situation – partie sud

12^e ligne 735 kV

Plan de situation – partie nord

See plan no. 37 Plate 9 Plan de situation – partie nord (Complementary Documents)

12^e ligne 735 kV

Plan de situation – partie sud

See plan no. 38 Plate 9A Plan de situation – partie sud (Complementary Documents)

1.6 Series capacitors Project

The Project consists of the installation of capacitors to block direct current in the middle of the three lines between Radisson and Némiscau and in the middle of the line linking La Grande 2 to Chissibi.

These installations, modest in size, are located within the right-of-way and under their respective line, as close as possible to an existing road.

The location of the sites is shown on Plate 10:

Site 1, which serves two of the Radisson – Némiscau lines, includes two installations (Opinaca 2 and Opinaca 3) of series capacitors and is located near the Matagami – La Grande 2 road, approximately 200 km from the La Grande 2 powerhouse near the Eastmain River; its access route is 105 m long;

Site 2, which serves one of the Radisson – Némiscau lines includes one installation (Opinaca 1) of series capacitors and is located near the same Matagami – La Grande 2 road, approximately 185 km from the La Grande 2 powerhouse near little Opinaca Lake; its access route is 80 m long;

Site 3, which serves the La Grande 2 – Chissibi line includes one installation (Sakami) of series capacitors and is located near the road linking La Grande 2 to La Grande 3, approximately 105 km from the La Grande 2 powerhouse; its access route is 120 m long.

The overall dimensions of each of the three sites are about 19 m x 47 m.

Plate for the Series capacitors Project:

Plate 10: plan de situation

Condensateurs séries

Plan de situation

See plan no. 39 Plate 10 Plan de situation (Complementary Documents)

1.7 Series compensation Project for the north-west network; Abitibi, Albanel, Chibougamau and Némiscau substations:

Abitibi substation

Expansion of Abitibi substation

Series compensators will be installed on each of the three lines connecting the Némiscau substation to the Abitibi substation, located approximately 38 km west of the municipality of Chapais.

The enlargement of the site for the installation of the series compensators is located in the northern part of the substation and requires a surface area of approximately 11.6 ha.

Technical description

A three-phase set of series compensators will be installed along each of the three above-mentioned 735-kV lines. For each of the three phases, the following components will be installed on a platform supported by insulating towers:

capacitors;

varistors (non-linear resistance);

damping circuit including dry-type series reactor and resistor;

spark gap;

current and voltage transformers.

The three platforms of each of the lines will be fenced in, built about 8 m from the ground and insulated at 735 kV.

In addition, the installation as planned will include the following equipment:

bypass circuit breakers;

disconnect switches;

busbars mounted on post insulators;

control building;

monopode towers.

Furthermore, one set of shunt reactors will be installed at the starting point of the line connecting the Abitibi and La Vérendrye substations. The installation of a three-phase set of shunt reactors at 735 kV requires the following items:

shunt reactors;

air circuit breaker;

disconnect and grounding switches;

current transformers;
lightning arresters;
steel structures and supports;
fire walls when required;
oil retention basins and oil recovery well;
control and protection equipment.

Albanel substation

Expansion of Albanel substation

Series compensators will be installed on each of the two lines connecting the Lemoyne substation to the Albanel substation located approximately 40 km east of the village of Nemaska. The passage of the 12th transmission line at the Albanel substation requires the installation of a third set of series compensators.

The enlargement of the northern part of the substation by 8.05 ha for series compensation equipment and of the southern part of the substation over 1.18 ha for the reactors is required. Overall, the extension requires a surface area of 9,23 ha.

Technical description

A three-phase set of series compensators will be installed along each of the three above-mentioned 735-kV lines. For each of the three phases, the components required are those described above for the Abitibi substation.

Furthermore, four sets of shunt reactors will be installed at the starting point of the lines connecting the Albanel substation to the Chissibi, Chibougamau and Lemoyne substations. Two of these sets are related to the 12th transmission line.

Chibougamau substation

Expansion of Chibougamau substation

Series compensators will be installed on each of the two lines connecting Albanel substation to Chibougamau substation located approximately 28 km south-west of the municipality of Chibougamau. The passage of the 12th transmission line at the Chibougamau substation requires the installation of a third set of series compensators.

North of the substation, the alignment of the access road will be modified over an area of 0.10 ha, corresponding to a length of 90 m. The site enlargement required for these new installations will cover 8.56 ha for series compensation, 0.28 ha for the inductors on the west side of the substation, and 0.38 ha for the set of shunt reactors located south of the substation. A total of 9.32 ha is required.

Technical description

A three-phase set of series compensators will be installed on each of the three above-mentioned 735-kV lines. For each of the three phases, the components required are those described above for the Abitibi substation.

Furthermore, two sets of shunt reactors will be installed at the starting point of the 12th transmission line connecting the Albanel and Chibougamau substations on the one hand and the Chibougamau and Chamouchouane substations on the other hand.

Némiscau substation

Expansion of Némiscau substation

Series compensators will be installed on each of the three 735-kV lines connecting the Radisson substation, located approximately 15 km south of the La Grande 2 powerhouse, to the Némiscau substation, located approximately 11 km east of the village of Nemaska.

The installation of series compensators requires the enlargement of the northern part of the substation and involves a surface area of approximately 8.6 ha.

Technical description

A three-phase set of series compensators will be installed on each of the three above-mentioned 735-kV lines. For each of the three phases, the components required are those described above for the Abitibi substation.

Compl. A. no. 11, ss. 1 and 6

8.2 Specific provisions related to the diversion of the Eastmain and Opinaca Rivers

8.2.1 Flow maintenance in the diverted rivers

In view of the findings of the study group established to assess the benefits of partial flow maintenance in the Eastmain and Opinaca Rivers and its recommendation that such flow maintenance is not warranted in relation to the potential benefits, the flow of the Eastmain and Opinaca Rivers at the points of diversion shall not be maintained after the said rivers have been diverted.

In view of the foregoing, La Société d'énergie de la Baie James agrees to pay, in the manner set forth hereinafter, a total amount of thirteen million dollars (\$13,000,000.00) which shall be applied to the remedial works and programs contemplated by Sub Section 8.9 herein, and this amount shall be part of the financing for La Grande Complex Remedial Works Corporation created in the Sub Section 8.9.

JBNQA, par. 8.2.1
A. corr.

8.2.2 Water levels in Sakami Lake

La Société d'énergie de la Baie James undertakes to take all steps necessary to maintain the minimum level of Sakami Lake at or above Elevation five hundred and ninety-six feet (596') above MSL.

The diverted flow from the Eastmain, Opinaca and Rupert rivers through the La Sarcelle Powerhouse and the La Sarcelle Control Structure at the Opinaca Reservoir outlet shall not exceed two thousand seven hundred and seventy cubic meters per second (2,770 m³/s).

However, the La Sarcelle control structure and the La Sarcelle powerhouse have a combined discharge capacity of three thousand three hundred and sixty two cubic meters per second (3,362 m³/s) and the flow rate through both structures may from time to time exceed 2,770 m³/s in cases of emergency, to ensure public safety or to reduce the frequency of use of the Eastmain River control structure.

Remedial works shall be carried out along the course of the diverted water between the Opinaca Reservoir and the forebay of the LG 2 powerhouse for the purpose of minimizing the negative impacts of the diversion on the fauna of the area.

In the Lake Boyd area, the said remedial works are presently being carried out pursuant to agreement between la Société d'énergie de la Baie James and the interested native people and the Cree native party acknowledges that it is satisfied with such works.

In the area of Lake Sakami, the said remedial works shall include, at the outlet, works to increase the flow capacity for the purpose of ensuring that the maximum water level of the lake shall not normally exceed six hundred and thirteen feet (613') above MSL at the outlet.

For the purpose of this paragraph, the minimum and maximum water levels mentioned herein shall be measured at the point longitude 76° 40 '46" west and latitude 53° 28' 02" north.

JBNQA, par. 8.2.2
Compl. A. no. 5, s. 2
Compl. A. no. 21

8.2.3 Water levels in the Opinaca reservoir

Notwithstanding Schedule 1 of this Section the lower and upper limits of the water levels in the Opinaca reservoir shall be Elevation 695.0 feet and 710.0 feet respectively above MSL. La Société d'énergie de la Baie James may use any operating levels within this range provided that the design of the reservoir allows for 125 billion cubic feet live storage.

During spring run-off each year, the control structure from the Opinaca reservoir to Lake Boyd shall be operated in a maximum open position, provided that the water levels for Sakami Lake specified in paragraph 8.2.2 above are not exceeded and provided that the storage capacity of the LG 2 reservoir permits.

Furthermore, should the estimated spring run-off for any one year indicate that spilling through the spillways into the Eastmain and/or Opinaca Rivers may be required, La Société d'énergie de la Baie James undertakes to distribute the spills over the longest practical period to minimize the peak discharges.

Whenever such spills have taken place, La Société d'énergie de la Baie James shall furnish to the Grand Council of the Crees (of Québec) details of such spills and daily discharge records.

8.2.4 Permanent non-native community for the diversion of the Eastmain and Opinaca Rivers

La Société d'énergie de la Baie James undertakes that no permanent non-Native community, town or settlement shall be built in connection with the construction, operation and maintenance of the diversion of the Eastmain and Opinaca Rivers.

8.3 Clearing of reservoirs and forebays

8.3.1 Objectives

Except where expressly provided otherwise elsewhere in this Sub Section 8.3, the clearing of forebays and reservoirs created for Le Complexe La Grande (1975) shall be carried out taking into consideration the clearing objectives in the document attached hereto as Schedule 2 of the present Section entitled "Clearing objectives and specifications of Le Complexe La Grande (1975)".

JBNQA, par. 8.3.1
A. corr.

8.3.2 "LG 1, Revision 1" or "LG 1", as the case may be, forebay

The "LG 1, Revision 1" or "LG 1", as the case may be, forebay shall be cleared entirely from the maximum water level of the forebay to a level such that there is a clearance of 10 feet between the minimum water level of the forebay and the top of remaining trees and brush therein. All floating debris in said forebay shall be removed from time to time by La Société d'énergie de la Baie James at its expense.

JBNQA, par. 8.3.2
Compl. A. no. 4, s. 8

8.3.3 Opinaca reservoir

The Opinaca reservoir shall be cleared in part to the extent indicated on the plan attached hereto as Schedule 3 of the present Section. Such plan may be modified by mutual agreement between La Société d'énergie de la Baie James and the Grand Council of the Crees (of Québec).

8.3.4 LG 2, LG 3, LG 4 forebays and Caniapiscou reservoir

Selective clearing in LG 2, LG 3 and LG 4 forebays and Caniapiscou reservoir shall be carried out and the extent of such clearing shall take into consideration the objectives for clearing of reservoirs and forebays for Le Complexe La Grande (1975) provided for in Schedule 2 of this Section.

In addition, the need for migration corridors for caribou shall be considered and clearing, if required, shall be carried out for such corridors in the drawdown areas.

The plans for clearing of said forebays and reservoirs shall be submitted to the Environmental Expert Committee of La Société d'énergie de la Baie James for review and recommendation.

It is understood that the Cree representative on the said Committee shall have the right to submit specific briefs to the Committee regarding Cree needs for cleared areas, debris control and other similar matters to facilitate their hunting, fishing and trapping activities.

8.3.5 EM 1 and LA 1 Powerhouses

Should the EM 1 and/or the LA 1 powerhouses and dams be constructed, the clearing shall be carried out in accordance with the provisions of paragraph 8.3.4 above.

8.3.6 Extent of clearing

It is acknowledged that La Société d'énergie de la Baie James shall have the final decision as to the extent of the said selective clearing in the forebays and reservoirs mentioned in paragraphs 8.3.4 and 8.3.5 hereinabove.

8.3.7 Cost of clearing

All clearings contemplated by the present Sub Section shall be paid entirely by La Société d'énergie de la Baie James.

8.4 Control of water level fluctuations in forebays and reservoirs

La Société d'énergie de la Baie James and/or Hydro-Québec undertakes to control the seasonal variation of levels in the forebays and reservoirs of Le Complexe La Grande (1975) with maximum consideration for environmental objectives within the technical-economic limitations for operating the hydroelectric installations.

JBNQA, subs. 8.4
A. corr.

8.5 (Cancelled).

8.5.1 (Cancelled).

JBNQA, par. 8.5.1
Compl. A. no. 4, s. 3

8.5.2 *(Cancelled)*.

JBNQA, par. 8.5.2
Compl. A. no. 4, s. 3

JBNQA, subs. 8.5
Compl. A. no. 4, s. 3

8.6 Fort George special undertakings**8.6.1 Preamble**

La Société d'énergie de la Baie James agrees to carry out the following special undertakings for the Crees and other residents of Fort George in consideration of the social impacts which may be caused to the Native people by the development of Le Complexe La Grande (1975).

JBNQA, par. 8.6.1
Compl. A. no. 4, s. 4

8.6.2 *(Cancelled)*.

JBNQA, par. 8.6.2
Compl. A. no. 4, s. 3

8.6.3 *(Cancelled)*.

JBNQA, par. 8.6.3
Compl. A. no. 4, s. 3

8.6.4 *(Cancelled)*.

JBNQA, par. 8.6.4
Compl. A. no. 4, s. 3

8.6.5 *(Cancelled)*.

JBNQA, par. 8.6.5
Compl. A. no. 4, s. 3

8.6.6 *(Cancelled)*.

JBNQA, par. 8.6.6
Compl. A. no. 4, s. 3

8.6.7 *(Cancelled)*.

JBNQA, par. 8.6.7
Compl. A. no. 4, s. 3

8.6.8 Supply of electricity to Fort George

La Société d'énergie de la Baie James, la Commission hydroélectrique de Québec (Hydro-Québec), the Grand Council of the Crees (of Québec) and the Fort George Cree Band have agreed in a separate agreement upon the modalities of the supply of electrical power to the Fort George community.

Nothing herein shall affect the rights or obligations of the parties to the Protocole d'Entente presently in force between Canada, Québec and Hydro-Québec concerning the supply of electric power in isolated northern Québec communities executed by the parties on March 1, 1974, January 29, 1974 and December 21, 1973 respectively.

JBNQA, par. 8.6.8
Compl. A. no. 4, s. 5

8.6.9 Temporary water supply for Fort George

La Société d'énergie de la Baie James shall provide Fort George village with a temporary water supply during the initial filling of the LG 2 reservoir of Le Complexe La Grande (1975).

JBNQA, par. 8.6.9
Compl. A. no. 4, s. 6

8.7 (Repealed).

8.7.1 (Repealed).

JBNQA, par. 8.7.1
Compl. A. no. 4, s. 7
Compl. A. no. 13, s. 4

8.7.2 (Repealed).

JBNQA, par. 8.7.2
Compl. A. no. 4, s. 7
Compl. A. no. 13, s. 4

8.7.3 (Repealed).

JBNQA, par. 8.7.3
Compl. A. no. 4, s. 7
Compl. A. no. 13, s. 4

8.7.4 (Repealed).

JBNQA, par. 8.7.4
Compl. A. no. 4, s. 7
Compl. A. no. 13, s. 4

8.7.5 (Repealed).

JBNQA, par. 8.7.5
Compl. A. no. 4, s. 7
Compl. A. no. 13, s. 4

JBNQA, subs. 8.7
Compl. A. no. 4, s. 7
Compl. A. no. 13, s. 4

8.8 Other undertakings

8.8.1 Road network within Le Complexe La Grande (1975)

The roads built by La Société d'énergie de la Baie James and/or La Société de développement de la Baie James for Le Complexe La Grande (1975) in the territory may be used by the Crees, except for roads within work camps and construction sites, as soon as such roads have been completed and are safe, subject to the observance of regulations applicable from time to time.

The Crees may also use the service stations along these roads in the same manner as all other road users.

8.8.2 Supply of electricity to isolated northern communities

The parties hereto agree to accelerate the execution of the Protocole d'Entente referred to in paragraph 8.6.8 providing for the supply of electricity to isolated Québec northern communities.

8.9 Remedial works and other ameliorating undertakings

8.9.1 Preamble

It is acknowledged that some of the potential impacts and many of the remedial measures related to Le Complexe La Grande (1975) cannot be determined at this time and that remedial measures shall need to be studied, planned and executed during the construction and operation period of Le Complexe La Grande (1975).

Consequently, the parties agree that a continuing relationship between the Crees and La Société d'énergie de la Baie James is necessary to further assess the impacts from the project on the Cree way of life and to carry out alleviating measures.

Such continuing relationship between the Crees and La Société d'énergie de la Baie James shall be established through the formation of a corporation under the English name of La Grande Complex Remedial Works Corporation and under the French name of La Société des Travaux de Correction du Complexe La Grande, hereinafter referred to as SOTRAC.

SOTRAC will be financed by La Société d'énergie de la Baie James, as provided for and within the limitations stipulated in paragraph 8.9.4 hereafter.

8.9.2 SOTRAC

SOTRAC shall be established as a non-profit Québec company under Part III of the Québec Companies Act or under other Québec legislation.

La Société d'énergie de la Baie James and the Grand Council of the Crees (of Québec) shall take the necessary measures to effect such incorporation forthwith upon the execution of the Agreement.

There shall be two classes of membership, one class of which shall be voting and the other non-voting. There shall be equal representation of La Société d'énergie de la Baie James and the Grand Council of the Crees (of Québec) in the voting membership of the Corporation. Both La Société d'énergie de la Baie James and the Grand Council of the Crees (of Québec) may replace the members representing them from time to time at their discretion.

The board of directors shall consist of five (5) members, one of whom shall be non-voting ("honorary"). Two (2) of the voting directors shall be appointed by or with the consent of the Grand Council of the Crees (of Québec), and the two (2) others by or with the consent of La Société d'énergie de la Baie James. The non-voting member of the board shall be appointed by or with the consent of the Grand Council of the Crees (of Québec) subject to the concurrence of La Société d'énergie de la Baie James in regard to such appointment.

To be valid, any resolution by the board of directors must have the assent of the majority of the voting directors present including at least one voting member of the Grand Council of the Crees (of Québec) and one voting member of La Société d'énergie de la Baie James.

In the case of an equal vote in respect to a proposed resolution, the matter forming the object of the proposal may be submitted to binding arbitration by any director present when such resolution was voted on as provided in Sub Section 8.16.

The application for incorporation and proposed by-laws shall be such as to give effect to the intent of the provisions of the present Sub Section.

The object of SOTRAC shall be to plan, evaluate, authorize, execute and operate, by itself or by others, remedial works and programs provided for within the scope and limitations defined hereafter.

The purpose of such remedial works and programs shall be primarily to alleviate negative impacts of Le Complexe La Grande (1975) on hunting, fishing and trapping of the Crees and on activities related to such hunting, fishing and trapping, and secondarily to provide for enhancement works carried out to offset such negative impacts.

Without restricting the generality of the foregoing, SOTRAC shall have the sole responsibility for:

- a) All works related to the planning and execution of the capture, harvesting and/or re-location of animals prior to, during and after the filling of the reservoirs and forebays within Le Complexe La Grande (1975). In works related to the Caniapiscou reservoir, some Inuit will be employed, if available.
- b) All works related to the planning and execution of the re-organization of the Cree traplines as consequence of Le Complexe La Grande (1975).
- c) All works related to the planning and execution of general remedial works benefiting the Crees downstream of "LG 1, Revision 1" or "LG 1", as the case may be, and downstream of the points of diversion of the Eastmain and Opinaca Rivers.

However, the undertakings of La Société d'énergie de la Baie James under Sub Sections 8.5, 8.6 and 8.7 of this Section shall not be the responsibility of SOTRAC.

- d) The administration and operation of SOTRAC including fees, salaries, travel expenses, office space, office supplies, and all other costs related to the administration and operation of SOTRAC.

The board of directors of SOTRAC shall be restricted to the mandate and responsibilities set forth in this Sub Section. For greater clarity, a list of permissible remedial works and programs which may be carried out by SOTRAC is attached hereto as Schedule 4 to form part hereof.

In general, the decisions shall be taken within the definition of permissible remedial works and programs and budgetary restraints. The Crees, through their representatives on SOTRAC, shall generally propose remedial works and programs to be undertaken. However, La Société d'énergie de la Baie James and other parties to the Agreement may also propose remedial works and programs for consideration by the board of directors of SOTRAC.

La Société d'énergie de la Baie James shall, through their representatives on SOTRAC, advise the Crees on compatibility of proposed programs with project undertakings and on scientific, technical and economic aspects of proposed programs.

La Société d'énergie de la Baie James representatives may oppose proposals before the board of directors of SOTRAC which they consider outside the defined permissible scope of remedial works and programs, proposals which are deemed incompatible with project plans and programs which do not comply with the rules and procedures for expenditure of public funds. The Grand Council of the Crees (of Québec) representatives may oppose programs which they deem incompatible with the interests of the Crees, or they consider outside the defined permissible scope of remedial works and programs. Such opposition shall not be exercised unduly and shall, if requested by either party, be subject to binding arbitration as provided in Sub Section 8.16.

All works carried out on behalf of SOTRAC shall be subject to applicable laws and regulations and shall be subject to the various regimes established by the Agreement.

SOTRAC operations shall be managed by a limited full-time staff reporting directly to the SOTRAC board of directors. The head office shall be located in Montreal and a branch office or branch offices shall be established to the extent required.

Remedial works and programs approved by SOTRAC may be carried out through third party contracts awarded, administrated and supervised by La Société d'énergie de la Baie James until December 31, 1982 and thereafter directly by SOTRAC.

The transactions and contracts shall be in French and English, except when otherwise authorized by the board of directors of SOTRAC. SOTRAC shall arrange and pay for translations authorized by the board of directors of SOTRAC from time to time. Responsibility for translations to and from Cree shall rest with the Grand Council of the Crees (of Québec), but shall be paid for by SOTRAC.

The Crees shall have a preferential status for employment arising from remedial works and programs carried out by or on behalf of SOTRAC. Further, SOTRAC shall as far as practical design contract packages for remedial works and programs so the Cree bands and/or Cree enterprises get a fair opportunity to tender on contracts for such works and programs. For the award of contracts by SOTRAC, the Cree bands and Cree enterprises shall enjoy a 10% price preferential. SOTRAC shall take all administrative steps to implement the foregoing.

JBNQA, par. 8.9.2
Compl. A. no. 4, s. 8

8.9.3 Modification of membership in SOTRAC

Until January 1st, 1986 and until all payments by La Société d'énergie de la Baie James provided for hereinafter for SOTRAC financing have been made, La Société d'énergie de la Baie James and the Grand Council of the Crees (of Québec) shall retain their representation in SOTRAC, unless otherwise mutually agreed to by both parties. Upon such agreement, one of the parties may withdraw. The consent of both parties to such withdrawal shall be given by a formal resolution of the board of directors of each of La Société d'énergie de la Baie James and the Grand Council of the Crees (of Québec) communicated to the other party and to SOTRAC.

After January 1st, 1986 and after all payments by La Société d'énergie de la Baie James provided for hereinafter for SOTRAC financing have been made, La Société d'énergie de la Baie James shall have the option to withdraw its participation and representation in SOTRAC, by resolution of the board of directors of La Société d'énergie de la Baie James communicated to the Grand Council of the Crees (of Québec) and to SOTRAC.

The parties agree to execute the necessary legal documents to give effect to the above.

The rights, interest and obligations of La Société d'énergie de la Baie James shall be transferred to Hydro-Québec in case La Société d'énergie de la Baie James should be dissolved before SOTRAC is dissolved.

In case the Grand Council of the Crees (of Québec) ceases to participate or ceases to represent the majority of the Cree people, the James Bay Cree shall designate a successor to the Grand Council of the Crees (of Québec) for the purposes herein.

In the case of withdrawal of participation by either party, but subject to the immediately preceding paragraph, the corporation whose representatives remain in SOCTRAC shall have the right to appoint all the members and the voting restrictions shall cease to apply.

8.9.4 Financing of SOTRAC

La Société d'énergie de la Baie James shall pay a total amount of thirty million dollars (\$30,000,000.00) in accordance with the terms and schedule hereafter set forth for the purposes to pay for all costs of the activities of SOTRAC authorized herein, except for the services furnished free of charge by La Société d'énergie de la Baie James stipulated in this sub-paragraph 8.9.4 b).

The said thirty million dollars (\$30,000,000.00) shall include the amount of thirteen million dollars (\$13,000,000.00) provided for in paragraph 8.2.1 of this Section.

a) Payment Schedule

During the main construction period defined for the purpose of this sub-paragraph as the period from the execution of the Agreement through December 31, 1982, La Société d'énergie de la Baie James shall pay for the account of SOTRAC for the cost of remedial works, programs and administration of SOTRAC, a total amount of nine million dollars (\$9,000,000.00) up to the following amounts during each of the calendar years scheduled:

1976	\$ 250,000.00
1977	500,000.00
1978	750,000.00
1979	1,000,000.00
1980	1,500,000.00
1981	2,500,000.00
1982	2,500,000.00

Any portion of said annual amounts not expended at the end of each calendar year shall be paid to SOTRAC. Such amounts may be used in whole or in part for Remedial Works and Programs in subsequent years and/or invested as hereinafter determined.

Commencing January 1st, 1983, SOTRAC shall become self-financing and La Société d'énergie de la Baie James shall pay to SOTRAC the remaining twenty one million dollars (\$21,000,000.00) as follows:

January 1, 1983	\$ 2,000,000.00
January 1, 1984	2,000,000.00
January 1, 1985	2,000,000.00
January 1, 1986	15,000,000.00

The said amounts and any amounts not expended during the main construction period as provided hereinbefore shall be invested as determined from time to time by the SOTRAC board of directors and the earnings from such investment shall finance remedial works and programs and the administration of SOTRAC, provided that on resolution by the SOTRAC board of directors, some principal capital may be used if required for major remedial works.

b) Services by La Société d'énergie de la Baie James

During the main construction period La Société d'énergie de la Baie James shall without cost to SOTRAC prepare contract documents including drawings and specifications, when cost of such drawings and specifications is incurred through the permanent staff of La Société d'énergie de la Baie James, call for tenders, evaluate, award, administrate and supervise contracts for remedial works and programs authorized by SOTRAC. La Société d'énergie de la Baie James shall further during the main construction period furnish without cost to SOTRAC administrative services such as accounting, bookkeeping, payroll and related functions including up to 1000 square feet of office space according to La Société d'énergie de la Baie James standards as required for the SOTRAC Head Office permanent staff and Cree liaison workers.

From January 1, 1983 SOTRAC shall pay for all cost of administration, remedial works and programs except that La Société d'énergie de la Baie James shall absorb the cost of salaries and travel expenses of the members and directors of SOTRAC appointed by La Société d'énergie de la Baie James.

La Société d'énergie de la Baie James shall make available to SOTRAC free of charge scientific and technical information arising from ongoing environmental programs of La Société d'énergie de la Baie James which may be useful to the SOTRAC activities as long as La Société d'énergie de la Baie James participates in SOTRAC.

JBNQA, par. 8.9.4
A. corr.

8.9.5 Upon the incorporation of James Bay Eeyou Corporation by legislation of l'Assemblée nationale du Québec or within one year of the execution of Complementary Agreement No 7, whichever is the earlier, all the rights, assets, powers, obligations and liabilities of SOTRAC shall vest in the James Bay Eeyou Corporation.

Compl. A. no. 7, s. 4

8.9.6 The James Bay Eeyou Corporation shall be incorporated in order to become the successor to SOTRAC as of the date mentioned in said paragraph 8.9.5, in order to study, plan, design and carry out mitigating measures and control and administer the Mitigating Works (SOTRAC 1986) Fund, consisting of the balance of funds remaining to the credit of SOTRAC at the time mentioned in said paragraph 8.9.5 as well as an additional amount of FIFTEEN MILLION DOLLARS (\$15,000,000) payable over a period of twenty (20) years, the Cree Community Fund in the amount of FIFTY MILLION DOLLARS (\$50,000,000), payable through FIFTEEN MILLION DOLLARS (\$15,000,000) in cash and THIRTY-FIVE MILLION DOLLARS (\$35,000,000) payable over a period of ten (10) years and the Cree Economic Assistance Fund in the amount of FORTY-FIVE MILLION DOLLARS (\$45,000,000) payable over a period of twenty (20) years.

Compl. A. no. 7, ss. 5 and 17

8.9.7 The James Bay Eeyou Corporation shall also assume the functions of SOTRAC under the James Bay and Northern Québec Agreement and provide for a continuing forum to deal more efficiently with issues involving the James Bay Crees and Hydro-Québec and perform other functions which may be conferred upon it by the parties hereto.

Compl. A. no. 7, ss. 6 and 17

8.9.8 James Bay Eeyou Corporation shall be established as a non-profit corporation without share capital and without pecuniary gain to its members under the name, in English, James Bay Eeyou Corporation, in French, la Société Eeyou de la Baie James, and in Cree, Eeyou Companeé.

Compl. A. no. 7, ss. 7 and 17

8.9.9 Upon the execution of this Agreement, the Cree Regional Authority may, at its option, cause to be incorporated the James Bay Eeyou Corporation under the Québec Companies Act prior to its statutory incorporation by l'Assemblée nationale du Québec, if l'Assemblée nationale du Québec deems such statutory incorporation appropriate.

Compl. A. no. 7, ss. 8 and 17

8.9.10 Until such statutory incorporation, the James Bay Eeyou Corporation, as incorporated under the Québec Companies Act, shall be and continue to be the James Bay Eeyou Corporation contemplated by this Agreement.

Compl. A. no. 7, ss. 9 and 17

8.9.11 Moreover, as a provisional measure, until the incorporation of the James Eeyou Corporation under the Québec Companies Act, the Grand Council of the Crees (of Québec) shall act in the place and stead of the James Bay Eeyou Corporation.

Compl. A. no. 7, ss. 10 and 17

8.9.12 The members of the James Bay Eeyou Corporation shall be the Cree Regional Authority and Hydro-Québec.

Compl. A. no. 7, ss. 11 and 17

8.9.13 The affairs of the James Bay Eeyou Corporation shall be managed by a Board of Directors constituted as follows:

8.9.13.1 The members of the Council of the Cree Regional Authority shall, by virtue of their office, be members on the Board of Directors of the James Bay Eeyou Corporation and until representatives of the Oujé-Bougoumou Crees are members of the Council of the Cree Regional Authority, the Oujé-Bougoumou Crees shall appoint two (2) members of the Board of Directors.

8.9.13.2 Hydro-Québec shall appoint four (4) members of the Board of Directors, who shall hold office for such terms as Hydro-Québec may designate, and shall pay for their expenses.

8.9.13.3 With the consent of the Cree Regional Authority, le Gouvernement du Québec may appoint a maximum of three (3) additional members and the Government of Canada one (1) additional member to the Board of Directors.

Compl. A. no. 7, ss. 12 and 17

8.9.14 The James Bay Eeyou Corporation shall have the following objects:

8.9.14.1 To carry out the functions vested in it by this Agreement for the social and civic improvement of the Cree communities.

8.9.14.2 To promote the general welfare of the James Bay Crees, to improve the conditions in the Cree communities and to provide training, employment and economic opportunities for the James Bay Crees.

8.9.14.3 To carry out mitigating measures respecting the “Le Complexe La Grande (1975)”.

8.9.14.4 To assume all of the rights, assets, interests, obligations and liabilities of SOTRAC in accordance with said paragraph 8.9.5.

8.9.14.5 To assist the Cree Bands in preserving the traditional way of life of the James Bay Crees based on hunting, fishing and trapping and to assist in promoting the culture, values and traditions of the James Bay Crees.

8.9.14.6 To provide for the framework for an improved relationship between the Crees and Hydro-Québec.

8.9.14.7 Subject to amendments to the James Bay and Northern Québec Agreement and the legislation pertaining to SODAB, to own the majority of shares in the James Bay Native Development Corporation and to own the latter as a subsidiary of James Bay Eeyou Corporation.

Compl. A. no. 7, ss. 13 and 17

8.9.15 The powers and duties of the James Bay Eeyou Corporation shall include:

8.9.15.1 The control, administration, management and disposition of the Mitigating Works (SOTRAC 1986) Fund, the Cree Community Fund and the Cree Economic Assistance Fund mentioned above.

8.9.15.2 To study, plan, design, carry out and administer mitigating measures and to cooperate with Hydro-Québec in respect to the carrying out of mitigating undertakings of Hydro-Québec in respect to Le Complexe La Grande (1975).

8.9.15.3 To cooperate with Hydro-Québec in respect to employment, training and contract undertakings of Hydro-Québec.

8.9.15.4 To carry out such other functions, powers and duties as may be conferred upon it by the parties to Complementary Agreement No 7.

Compl. A. no. 7, ss. 14 and 17

8.9.16 The head office of the James Bay Eeyou Corporation shall be situated on Cree Category IA lands in the Cree Community of Chisasibi.

Compl. A. no. 7, ss. 15 and 17

8.10 *(Removed).*

8.10.1 *(Removed).*

JBNQA, par. 8.10.1

A. corr.

Compl. A. no. 9, s. 2

8.10.2 *(Removed).*

CBJNQ, al. 8.10.2

A. corr.

Compl. A. no. 9, s. 2

8.10.3 *(Removed).*

JBNQA, par. 8.10.3

A. corr.

Compl. A. no. 9, s. 2

JBNQA, subs. 8.10

A. corr.

Compl. A. no. 9, s. 2

8.11 Representation on the environmental expert committee of La Société d'énergie de la Baie James

La Société d'énergie de la Baie James shall carry out and pay for its normal environmental program including impact assessments and remedial works to be studied, decided, planned, executed and supervised through its normal administrative procedure. The Crees and the Inuit shall have an opportunity for input into the hereinabove mentioned activities through representation on James Bay Energy Corporation Environmental Expert Committee, as provided for below.

8.11.1 The Environmental Expert Committee of La Société d'énergie de la Baie James

The Environmental Expert Committee of La Société d'énergie de la Baie James is organized to review from time to time environmental impact assessments of the various project features for the purpose of minimizing potential negative environmental impact of the project consistent with technical and economical objectives, and to maximize potential positive effects consistent with technical and economical objectives. The members of the said committee may vary at the discretion of La Société d'énergie de la Baie James.

Issues to be placed before the Environmental Expert Committee for review and recommendations shall be submitted to the members for review and analysis prior to the meetings.

Recommendations of the Environmental Expert Committee are submitted to La Société d'énergie de la Baie James Management Committee and, when appropriate, to the board of directors which makes the final decision as to the implementation of the recommendations.

8.11.2 Scope of activities

Under La Société d'énergie de la Baie James environmental program, environmental studies and considerations form an integral part of the decision making process. These studies and considerations deal with all features of the project, such as flow maintenance during construction, including LG 2, clearing of reservoirs, impact on fauna and ameliorating measures such as preparation of spawning grounds, location of access roads and others.

8.11.3 Cree representation on the Environmental Expert Committee

The James Bay Crees shall be entitled to have one regular representative on La Société d'énergie de la Baie James Environmental Expert Committee who may participate as a full-fledged member.

The Cree representative shall be designated by the Grand Council of the Crees (of Québec) subject to approval by La Société d'énergie de la Baie James. The appointment of such representative shall be for one-year periods.

8.11.4 Inuit representation on the Environmental Expert Committee

The Inuit shall be entitled to have one representative on the La Société d'énergie de la Baie James Environmental Expert Committee. This representative may participate as a full-fledged member, but may only intervene or submit briefs on matters which may affect the area north of the 55th parallel of latitude.

The Inuit representative shall be designated by the Northern Quebec Inuit Association, subject to the approval by La Société d'énergie de la Baie James. The appointment of such representative shall be for one-year periods.

8.11.5 Participation in the proceedings of the Environmental Expert Committee

The Cree and Inuit representatives on the Environmental Expert Committee shall be afforded similar rights and obligations as the regular members appointed by La Société d'énergie de la Baie James.

8.11.6 Remuneration

The representatives of the James Bay Crees and the Inuit of Québec shall receive remunerations corresponding to those paid to the other members of the Committee, taking into account qualifications and experience of said representatives.

8.12 Compensation procedure for damage to trappers' equipment and facilities by the construction of Le Complexe La Grande (1975)

La Société d'énergie de la Baie James and the Grand Council of the Crees (of Québec) shall enter into a contract forthwith after the execution of the Agreement establishing an appropriate procedure for settlement of any claim against La Société d'énergie de la Baie James for damage to trappers' equipment and facilities caused by the construction of Le Complexe La Grande (1975).

8.13 Procedures for identification and re-location upon request of burial sites

La Société d'énergie de la Baie James and the Grand Council of the Crees (of Québec) shall enter into a contract forthwith after the execution of the Agreement establishing an appropriate procedure for identification and re-location upon request of burial sites of native people in locations affected by the works of Le Complexe La Grande (1975) and affected by the flooding areas created by Le Complexe La Grande (1975).

8.14 Preferential provisions for project employment and contracts for the Crees

La Société d'énergie de la Baie James and Hydro-Québec undertake within their mandate and power to implement preferential arrangements to permit the Crees within their capabilities to obtain employment and competitive contracts on the Le Complexe La Grande (1975).

More specifically La Société d'énergie de la Baie James and Hydro-Québec undertake to:

8.14.1 Continue and improve procedures already in effect for employment during the construction of Le Complexe La Grande (1975) including transmission lines within the Territory.

8.14.2 Encourage within their mandate and power training and apprenticeship programs with particular emphasis on the need for the Crees to learn the higher skills within the construction industry such as electric installation, plumbing, carpentry, masonry and repair of equipment.

8.14.3 Study the implementation of a program to permit Crees to be educated and/or trained to meet the requirements for permanent employment in operation, maintenance and administration of Le Complexe La Grande (1975).

8.14.4 Develop contracting procedures and provisions which shall permit the Cree Bands or enterprises to tender for construction work and services which falls within their capabilities and expertise. Such contract procedures and provisions must be designed to give the Crees a fair opportunity to compete with other tenderers trying to obtain contracts for such construction work and services.

8.15 Fortuitous event

There shall be no liability under the present agreement for any party hereto in case of events beyond the control of such party and in case of fortuitous events, that is to say, any unforeseen event caused by superior force which it was impossible to resist. Without limiting the foregoing, fortuitous events shall include an act of public enemies, war, invasion, insurrection, riot, civil disturbance, labor strike and other similar events.

8.16 Arbitration

For the sole purpose of the application of Sub Section 8.9, La Société d'énergie de la Baie James and the Grand Council of the Crees (of Québec) hereby agree to submit any dispute pertaining to the application of said Sub Section 8.9 to binding arbitration in accordance with the laws of the Province of Québec and in a manner as hereinafter provided.

The arbitrators shall be three (3) persons chosen as follows, namely: La Société d'énergie de la Baie James shall nominate one arbitrator, the Grand Council of the Crees (of Québec) shall nominate one arbitrator and these two (2) nominated arbitrators shall agree upon a third. If the two (2) nominated arbitrators do not agree upon such third arbitrator within a period of thirty (30) days of the initial arbitration demand, then a Provincial Court judge shall be appointed by the Chief Justice of said Provincial Court by way of a motion by La Société d'énergie de la Baie James or the Grand Council of the Crees (of Québec) to said Chief Justice.

The arbitrators shall convene within thirty (30) days of the arbitration demand for the purpose of examining and determining the dispute that is submitted to them.

The award shall be rendered in writing within ten (10) days after the completion of the arbitration hearing and notice of said written award shall be forwarded to both La Société d'énergie de la Baie James and the Grand Council of the Crees (of Québec).

The award of arbitrators shall be final and binding upon La Société d'énergie de la Baie James and the Grand Council of the Crees (of Québec) but shall only be executed under the authority of a court having jurisdiction, and upon motion for homologation to execute it provided however that the said motion shall be made within one year from the date of the award.

8.17 Release

In consideration of and subject to the benefits and undertakings in favour of the Native people contemplated by this Agreement and except as otherwise provided for in this Agreement, the said Native people in respect to Le Complexe La Grande (1975) hereby release La Société d'énergie de la Baie James and/or Hydro-Québec and/or La Société de développement de la Baie James of all claims, damages, inconvenience and impacts of whatever nature related to the hunting, fishing and trapping of the Crees and of the Inuit and related activities and to their culture and traditional ways that may be caused by the construction, maintenance and operation of Le Complexe La Grande (1975).

JBNQA, subs. 8.17
Compl. A. no. 9, s. 3

8.18 Application of laws of Canada

Notwithstanding anything in this Section, the laws of Canada, from time to time in force, shall continue to apply to all development contemplated within the terms of this Section insofar as such laws are applicable to such development.

Canada acknowledges that the project and its components, as presently described in Schedule 1, are in substantial conformity with the requirements of applicable federal laws and regulations and consents to its construction in accordance with said description in so far as such consent is required.

8.19 Amendments

The provisions of paragraph 8.1.2 and sub-sections 8.2 to 8.17 as well as the provisions of paragraph 2.9.5 may be amended with the consent of La Société d'énergie de la Baie James, Hydro-Québec and the Grand Council of the Crees (of Québec) or its successor, until the coming into force of the legislation establishing the Cree Regional Authority and thereafter, the Cree Regional Authority or its successor, except if such amendment relates to the Caniapiscou Diversion, in which case the consent of the Northern Quebec Inuit Association or its successor until the coming into force of the legislation establishing La Société inuit de développement – The Inuit Development Corporation and thereafter, the said corporation or its successor will also be required.

Annex 1

Section 8 Technical aspects

Société d'énergie de la Baie James

Le Complexe La Grande (1975)

Technical description

October 20, 1975

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Introduction

Numerous studies have been conducted regarding a hydroelectric development plan for the northern area of the James Bay Territory. Among several alternatives subjected to close consideration, the final plan chosen jointly by members of the Québec Hydroelectric Commission and the Board of Directors of the Société d'énergie de la Baie James, in broad terms can be outlined as follows:

- the construction of four powerplants, LG 1, LG 2, LG 3 and LG 4 on the La Grande River;
- the diversion of a portion of the watershed of the Caniapiscou River at Lake Duplanter, into the watershed of the Laforge River, a tributary of the La Grande River, upstream of the LG 4 powerplant;
- the diversion of the Eastmain and Opinaca Rivers towards the La Grande River, upstream from the LG 2 powerplant.

The total installed capacity of these four powerplants is 10 190 MW. The regulated mean annual flow of the La Grande River at the LG 1 powerplant will be approximately 118 000 cfs.

See Plates 1, 2 and 3 for maps of the area. The main features of the La Grande Complex are listed in the following tabulation.

La Grande Complexe (1975)

Main Features

Site	Description	Reservoir Level (ft.)		Live Storage (bcf)	Number of Units	Installed Capacity (MW)	Energy (annual in billions of KWH)
		Max.	Min.				
LG-1	Powerplant	105	100	1.4	10	910	5.6
LG-2	Powerplant	575	550	690	16	5 328 (1)	35.8
LG-3	Powerplant	840	800	900	10	1 920 (1)	12.3
LG-4	Powerplant	1 235	1 200	250	8	2 032	14.1
Caniapiscou	Res. & Div.	1 760	1 717	1 400			
Opinaca	Res. & Div.	708	695	125			
Laforge	Diversion	1 590					
Frégate	Diversion	1 053					
Total				3 366	44	10 190 (2)	67.8

Note:

(1) Only the installed capacities of LG 2 and LG 3 are final.

(2) Studies are being conducted regarding construction of other powerplants such as LA 1 on the Laforge River and EM 1 on the Eastmain River

Caniapiscou Reservoir and Laforge diversion

The raising of the water level of the Caniapiscou Reservoir and the construction of the Laforge diversion works permit the diversion of the water from the upper basin of the Caniapiscou River into the Laforge River, a tributary of the La Grande, upstream of LG 4.

The general layout of the area is shown on Plate 8.

The maximum and minimum levels of the Caniapiscou reservoir are Elevations 1 760 ft and 1 717 ft respectively with a total live storage of 1 400 bcf. A system of 32 dikes and two (2) dams is required, entailing approximately 35 300 000 yd³ of fill as well as 4 200 000 yd³ of excavation. The main dikes at the closure point of the Caniapiscou River are of the rock-fill type with glacial till core; these dikes account for approximately 80% of the total volume of fill material required.

The spillway, located at the northern end of the reservoir in the western arm of the river, has a capacity of 130 000 cfs and consists of two (2) gates, 40 ft wide and 55 ft high. This spillway will return excess water to the Caniapiscou River.

The water of the Caniapiscou reservoir will be channelled towards the control structure at the western end of the reservoir, north of Lake Brisay. This control structure has 4 gates 40 ft wide by 63 ft high for a capacity of 40 000 cfs at minimum water level; channel excavation amounts to about 2 000 000 yd³.

A diversion tunnel 45 ft wide, 55 ft high and 800 ft long, with a capacity of 88 000 cfs is required to execute the closure of the river.

Beyond the control structure, the water from the Caniapiscou is channelled into the “Laforge” diversion, a series of twelve (12) dikes requiring a total of 10 000 000 yd³ of fill and channels requiring some 500 000 yd³ of excavation. From there, the water follows the natural course of the Laforge, a tributary of the La Grande, to the LG 4 forebay.

The Caniapiscou construction site can be reached via a 220-mile access road from LG 4; a branch access road leads to the Laforge diversion.

Opinaca reservoir

The diversion of water from the watershed of the Eastmain, Petite Opinaca and Opinaca Rivers into the watershed of the La Grande requires damming these rivers. A dam on the Eastmain River, which includes a spillway raises the water until it spills over and flows into the basin of the Petite Opinaca, then into the Opinaca watershed and finally, via Lake Sakami into the La Grande River (see Plate 9).

The maximum water level of the Opinaca reservoir is Elevation 708 ft and the minimum Elevation 695 ft with a total live storage of 125 bcf.

The main dam on the Eastmain River is rockfill with glacial till core and has a maximum height of 100 ft. The spillway will be the first structure to be built; it will be used for the temporary diversion of water during construction of the dam. This spillway will have capacity of 200 000 cfs at the maximum level of 708 ft is located on the left bank of the Eastmain River and has three (3) gates 40 ft wide by 65 ft high.

A second spillway is located on the Opinaca River and has two (2) gates of the same dimensions as those of the Eastmain spillway.

The control structure located upstream of Lake Boyd which is used to regulate the flow of the Eastmain and Opinaca Rivers has three gates 40 ft wide by 33 ft high, with a capacity of 70 000 cfs.

Access roads some 50 miles long link the structures on the river with the main Matagami-LG 2 highway.

Fregate diversion

The water from the upper Sakami River normally flows into the de Pontois river from Fregate Lake and joins the La Grande upstream of LG 3. During flood conditions, increased water levels of Lake Fregate cause a partial spilling into the lower Sakami which flows into the La Grande River below LG 3. To avoid this loss of water, a retaining dike will be built; the crest length will be about 800 ft, the maximum height 50 ft and the fill volume 64 000 yd³.

Access will be by a winter road from the road connecting LG 3 and LG 4 near the Lemoyne substation.

Forebays and powerhouses

The LG 1, LG 2, LG 3 and LG 4 powerhouses are located respectively at mile 44, 73, 148 and 288 inland from the mouth of the La Grande River.

LG 1

The general layout of the LG 1 site is shown on Plates 4 and 10.

The maximum and minimum headwater levels are Elevation 105 ft and 100 ft respectively; the tail-race level under free-flow conditions and mean annual regulated flow of 118 000 cfs is Elevation 28.0 ft for a gross maximum head of around 77 ft.

The powerhouse is located above ground on the south side of the river and consists of ten (10) units of 91 MW each, for a total installed capacity of 910 MW under a net head of around 72 ft. During winter conditions, the discharge through the powerplant will be approximately 152 000 cfs.

Plate 11 shows a cross section of the powerhouse.

The 13.8 -315 kV transformers are located on the lower service bridge above the draft tubes and are connected to a switching station on the roof of the powerplant. A double-circuit 315-kV line, 18 miles long, connects the LG 1 powerplant to the Radisson collecting substation located some 12 miles west of the LG 2 powerhouse.

The spillway on the north side of the river will be used for temporary diversion during construction of the powerhouse; the spillway has eight (8) gates – 65 ft high by 40 ft wide with a capacity of 540 000 cfs at maximum level.

A retaining dike, rockfill with a glacial till core of 65 000 yd³ connects the spillway to the right bank while a concrete wall connects the powerhouse to the left bank.

LG 2

The LG 2 underground station, the largest of the four (4) powerplants in the La Grande Complex and the first scheduled for service, is located on the La Grande River, 69 miles inland from James Bay. Plates 5 and 12 give the location and general layout of the site respectively.

The maximum operating level is Elevation 575 ft and the minimum level 550 ft giving a live storage of 690 bcf.

The main dam, at mile 73, is rockfill with glacial till core. The total crest length is some 10 000 ft and the design calls for approximately 33 500 000 yd³ of embankment including cofferdams. A system of 30 dykes is needed to complete the damming of the forebay, requiring a total volume of 29 500 000 yd³ of embankments.

Construction of the main dam requires two (2) diversion tunnels, 48 ft wide, 59 ft high with a total length of 2 600 ft having a discharge of approximately 265 000 cfs at a headwater level of 255 ft.

Via a natural valley on the south bank, the water is channelled towards the powerhouse intakes which are located some four (4) miles downstream from the site of the main dam. The sixteen (16) water intakes are equipped with trashracks and fixed wheel gates. The sloping section of the penstocks is concrete-lined while their horizontal section has a steel lining. Plate 13 depicts a longitudinal section of the LG 2 powerplant.

The installed capacity of LG 2 will be some 5 328 MW, consisting of 16 units of 333 MW each. The powerplant has a total length of 1 584 ft and a width of 76 ft. The machine hall divides the powerplant into two sections of 8 units each, with an access tunnel 33 ft wide and 30 ft high. An elevator provides access to the center of the powerplant.

The surge chamber, downstream of the powerplant, is 64 ft wide, 147 ft high and 1 479 ft long and allows for level fluctuations between elevations 66 and 187 ft. A shaft, 30 ft in diameter, provides aeration.

The four (4) tailrace tunnels are 45 ft wide, 65 ft high and about 3 900 ft long; they can be closed by means of emergency gates that can be lowered into concrete slots built upstream of each of the tailrace tunnels.

The spillway is at the northern end of the main dam and consists of eight fixed wheel gates, 40 ft wide by 67 ft high with a total capacity of 540 000 cfs at elevation 575 ft.

Isolated phase bus ducts in 11-ft diameter vertical bus shafts, connect the ac generators to the 13.8 – 735-kV transformers installed in the substation above ground. Four 735-kV lines connect LG 2 to the southern system of the province and to the other powerplants in the Complex.

LG 3

The LG 3 site is at mile 148 inland on the La Grande River; the powerplant itself is situated on the left bank, whereas the diversion tunnels and the spillway are on an island in the river. Maximum and minimum headwater levels are 840 and 800 ft respectively, giving a live storage of 900 bcf. See Plate 6 for an area map and Plate 14 for a map of the LG 3 site.

The access road, 79 miles long, is located south of the LG 2 forebay and starts at a point on the Matagami – LG 2 highway, near Lake Yasinski. The Sakami River is bridged at the mouth of Sakami Lake.

The construction of the main dam requires two unlined diversion tunnels, 45 ft wide, 55 ft high and 1 279 long.

The powerplant built above ground consists of ten Francis turbines with a capacity of 192 MW each. See Plate 15 for a longitudinal section.

The 13.8 – 735 kV transformers are located on the upstream side of the powerplant at roof level; from there, three (3) lines lead to the Chissibi collecting substation, 2 miles south-west of the powerplant.

The spillway on the island in the river will be equipped with five fixed wheel gates, 40 ft wide, 67 ft high; its capacity is about 340 000 cfs at a maximum level of 840 ft.

The main dam is rockfill with glacial till core. A system of 50 dikes is required on the north and south banks to complete the damming of water at an Elevation of 840 ft. The total crest length of the dikes and dam is some 80 200 ft; their height varies between 10 and 300 ft and the total volume of embankment is about 42 800 000 yd³.

LG 4

The underground powerplant is located on the north bank, at mile 288, and consists of eight units of 254 MW each, under a net head of 376 ft. The maximum and minimum headwater operating levels are Elevations 1 235 ft and 1 200 ft respectively, giving a live storage of 250 bcf.

Plates 7 and 16 show maps of the area and the general layout of the site.

The access road between LG 3 and LG 4 runs on the south side of the LG 3 forebay and is 143 miles long. A temporary bridge provides access to the north bank for building camps.

The main dam closes off the river channel, and a system of ten dikes closes off the secondary valleys. The dam and the forebay dikes require a total volume of 47 000 000 yd³ of embankments.

One temporary diversion tunnel is required and is located on the south bank. It is 45 ft wide, 60 ft high and has a total length of 1 300 ft.

The powerhouse intakes are the same type as those of LG 2; the sloping section of the penstocks are concrete lined and the horizontal section has steel lining. (See Plate 17 for a longitudinal section of the powerplant).

The powerplant is 905 ft long, 85 ft wide and 162 ft high. The erection bay is located at the southern end. An access tunnel to the northern end measures 38 ft in width and 31 ft in height.

Eight shafts connect the generators to the 13.8 – 315-kV transmission station above ground. Two double-circuit 315-kV transmission lines, each 2 miles long, connect this substation to a 315 – 735-kV step-up substation on the north bank, west of the powerplant.

The surge chamber has a maximum width of 62 ft, a height of 160 ft and a length of 835 ft.

The two unlined tailrace tunnels are 50 ft wide, 65 ft high and 3 150 ft long.

The spillway located at the southern extremity of the main dam discharges excess waters into a secondary valley which rejoins the river three miles downstream via a series of channels excavated in the rock; the spillway has four gates, 40 ft wide by 65 ft high with a capacity of approximately 257 000 cfs at maximum level.

735-Kv extra high voltage transmission line; step-up, collecting and switching substations

Hydro-Québec's engineers have sole responsibility for designing the extra high voltage transmission lines as well as the step-up, collecting and switching substations. From 1973 to 1975, initial studies for transmission line routes were made and the westerly corridors were selected.

Plate 3 shows a schematic layout of substations and transmission lines.

Three corridors consisting of a total of five 735-kV transmission lines link the powerplants of the La Grande Complex with Hydro-Québec systems; two of these corridors, with a total of three lines, start at the LG 2 powerplant; one of these three transmission lines crosses the Radisson substation, through which it interconnects with the LG 1 powerplant. The third corridor starts at the Lemoyne substation west of the de Pontois River.

A double-circuit 315-kV line connects the LG 1 powerplant with the Radisson substation; one 735-kV transmission line connects the LG 2 powerplant directly to the Chissibi substation, 2 miles southwest of LG 3; another 735-kV line connects this substation to the Lemoyne substation and finally, two 735-kV lines link the Lemoyne substation with LG 4.

The total length of transmission lines is some 3 000 miles.

Other powerplants

The engineers of La Société d'énergie de la Baie James are presently studying the possibility of further hydroelectric development projects on the rivers and tributaries of the La Grande Complex, such as the LA 1 powerplant on the Laforge River and EM 1 on the Eastmain River.

The location of those two powerplants is shown on Plate 3; a double circuit 315-kV line will be required between LA 1 and LG 4 powerplants, and between EM 1 and the Nemaska substation, in the area of Nemaska Lake; a sixth line, 735-kV in voltage, will be required and will roughly follow the eastern corridor from the Lemoyne substation.

Other sites, upstream of these two powerplants, are also under consideration.

See plan no. 40 Plate 1 Complexe La Grande General Area Map (Complementary Documents)

See plan no. 41 Plate 2 Complexe La Grande Map and Profiles (Complementary Documents)

See plan no. 42 Plate 3 Complexe La Grande Airports, Roads and Transmission Lines (Complementary Documents)

See plan no. 43 Plate 4 LG 1 Area Map (Complementary Documents)

See plan no. 44 Plate 5 LG 2 Area Map (Complementary Documents)

See plan no. 45 Plate 6 LG 3 Area Map (Complementary Documents)

See plan no. 46 Plate 7 LG 4 Area Map (Complementary Documents)

See plan no. 47 Plate 8 Caniapiscau Area Map (Complementary Documents)

See plan no. 48 Plate 9 Eastmain-Opinaca Area Map (Complementary Documents)

See plan no. 49 Plate 10 LG 1 Map of the Site (Complementary Documents)

See plan no. 50 Plate 11 LG 1 Powerplant -10 Units (Complementary Documents)

See plan no. 51 Plate 12 LG 2 Map of the Site (Complementary Documents)

See plan no. 52 Plate 13 LG 2 Powerplant -16 Units (Complementary Documents)

See plan no. 53 Plate 14 LG 3 Map of the Site (Complementary Documents)

See plan no. 54 Plate 15 LG 3 Powerplant -10 Units (Complementary Documents)

See plan no. 55 Plate 16 LG 4 Map of the Site (Complementary Documents)

See plan no. 56 Plate 17 LG 4 Powerplant -8 Units (Complementary Documents)

JBNQA, Sch. 1

A. corr.

Annex 2

Section 8 – Technical aspects

Clearing objectives and specifications of Le Complexe La Grande (1975)

1. Clearing to enhance reproduction of fish in forebays and reservoirs

Specific studies shall be made of each reservoir and forebay to determine suitable sites for selective clearing to enhance fish reproduction. In evaluating sites, these studies shall take into account

1. the ecology of fish concerned
2. the water level fluctuations
3. suitability of substrate
4. proximity of natural spawning sites
5. potential use of lake by native people
6. exposure of shorelines to winds and currents
7. experience from existing reservoirs and forebays.

2. The clearing of tributaries flowing into forebays and reservoirs to enhance fishing

The flooding of tributary streams may cause tree-kill along the banks and low lying ground. Dead trees falling into the water block stream passage which may prevent the up-stream movements of spawning fish such as walleye, sturgeon, brown trout and suckers. Consequently streams flowing into reservoirs and forebays with fish spawning potential and that are likely to experience problems from falling timber shall be considered priority areas for clearing. Areas selected to be cleared shall reflect:

- i) Potential use of these fish populations by Native people in subsistence; and

ii) The potential of the stream for fish spawning.

Clearing objectives shall be to obtain a 5 foot clearance below the minimum drawdown level in the reservoir, and the clearing shall extend to at least the maximum water level in the areas selected.

3. Clearing to facilitate harvesting of fish

Subsistence fishing may be developed by Native people, in forebays and reservoirs with significant fish populations. Fishing sites are often adjacent to areas where fish concentrate for spawning or migration purposes, near spawning reefs and at the mouths of in-flowing streams. Suitable potential fishing sites shall be selected and considered priority areas for clearing.

The clearance shall assure 10 vertical feet of clear water below the minimum water level of the reservoir during the fishing season. Near the cleared fishing zones, docking points shall be cleared.

4. The clearing of navigation corridors

The clearing of navigation corridors shall be considered to allow for the use of reservoirs as freighter canoe and snowmobile travel routes to inland traplines and hunting and fishing areas. In certain cases the clearing of in-flowing tributary rivers and streams used as navigation routes shall also be considered to permit access to these rivers by canoe.

The clearing required for navigation corridors shall vary according to the particular features of each reservoir. Nevertheless, the depths of clear water should be at least 10 vertical feet below the minimum water level experienced in the reservoir during the ice-free season (between the beginning of May and the end of November).

5. The clearing of docking points

The clearing of docking points should be related mainly to security of Native people, fishermen or tourists. These docking points shall be selected in view of providing Native people with access to bush camps and facilitate their use of forebays and reservoirs.

Landing areas shall be cleared to provide a clearance of 5 feet of water below the minimum water level experienced during the ice-free season. This water level is calculated from the minimum predicted level that would be experienced from the beginning of May to the end of November.

6. The clearing of access ramps

Access ramps to reservoirs shall be provided at points easily accessible by road to permit the launching of canoes. Their location shall be related to cleared navigation corridors, subsistence fishing sites and the road network so as to provide access to reservoirs and forebays at all water levels during the navigation season.

Access ramps should be cleared for a strip up to a maximum of 500 feet along the shore outwards to obtain a 10 vertical feet clearance below minimum water level experienced in the ice-free season and upwards to the maximum water level. Inside the cleared strip, consideration shall be given for the construction of an access road down to the minimum water level.

7. Clearing to permit access by sea planes

Sea plane landing areas in reservoirs may be useful to Native people going to their traplines and carrying out other bush activities if the natural lakes do not provide landing site. Sheltered bays not likely to fill with drifting timber and flotsam and that could be boomed off are most suitable as landing sites.

Selected areas shall be cleared to obtain a depth of 5 feet clearance below minimum water level during ice-free season.

JBNQA, Sch. 2
A. corr.

Annex 3

Section 8 – Technical aspects

See plan no. 57 Déboisement Réservoir Opinaca (Complementary Documents)

Annex 4

Section 8 – Technical aspects

Permissible remedial works and programs

Preamble

No remedial works and programs can be carried without authorization of plans, budgets and administrative procedures for such remedial works and programs by resolution of the board of directors of SOTRAC.

Permissible remedial works and programs as referred to in paragraph 8.9.2 SOTRAC of the Agreement may include but not be limited to the following.

1.0 Trapping out, re-location and/or harvest of animals from areas to be flooded by forebays and reservoirs.

In general, SOTRAC shall work closely with La Société d'énergie de la Baie James to plan and execute the undertaking to trap out, harvest and/or capture and re-locate animals from the areas to be flooded by the forebays and the reservoirs. This undertaking more specifically consists of the following steps:

1.1 Trapping out and/or harvesting of animals in the areas to be flooded prior to the filling of forebays and reservoirs.

1.2 Capture and re-location of fauna from areas to be flooded by the forebays and reservoirs to other areas prior to the filling of the forebays and reservoirs.

1.3 Rescue and re-location and/or harvesting of animals during the filling of forebays and reservoirs from areas being flooded.

2.0 Re-organization of the traplines

SOTRAC jointly with the Cree trappers and with the advice of the Hunting Fishing Trapping Coordinating Committee shall plan and implement the required re-organization of the Cree traplines required due to loss of trapping areas by flooding in forebays and reservoirs and other project installations. This work may include the following steps:

2.1 Arrange and pay for cost of inter and intra Cree community meetings of the trappers to re-draft trapline boundaries.

2.2 Arrange and pay for reconnaissance visits for the Cree trappers to proposed new trapping areas.

2.3 Provide technical and financial assistance to the trappers for planning and development of new hunting fishing trapping camps, lodges, caches, landing places, portages and other hunting fishing trapping support facilities as required for efficient use of the re-organized traplines.

2.4 Provide technical and financial assistance to transfer equipment and supplies from camps, lodges, caches no longer in suitable locations for the re-organized traplines to the new locations described in 2.3 above.

2.5 Provide technical and financial assistance to the Cree trappers for other programs and undertakings which may be required for efficient implementation of the re-organization of the traplines.

3.0 Transportation subsidies

The re-organized traplines may increase travel distances from the Cree communities. To off-set the economic impact of such extended travel SOTRAC may provide technical and financial assistance to the Cree trappers for such periods SOTRAC may determine as follows.

3.1 To off-set incremental increase of cost of present modes of travel to the re-organized traplines.

3.2 To study, plan and implement alternative modes of transportation to and from traplines more suitable for the conditions encountered on the re-organized traplines.

3.3 To study, plan and implement other transportation related programs which will off-set impacts from the project and facilitate more efficient use of the re-organized traplines.

4.0 Programs to increase the efficiency of subsistence harvesting.

Recognizing the possibility for using areas of marginal economic yield for the re-organized traplines to off-set the loss of prime areas due to flooding and other projects features SOTRAC shall study, plan, implement and finance programs which may increase the efficiency of the subsistence harvesting such as:

4.1 Aerial inventories of beaver lodges, caribou herds, moose and other animals.

4.2 Alternative methods for harvesting.

4.3 Improved communications and logistics support for the trappers in the bush.

4.4 Other related programs.

5.0 Programs for development of hunting, fishing, trapping related activities.

Recognizing the potential reduced yields from hunting, fishing and trapping due to impacts of Le Complexe La Grande (1975) SOTRAC shall study, plan, implement and furnish financial assistance to the development of Cree hunting, fishing, trapping related activities such as:

5.1 Study, evaluation, development and operation in fur animal farms.

5.2 Contributions to education and training of Crees in the knowledge and skills required to carry on the hunting-fishing-trapping related activities such as tanning, fur manufacturing, etc.

5.3 Studies for installation of food preservation facilities to enhance barter or trade opportunities within and between the Cree communities of fish, meat, game and other subsistence harvest foods; but normally no construction of such facilities.

5.4 Studies related to development of hunting and trapping on the Off-Shore Islands and fishing in the Bay.

6.0 Works to improve habitats and increase the productivity of the environment.

Recognizing the Cree desire to maintain subsistence harvesting potential at the highest level practical within the productive capacity of the area affected by Le Complexe La Grande (1975) and the objectives of conservation set forth in the Hunting Fishing Trapping Section of the Agreement SOTRAC may study, analyze and implement undertakings designed to increase the potential for subsistence harvesting such as:

6.1 Stream management programs to improve spawning areas, nursery areas and the general capacity of rivers for holding desirable fish populations

6.2 Stream flow modification programs on rivers that have been diverted or whose flow regimes are affected by the project.

6.3 Channel improvement and dredging operations on rivers, estuaries and shore-line areas of James Bay to facilitate navigation by Cree people engaged in subsistence activities and also to facilitate fish passage.

6.4 Works to improve existing or create new waterfowl feeding, staging and nesting habitat.

6.5 Works on reservoirs and lakes to improve habitats for furbearer animals and to reduce erosion problems.

6.6 Stream, lake and reservoir bank stabilization works to improve habitats for furbearer animals and to reduce erosion problems.

6.7 The improvement and management of shoreline habitat along rivers and reservoirs.

6.8 The creation of embayments, especially at the mouths of rivers entering reservoirs to create optimal fish spawning and nursery areas and to create optimal habitat for fur-bearer animals.

6.9 Physical works that could lead to improvement of the habitats of fish, wildfowl, fur-bearer animals and big game.

7.0 The establishment of artificial fish spawning facilities in rivers and streams such as the creation of spawning channels and spawning boxes to replace natural areas lost due to the construction and operation of Le Complexe La Grande (1975).

8.0 The establishment of fish hatcheries to provide stocks for the forebays and reservoirs and rivers, lakes in which recruitment to natural fish populations is interfered with Le Complexe La Grande (1975), and/or for stocking existing lakes and rivers to off-set productivity loss in the project affected areas.

9.0 Re-stocking or introduction of specific species of fur-bearers and mammals under careful monitoring systems.

10.0 Specific Works. The following are examples of types of special remedial works which may be considered by SOTRAC.

10.1 The construction of a control structure on the outlet of Menouow Lake to stabilize water levels there and permit the development of a new shoreline habitat.

10.2 Creation of control structures in other localized regions of the Opinaca reservoir to maintain water levels and thus create habitat.

10.3 Channel improvement of the Eastmain downstream of the diversion point, particularly in the region of Islands, i.e. channelization of the river to north or south side of Islands Rapid and other locations along the river.

10.4 Stream improvement and management on the Miskimatao River flowing into the Eastmain on the south bank just above Island Rapids.

10.5 Stream management and habitat improvement of the Cold Water River flowing into the Eastmain on the south bank below the First Rapids.

10.6 Habitat improvement and stream management on the Opinaca River.

10.7 Dredging and channel improvement in the Eastmain estuary to permit access to and from Eastmain village.

10.8 Mile 23 La Grande, creation of a fish pass to permit passage of whitefish and cisco up La Grande beyond Mile 23 and possibly into tributary rivers downstream of Mile 44.

10.9 The management of water levels in selected bays along the James Bay coast to optimize their suitability as wildfowl feeding and staging areas, i.e. Goose Bay, Paul Bay, etc...

10.10 Channelization between Wastikun Island and the mainland on James Bay. This high rocky promontory approximately 15 miles north of Fort George along the coast is a hazard to safe coastal navigation to goose

hunting areas and it might be possible to channelize the shallow passage about 200 ft. long between Wastikun Island and the mainland to permit safe passage of canoes under all weather conditions.

JBNQA, Sch. 4
A. corr.

Annex R1

LG 1, Revision 1, at mile 23 on La Grande River

List of Plates,

Plate D-1,

Plate D-2,

Plate D-3,

Plate D-4

LG 1, Revision 1, at mile 23 on La Grande River

LG 1, Revision 1, is the relocated LG 1 of Le Complexe La Grande (1975) from mile 44 to approximately mile 23 on La Grande River. The Complexe La Grande (1975) is defined in Schedule 1 to Section 8 of the James Bay and Northern Québec Agreement. The LG 1, Revision 1, is described hereafter and illustrated on Plates D-1 to D-4 hereof.

Main features:	Maximum reservoir elevation	105	ft
	Minimum reservoir elevation	100	ft
	Net head (approximate)	92.5	ft
	Live storage	4	bcf
	Number of units	10	
	Installed capacity	1140	MW
	Annual energy output	7.2	billion of kWh

Description

The power plant is located above ground on the south side of the river and consists of ten (10) units of 114 MW each, for a total installed capacity of 1140 MW under a net head of around 92.5 ft. During winter conditions, the discharge through the power plant will be approximately 152 000 cfs with a mean annual regulated flow of 118 000 cfs.

The 13.8 – 315 kV transformers are located on the lower service bridge above the draft tubes and are connected to a switching station on the roof of the power plant. A double-circuit 315 kV line, 38 miles long, connects the LG 1 power plant to the Radisson collecting substation located some 12 miles west of the LG 2 power plant.

The spillway on the north side of the river has eight (8) gates – 65 ft high by 40 ft wide with a capacity of 540 000 cfs at Elevation 105.

A diversion channel may be excavated on the north bank allowing the diversion of the river during the construction of the spillway and power plant. A concrete gravity dam is built in the channel to close the diversion.

Two retaining dikes are constructed: one on the north bank, of 8000 ft long with a maximum height of 50 ft, and one on the south bank, of 850 ft long with a maximum height of 100 ft.

List of plates

No	Date	Title
D-1	March 6, 1978	Complexe La Grande Plan et profil avec LG 1, Révision 1
D-2	March 6, 1978	LG 1, Révision 1 Plan de localisation
D-3	March 6, 1978	LG 1, Révision 1 Plan général de l'aménagement
D-4	March 6, 1978	LG 1, Révision 1 Centrale de 10 groupes de 114 MW Coupe de l'aménagement

Plan et profil avec LG 1, Révision 1

See plan no. 58 Plan et profil LG 1, Révision 1 (Complementary Documents)

Plan de localisation

See plan no. 59 Plan de localisation LG 1, Révision 1 (Complementary Documents)

Plan général de l'aménagement

See plan no. 60 Plan général LG 1, Révision 1 (Complementary Documents)

Centrale de 10 groupes de 114 MW – Coupe de l'aménagement

See plan no. 61 Centrale de 10 groupes LG 1, Révision 1 (Complementary Documents)

Compl. A. no. 4, (Sch. R1)

Compl. A. no. 21