# PEACE CASCADE DEVELOPMENT

# PREFEASIBILITY STUDY FOR A CASCADE OF LOW CONSEQUENCE STRUCTURES AS AN ALTERNATIVE TO SITE C

**Prepared by**

**KLOHN CRIPPEN CONSULTANTS LTD. AND SNC-LAVALIN INC.**

**For**

**B.C. Hydro**

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KLOHN CRIPPEN

SNC·LAVALIN

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BC Hydro Power Supply Engineering
Civil Department
6911 Southpoint Drive, 14th Floor
Burnaby, BC, V3N 4X8

Attention: Mr. Lach Russel, Project Manager

**Re: Peace Cascade Development Project**

Dear Mr. Russel:

We are pleased to submit 20 copies of this draft report for the conceptual design and cost estimate for the Peace Cascade Development project. This report supersedes our Interim Report dated 24 September 2002.

Please contact Garry Stevenson (604-251-8432) or if you have any questions regarding this report.

Yours truly,

Garry W. Stevenson, P.Eng.
Principal Geotechnical Engineer

GWS/*hb*

cc: G.D. Finlayson, SNC-Lavalin

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Submitted by:

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# EXECUTIVE SUMMARY

This report presents the conceptual design of a series of small hydroelectric developments in a cascade on the reach of the Peace River between Peace Canyon Dam and the proposed Site C Dam site.

Several aspects of the project were carried out in conjunction with BC Hydro. These included a study of the effect of the cascade on ice development and evaluation of socio-economic and environmental impacts.

The hydrology, geology and mapping of the above river reach were reviewed and appropriate sites were identified for six-, seven- and eight-dam developments. The reach was then inspected from Highway 29 and from a helicopter.

Seven sites were selected for further consideration in the cascade scheme. The rationale for selection of each site was documented in an interim report. The gross head developed at the selected sites varies from 5.4 m to 7.5 m.

An important objective of the study was to define facilities with a “Low” Consequence Category as defined by the Canadian Dam Association, so that the design flood and design earthquake would be relatively small and the cost of the overall development could be kept as low as possible. The study found that a cascade of seven dams and generating stations would satisfy this intent, with one proviso. Dam break analyses were carried out and it was found that failure of any one dam would not cause overtopping of the downstream dams in the cascade. Breach waves would attenuate substantially with distance downstream and no large impacts are anticipated downstream of the cascade in the event of a failure of one of the dams. No loss of life is expected, but confirmation is required to ensure that economic consequences of failure meet BC Hydro Criteria for Low Consequence Category dams.

A typical generating unit was selected for the cascade development and layouts were generated for a typical powerhouse, service bay, switchyard, spillway, navigation lock, fish way and transition block. These standard components were laid out to suit the topography, hydraulics and diversion requirements of each site. Power transmission was examined, including development of preliminary switchyard layouts and transmission line routing.

Power studies were carried out to examine the potential for energy generation from the cascade development. These included studies based on monthly average flows, as well as studies of the effect of daily and diurnal flow variations (using hourly flows). The effect of synchronizing cascade generation with Peace Canyon generation was also considered. These studies showed that the cascade scheme would develop an annual average energy in the order of 4,035 GWh (or about 86% of the 4,710 GWh anticipated from Site C).

Cost estimates were prepared for each site of the cascade. It was found that the total cost of developing the cascade would be in the order of $ 3.58 billion (or about 180% of the cost of developing Site C based on BC Hydro’s 2001 estimate of the cost of Site C). The cost of power from the cascade development would be of the order of 8.1cents / kWh.

Environmental and socio-economic impacts of the Peace Cascade Development were considered in relative terms. The cascade would have a significantly lower environmental impact than would the Site C development, while socio-economic impacts of the two options would be similar.

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# 1. INTRODUCTION

Several studies and investigations have been carried out in the past to develop the hydroelectric potential of the Peace River between the existing Peace Canyon Dam near Hudson's Hope and the Alberta border. This reach of river is approximately 145 km in length.

The currently proposed scheme, known as Site C, calls for a single dam and power plant located near Fort St. John which develops most of the potential of this reach at one generating station. Development of Site C would have a high capital cost, resulting in high cash flows over a period of seven or eight years. This dam would impound a large reservoir of approximately 9400 ha (Klohn Crippen Integ, September 1989) with significant flooding of land and infrastructure upstream of Fort St. John for a distance of nearly 80 km. It would also fall in the "High" or "Very High" Consequence Category as defined by the Canadian Dam Association because of the potential damage downstream in the event of a dam breach and the economic loss as a result of a dam failure, so it would be designed to withstand the Maximum Credible Earthquake (MCE) and the Probable Maximum Flood (PMF).

BC Hydro has examined other concepts for developing the available head on this reach of river, amongst which was a cascade scheme consisting of several low head plants along this reach of the river. Preliminary indications are that this would increase the overall cost but allow expenditures to be spread over a longer period of time by developing each selected site independently at different times. The reservoir impounded by each dam would be much smaller than the Site C reservoir and the environmental impacts of impoundment would be reduced. The concept included minimizing the head developed at each plant to minimize the consequential damages downstream of each dam site in the event of a dam failure, if possible keeping the dams within the "Low" Consequence Category, which would allow the design to be based on floods and earthquakes with an annual probability of occurrence of 1 in 1000.

On July 5, 2002 Klohn Crippen Consultants Ltd. and SNC-Lavalin Inc. submitted a joint proposal to BC Hydro for a Prefeasibility Level Study and Concept Design of a Multi-Site, Low Head Cascade Power Generating System (referred to herein as the Cascade Development). BC Hydro reviewed the proposal and requested certain revisions. BC

Hydro issued purchase orders to the two companies on July 12, 2002. A final proposal dated July 17, 2002 to BC Hydro documents the terms of reference as agreed for the study.

The terms of reference for the project were to develop a cascade scheme that would yield the maximum possible energy potential of the reach of river between Peace Canyon Dam and the proposed Site C. The individual structures were to have a “Low” Consequence Category with respect to dam safety, as defined by the Dam Safety Guidelines of the Canadian Dam Association and by BC Hydro’s dam safety standards.

An Interim Report for this project was issued in September 2000, documenting the process leading to the selection of the number and location of the cascade sites and the head developed at each site. Since issuing the interim report, minor changes have been made to the dam locations and gross heads at the individual sites as a result of the energy studies and associated hydraulic analyses. The final locations and characteristics of the sites are presented in this report.

In general, features and potential development sites are located in terms of river kilometres, e.g., Km 86, which are the distances upstream along the river from the Alberta border. For reference, the proposed Site C axis and existing Peace Canyon Dam are at approximately Km 62 and Km 145, respectively.

The project area is shown on Figures 1.1 and 1.2.

# 2. HYDROLOGY

## 2.1 Hydrologic Regime

The Peace River is formed at the confluence of the Finlay River, which flows south in the Rocky Mountain Trench, and the Parsnip River, which flows north in the Trench. From the confluence of the Finlay and Parsnip rivers, the Peace River flows eastward through the Rocky Mountains to Alberta. After entering Alberta, it flows in a northeasternly course, eventually discharging into the Arctic Ocean via the Slave and Mackenzie Rivers.

The hydrologic regime of the reach of the Peace River studied for the Peace Cascade Development is dominated by the regulated releases from W.A.C. Bennett and Peace Canyon dams. Williston Lake, which is impounded by W.A.C. Bennett Dam, has a drainage area of 68,900 $km^2$ and has substantial storage capacity (live storage of $41.3x10^9$ $m^3$). The average annual inflow into Williston Lake is approximately 1100 $m^3/s$ (see Table 2.1 for monthly average inflows). The available storage in the reservoir allows for complete regulation of the inflows. This is shown in Figure 2.1, which compares the average monthly releases and the average monthly inflows. This figure shows that the high inflows that occur in the spring and summer are released at an almost constant rate throughout the year. The average monthly releases are provided in Table 2.2.

Peace Canyon Dam is located some 20 km downstream of W.A.C. Bennett Dam and impounds Dinosaur Lake, which backs up to the tailwater of W.A.C. Bennett Dam. There are no major tributaries along this reach of the river therefore the inflows into the reservoir are approximately equal to the releases from W.A.C. Bennett Dam. Dinosaur Lake does not have sufficient capacity to regulate the inflows and the releases from Peace Canyon Dam, for the most part, mimic the releases from W.A.C. Bennett Dam. The average monthly releases from Peace Canyon Dam are provided in Table 2.3.

There are a number of tributaries that contribute unregulated flows to the Peace River within the 83 km long reach between Peace Canyon and Site C, including Maurice Creek, Lynx Creek, Farrell Creek, Halfway River, Cache Creek, Wilder Creek, Tea Creek and the Moberly River. The main tributaries are Halfway River, which is located midway along the reach, and Moberly River which is located near the downstream end of the reach. Halfway River, with a drainage area of 9,450 km², drains about 75% of the local catchment between Peace Canyon Dam and the Site C dam site. The average annual flow of the Halfway River is approximately 78 m³/s. The recorded historical flows for the Halfway River are provided in Table 2.4. The Moberly River has a drainage area of approximately 1,520 km², and an average annual flow of 11 m³/s. The recorded historical flows for the Moberly River are provided in Table 2.5. The total catchment area at the Site C dam site is approximately 83,680 km², of which the flow from the upstream 71,250 km² is regulated.

Sources of floods between Peace Canyon and Site C include routed floods from Williston Lake via Dinosaur Lake, and floods from the un-regulated tributaries. As mentioned above, W.A.C. Bennett Dam regulates the inflows from a large percentage of the catchment. In addition to the regulation provided by Williston Lake, the operating procedures dictate that the reservoir be drawn down whenever a large inflow event is anticipated. The purpose of the drawdown is to evacuate sufficient reservoir storage to accommodate the flood without exceeding the maximum allowable flood level. Given these pre-flood operating rules, it is difficult to determine the 1000-year flood outflow (a flood with an annual exceedance probability of 0.001) without undertaking additional studies. For the purposes of this present study, the 1000-year flood released from W.A.C. Bennett Dam is estimated to be 8000 m³/s. This estimate is based on a flood frequency study (BC Hydro, September 1977) which derived estimates up to the 100-year flood. The 1000-year flood was estimated by extrapolating the flood frequency curve to an exceedance probability of 0.001. Given the uncertainty of this method of deriving the 1000-year flood, this value should be confirmed in subsequent investigations for the Peace cascade development.

A flood frequency analysis was conducted on the historical Halfway River flows (recorded at WSC gauge 07FA008), and the 1000-year flood was estimated to be 6400 m³/s. This, combined with the full turbine discharge capacity at W.A.C. Bennett Dam and Peace Canyon Dam (2000 m³/s), gives an estimated 1000-year local inflow flood of 8400 m³/s. This flood flow is only applicable for the projects located downstream of Halfway River confluence.

The peak outflow from Peace Canyon Dam due to the Probable Maximum Flood (PMF) is 16,000 $m^3/s$, while the estimated PMF at the Site C location is 18,200 $m^3/s$ (BC Hydro, June 1977).

## 2.2 Sedimentation

There is a significant annual sediment load in the reach between Peace Canyon and Site C. Williston Reservoir is an effective trap, so discharges from W.A.C. Bennett Dam are virtually free of sediment. In addition, Dinosaur Lake will intercept all coarse sediment fractions from between W.A.C. Bennett and Peace Canyon catchment, so the discharge from Peace Canyon Dam is also virtually sediment free. Sediment transported in the river between Peace Canyon and Site C is therefore derived from redistribution of the existing riverbed sediments and inflow from the catchment area downstream of Peace Canyon Dam. While minor creeks and tributaries contribute some sediment load, the large tributaries such as Halfway River and Moberly River are the sources of most of the annual sediment load.

The Halfway River is the largest single sediment source with an annual average contribution of 2.3 million tons (B.C. Hydro, 1976). The distribution of size fractions in the Halfway River sediment load is as follows:

- Sand – 10%
- Silt – 45%
- Clay – 45%

Assuming that the clay fractions would remain in suspension in the relatively small reservoirs of the Peace Cascade Development, the sand and silt fraction (55% of the sediment load) has the potential to settle in the reservoir. The sediment densities given in the river morphology study (BC Hydro, 1976) were used to convert the sediment weights to an annual average volume of material. From the Halfway River alone, the volume of sediment with a potential to cause sedimentation was found to be approximately 0.9 million $m^3$/year.

The confluence of the Halfway River with Peace River is at Km 100, so it only has the potential to affect the more downstream sites in the Cascade Development. However, the sites upstream of the Halfway River will experience some sedimentation on an annual basis, and there is potential for large intermittent sediment inflows due to effluent from slides (which are common features in the sides of Peace River valley), especially those slides that enter the watercourse directly (such as Cache Creek slide and the more recent Attachie slide).

# 3. GEOLOGY AND SEISMICITY

## 3.1 Bedrock

The project area is underlain mostly by the Fort St. John Shale and Gates Sandstone sedimentary rocks. The most abundant rock formation is Cretaceous Fort St. John Shale of the Shaftsbury formation, which is found frequently exposed along the banks of the Peace River and its tributaries. The Dunvegan Sandstone overlies and forms a resistant cap to the Shaftsbury Shale. Upstream of approximately Km 125 near Hudson's Hope, a sequence of sandstone, shale and silty shale of the Gates Sandstone formation is exposed as islands and banks along the Peace River. The Shaftsbury Shale and Gates Sandstone bedrock are marine sedimentary sequences of dark grey, fine grained, moderately weak and very thinly bedded siltstone, shale and sandstone. The bedrock has a regional dip of about $1^{o}$ northeast, although local variations of 1 or 2 degrees from this regional dip are common. In general, the shale readily exfoliates and crumbles on exposure to air and water. The bedrock is cut mainly by 3 sets of fractures which are characteristic of valleys eroded in flat-lying, weak sedimentary rocks, namely:

- Fractures of softened rocks parallel to bedding;
- Steep relaxation fractures parallel to slopes; and
- Low angle shear zones of limited displacement.

The permeability of the bedrock, based on packer tests and response tests on piezometers carried out near Site C, ranges from more than $10^{-4}$ cm/sec in the relaxed surface rock to less than $10^{-7}$ cm/sec in undisturbed rock.

## 3.2 Overburden

The overburden geology, mapped by the Geological Survey of Canada, is shown on Figure 3.1 (Matthews 1963). Overburden in the area is mainly the product of in situ weathering of the parent rocks. The overburden typically classifies as medium to high plasticity silt (ML, MH) on the Atterberg plasticity chart. The riverbed contains very coarse alluvial deposits of sand, gravel, cobbles and boulders. Alluvial deposits in the riverbed range in depth up to 10 m. Glacial deposits are exposed along the Peace River and tributaries valleys and consist mainly of sand, gravel, and cobbles in a silty sand matrix, as well as glaciolacustrine clays deposited in lakes created by glaciers.

The permeability of the alluvial sands and gravels determined in drill holes located near Site C ranges from $10^{-1}$ cm/sec to $10^{-4}$ cm/sec. The permeability of the glacial till ranges from $10^{-4}$ cm/sec to less than $10^{-7}$ cm/sec.

Mapping and drilling completed by the Geological Survey of Canada (GSC) in 1985 identified a buried channel from approximately Km 128 to Km 138 and the GSC estimated that bedrock is more than 35 m below river level. The channel appears to be filled with sandy gravel overlying a silt, sand and clay unit overlying a water-bearing sand unit.

## 3.3 Project Area Stability

The Peace River shoreline from Site C to the Peace Canyon has been studied by Thurber Consultants Ltd. (March 1978, 1981) and by BC Hydro (1976,1981, 1990).

The riverbanks along the proposed reservoirs have experienced a continual process of sliding during the development of the existing valley slopes. Most slides were small and slow (velocity $\leq$3 m/s), except the 1973 Attachie slide (14 million cubic metres), which blocked the Peace River for a few hours before the river developed a channel adjacent to the left bank. Small overburden slides, in the form of slumps and flow slides, have originated mainly in lacustrine clays and silts and are typically less than 75,000 $m^3$. These small slides are generally remote from the river channel and will likely have no significant effect on the project.

The largest ancient bedrock slide is the Cache Creek slide (70 million cubic metres) in the vicinity of Km 81 to Km 83, which failed along the contact between Dunvegan sandstone and Shaftsbury shale.

For clarity and because of their influence on site selection, the known active, inactive and potential slides are shown on the site plan on Figure 1.1 and 1.2. Reservoir slope investigations carried out by BC Hydro (January 1990) indicated that most slides are stable, however creep movements still continue at the Moberly River, Tea Creek and Cache Creek slides, a small slide opposite Bear Flat and the Attachie slide. No recent stability problems have been reported in these areas. The KC/SNC-Lavalin helicopter inspection on August 14, 2002 identified no signs of recent activity in the riverbanks in the reach, except for shallow, surficial movements.

One of the criteria for selection of the cascade dam locations was to avoid the main overburden and rock slides.

It is anticipated that the reservoirs impounded by the low dams would only cause minor shoreline instability. Where the proposed dams lie within or near zones of possible reservoir-induced slumps, the subsurface conditions must be determined by drilling or trenching to confirm the potential impacts of impoundment on slope stability.

### 3.4 Shear Strength Parameters

The soil and bedrock unit weights and shear strength parameters for the foundation materials assumed for the cascade dams founded in the Gates Sandstone Formation and the Shaftsbury formation are summarized in Table 3.1.

### 3.5 Project Area Seismicity

The dams in the Peace Cascade Development are to be designed so that they can be classified as Low Consequence Category structures, in which accordance with CDA guidelines and BC Hydro's guidelines, would be designed for a Maximum Design Earthquake (MDE) with a probability of 1 in 1000 occurring in any year.

The region has a low level of historical seismicity and no significant seismic activity has been recorded in the project area since seismographs were installed in the mid 1960's. The only local seismic activity recorded, occurred well after completion of the Peace Canyon Dam. A series of five small earthquakes of magnitude M2 and M3 occurred in the Charlie Lake and Fort St. John area during November and December 1984. Since 1984, intermittent earthquake activity has occurred in the Fort St. John area, with the largest event being M4.3. The location and general dates of these earthquakes appear to correlate with oil extraction and water injection activities in the Eagle oil field near Fort St. John (BC Hydro, November 2001; Klohn Crippen Integ, 1990; Horner et. al, 1994; Horner et. al, 1995).

On the evening of 13 April 2001, a M5.4 earthquake near Dawson Creek was widely felt across northwest Alberta and northeast British Columbia, including some local "felt reports" in Hudson's Hope. The epicentre depth was approximately 15 km, which is deep within the Earth's crust and well below the depth of earthquakes caused by petroleum extraction.

Ground motion estimates corresponding to return periods between 100 and 10000 years have been estimated by BC Hydro (November 2001). The estimates were derived using a modified version of the EQRISK software, based on the Cornell-McGuire methodology. The key input parameters were the BC Hydro regional seismogenic zone model, magnitude recurrence, maximum magnitudes and assumed ground motion attenuation relationships. In that memo, BC Hydro estimated the peak horizontal ground acceleration to be 0.07g for a 1000 year return period. The estimate was made for Peace Canyon dam and it is assumed to apply to all reach of river between Peace Canyon and Site C.

# 4. CONSEQUENCE CATEGORY

## 4.1 General

The Terms of Reference require the selection of a cascade of dams that would fall in the "Low" Consequence Category of the Canadian Dam Association (CDA, 1999). Structures in this Consequence Category are designed for an Inflow Design Flood (IDF) with a probability of 1 in 100 to 1 in 1000 occurring in any year and a Maximum Design Earthquake (MDE) with the same range of probability. It is BC Hydro practice to select the top end of the CDA criteria ranges, so the IDF and MDE would both be based on a 1 in 1000 annual probability.

In order to qualify as "Low" Consequence Category structures, the Peace Cascade Development should cause no incremental loss of life and only "moderate" incremental socio-economic, financial and environmental damages if one of the dams in the cascade were to fail. The BC Hydro internal benchmark for this level of damage is "less than $40 million". The BC Dam Safety Regulations (BC Hydro, February 2000) require that Low Consequence Category Dams cause less than $1 million damage downstream of the dam but do not limit the cost of damage to the dam itself. The BC Hydro and BC Dam Safety Regulation criteria for Low Consequence Category dams are provided in Table 4.1.

According to Section 4.3 the CDA Guidelines, the following scenarios should be evaluated to define the consequences of dam failure:

- Failure during the design flood;
- Fair-weather failure at full supply level (due to piping or earthquake);
- Fair-weather failure during winter conditions where ice jam formation is possible; and
- Failure of a dam due to failure of an upstream structure.

Dam break analyses were undertaken to define the areas at risk of flooding under the above scenarios, and the results of these analyses were used to estimate the potential consequences of dam failure in terms of loss of life, social and economic consequences and environmental and cultural losses. These consequences are discussed below.

### 4.1.1 Areas at Risk of Flooding

In the event of a dam failure in the Peace Cascade Development, the potential areas at risk (BC Hydro, April 1985) in British Columbia include the following:

- The communities of Hudson's Hope, Attachie, Bear Flats, Fort St. John (old town), and Taylor;
- Highway 29, which follows the Peace River from Hudson's Hope to Bear Flats;
- Highway 97, the British Columbia Railway and a natural gas pipeline, which cross the Peace River at Taylor; and
- A vehicle ferry which crosses the Peace River approximately 4 km upstream of the B.C./Alberta border (if this is still operating).

Except for the ferry crossing, the communities and infrastructure located in British Columbia are situated on the riverbanks high above the likely flood level in the event of a dam failure. The inundation mapping for the theoretical breach of Peace Canyon Dam shows only a small amount of flooding at Taylor. Therefore, flooding at Taylor due to the failure of one of the low dams of the Peace Cascade Development is highly unlikely.

The potential areas at risk in Alberta were not readily available. However, it is known that the Town of Peace River is vulnerable to flooding if ice jams form on the river, therefore, this location may be at risk due to the failure of a dam in the Peace Cascade Development.

### 4.1.2 Potential for Loss of Life

The communities and bridges downstream of the Peace Cascade Development in BC are located high above the river, and it is anticipated that there would be sufficient warning time to evacuate potentially impacted communities in Alberta. Therefore, no loss of life is anticipated if a dam in the Peace Cascade Development were to breach.

### 4.1.3 Social and Economic Consequences

For the purposes of this study, it was assumed that only minor damage would occur if the flow released by a dam breach were less than the 200-year flood, because the 200 year flood levels are commonly used as design criteria for property and infrastructure developments near rivers. In addition, the Peace River historically experiences regular flooding due to ice jams, so most structures are situated well away from the river and do not encroach on the flood plains.

#### 4.1.4 Environmental and Cultural Losses

Because severe ice jam floods occurred naturally on the Peace River both before and after regulation of the river, it is anticipated that cultural loss from a breach of a low dam the Peace Cascade Development would be minimal and the affected areas would recover naturally from environmental damages with time.

### 4.2 Consequence of Failure

#### 4.2.1 Estimated Peak Outflows in the Event of a Dam Failure

Dam Breach analyses were carried out in order to assess downstream consequences. These analyses were based on failure of a concrete dam component, which fail more quickly than the earthfill components and therefore result in the most severe breach wave.

#### 4.2.2 Fair Weather Failure During Summer

The results of the dam breach analyses for a fair weather failure condition in summer are shown in Table 5.2.

#### 4.2.3 Fair Weather Failure During Winter

If a dam in the Peace Cascade Development were to fail during winter or spring, it is possible that the resulting flood wave could cause ice jams as it moves down river. BC Hydro's ice specialist reviewed the routed outflows from breaches from the various dams in the Peace Cascade Development. The analysis found that a damaging ice jam resulting from a breach of one of the dams was dependent on the location of the ice front at the time of the breach. For example, if the ice front was just upstream of the Town of Peace River there is a possibility of an ice jam that would cause significant damages. However, the combined probability of a dam failure with that particular ice front is extremely low.

#### 4.2.4 Design Flood Failure

The highest river flows would occur with failure of a dam during the peak of the Inflow Design Flood. However, such an event may not have the highest incremental consequences, because the downstream population would likely have been evacuated from the low lying areas due to the rising flood waters. In addition, the breach would cause a smaller incremental rise in water level than for the fair weather failure because the river is wider during floods and as a result the dam breach flood wave would attenuate quicker. The peak flows at each dam due to dam breach during the IDF are shown in Table 5.3. Note that each dam is assumed to be releasing 8000 $m^3/s$ when the breach occurs.

#### 4.2.5 Failure of an Upstream Structure

The dams upstream of the Peace cascade development include W.A.C. Bennett Dam and Peace Canyon Dam.

W.A.C. Bennett Dam is classified as a Very High Consequence Category dam, the failure of which would cause significant damages and potentially loss of life. A failure of Bennett Dam would likely cause failure of all of the dams downstream. The breach flows due to a failure of Bennett Dam are so high that the failure of the low head dams of the Peace Cascade Development would not be expected to produce any measurable increase in the downstream consequences.

The Peace Canyon Dam is smaller in size and impounds a smaller reservoir than Bennett Dam. A failure of Peace Canyon Dam during passage of the PMF would likely cause the failure of the dams of the Peace Cascade Development. It is not expected that the failure of the additional dams would result in significant additional incremental damages. A “fair weather” failure of Peace Canyon Dam would likely result in failure of at least some of the proposed dams, particularly at the upstream end of the cascade development. A dam break analysis would be required to confirm that the failure of the cascade dams, due to the failure of Peace Canyon Dam, would not result in significant incremental damages.

### 4.3 Satisfying the Criteria for "Low" Consequence Category

The dam breach analyses suggest that the dams of the Peace Cascade Development would probably satisfy the criteria in the BC Dam Safety Regulations for "Low" Consequence Category dams, because each dam would have sufficient spillway capacity to pass the flood wave generated by breach of an upstream dam and the river banks are relatively undeveloped in the reach that would be affected by breach waves.

However, the dams in the Peace Cascade Development are unlikely to satisfy BC Hydro's internal benchmark of $ 40 million for "Low" Consequence Category dams, because the benchmark cost includes the cost of replacing the failed component itself and most components of the dams will have a replacement cost well in excess of $40 million. The value of lost generation would also be significant.

The discussion above considers the dams individually, and considers the impact of failure of one dam on those downstream. Given the significant investment required for the total cascade development (the cost estimate is presented in Section 12), BC Hydro also would have to consider whether the risk of floods greater than the 1 in 1,000 design flood is acceptable, with respect to the total investment.

# 5. SITE SELECTION

The river profile and topographic mapping were examined and a site visit was carried out to identify potential hydro development sites on the Peace River between Peace Canyon Dam and Site C. As described in the Interim Report (Klohn Crippen and SNC-Lavalin, September 2002), seven sites were selected. These sites have similar gross heads and require structures that are low enough to qualify as “Low” Consequence Category dams as discussed in Section 4. Small adjustments were then made when the layouts were developed for each site, after the tailwater had been computed by backwater analysis.

## 5.1 River Profile

The water surface profile used in the selection of the sites was taken from work by Thurber (March 1978). This is shown in Figure 5-1, together with the dam locations and the backwater curves upstream of each reservoir (computed at the average flow of 1,100 $m^3/s$).

Three more recent river profiles (BC Hydro Drawing 1007-T07-E40, Peace River Low Flows Mapping Project) were provided later in the study phase, after the dam sites had been selected. These profiles were obtained from aerial photography of the river under three flows:

- 361 $m^3/s$ (dated 1997-09-01);
- 631 $m^3/ s$ (dated 1997-09-04); and
- 2,879 $m^3/ s$ (dated 1996-08-11).

The data file contained a considerable number of clearly erroneous data points, including many that indicated water levels 30 m or more below the likely riverbed level. In addition, there were no data for approximately 40% of the river reach. Nonetheless, when obviously spurious data were removed, the remaining data defined segments of river profile that appeared to be mutually consistent yet departed significantly from the water surface profile used for site selection (see Figure 5.2).

The most significant differences in the profiles occur in the vicinity of Attachie Slide. The recent river profile through this reach at high flows looks similar to the original Thurber profile, while the recent profiles at lower flows indicate a far more uniform river gradient past the slide toe. This could simply be a result of changes to the river morphology in the period between the original profile survey and the later aerial photography. The original survey took place in 1976, four years after Attachie slide came down and formed a natural dam across the Peace River. The river quickly eroded a new river channel at the toe of the slide and this channel would have continued to erode. This small river channel resulted in a fairly steep water surface profile past the toe of the slide, as shown on the original profile.

The river channel past the slide would have eroded further during the large flows (up to 5,273 $m^3/s$) released in 1996 due to repair work on W.A.C. Bennett Dam. When the flows subsequently returned to normal, there would have been less head loss through the enlarged river channel than shown on the original profile.

Confirmation of the reliability and completeness of the more recent data is required to justify a revision of the selected site locations. New surveys of river water surface and river profiles would be essential to any further investigation of a Peace Cascade Development.

If the river profile has changed in the manner suggested by the new profiles, it would affect the gross heads and dam heights at the individual sites and Site 7d would have to be relocated downstream of the Halfway River confluence.

The changes to the gross heads and dam heights would also affect the energy production and construction cost for each site in the cascade development. Sites that appear to have the most favourable economics on the basis of the original river profile would be less attractive if the later river profiles are correct.

However, the new river profiles are not expected to have a significant effect on the total cost of the entire Peace Cascade Development, nor on the energy that it would produce.

## 5.2 Summary

Table 6.1 shows the key properties of the selected sites. The gross heads range from 5.04 m to 7.58 m with an average of 6.62 m.

# 6. ENERGY STUDIES

## 6.1 Capacity

As the reservoirs for all the Peace Cascade Development sites provide little storage for regulation of flows, the generating capacity of each site was tentatively selected to utilize the maximum generation flow of G.M. Shrum and Peace Canyon generating stations, plus tributary inflows. Each plants in the Peace Cascade Development would thus be in approximate hydraulic balance with the upstream plants. The selected generating capacities yielded average capacity factors, based on the maximum generating capacity and the average energy produced at site, ranging from 60% to 63% as summarized in Table 6.1.

The assumption that plants in the Peace Cascade Development would be in hydraulic balance with G.M. Shrum and Peace Canyon generating stations was considered to be reasonable for this prefeasibility level study and it is also in line with the proposed Site C Development which would have a capacity factor of 53%. (The Site C powerhouse was designed to have a capacity of 900 MW and would generate an average of 480 MW (BC Hydro, July 1972)).

The installed capacity at each plant in the Peace Cascade Development should be optimized in future studies. This optimization would examine the differential cost and energy benefits per Megawatt installed, taking into account the cost of providing sluices to release small unused flows on a daily basis, and the generating unit maintenance requirements. During this study it was assumed that the project economics would not be sensitive to the costs of the electro-mechanical equipment because of the high civil construction costs for the Peace Cascade Development. Increasing the capacity factor might require a small amount of spill for a short duration on a daily basis because the peak inflow from the G.M. Shrum and Peace Canyon generation stations would exceed the flow capacity of the individual plants in the Peace Cascade Development. This spill could be accommodated either with manual or automated gate operations or by provision of a free overflow spillway section. The installed capacity for the Peace Cascade Development would also be affected the availability of the units. In this study a preliminary selection of 16 units per powerhouse was made. Assuming a normal maintenance schedule of one 2-week outage per year for each unit, there would be

32 weeks of the year when at least one unit was off line for maintenance. There is no season of the year when there are reduced flows in the river to accommodate these outages, so future optimization should take maintenance periods into account. Future studies should also evaluate whether the assumed outage is adequate for sites downstream of Halfway River where sediment removal may require an additional outage.

## 6.2 Energy

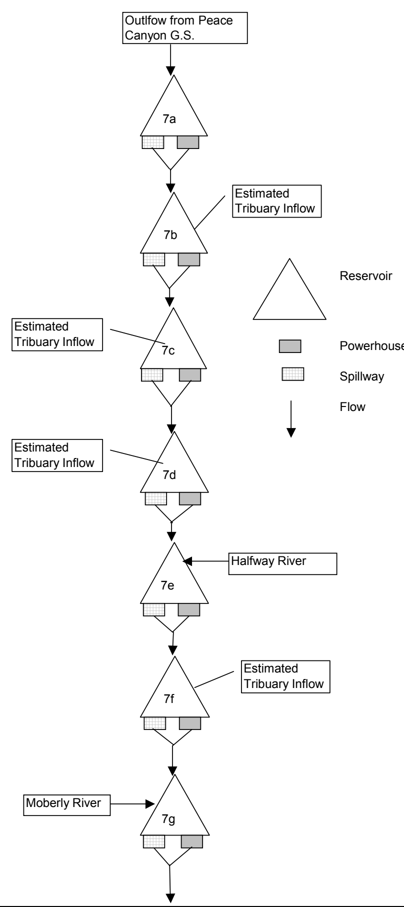
Two aspects of energy generation were considered for the Peace Cascade Development, namely the monthly energy generated by each plant in the Peace Cascade Development and the hourly average power resulting from the load-shaped flow released from Peace Canyon Dam.

### 6.2.1 Average Annual Energy

The average annual energy and monthly energy was estimated using PROSPER, SNC-Lavalin's in-house energy software program. The physical characteristics and inflows of the cascade plants were entered into the model, which in turn estimated the average energy for plant.

A schematic diagram of the Peace cascade development is provided to the right. Peace Canyon and W.A.C. Bennett dams were not included in the model, since the Peace Cascade Development is run-of-river and it was assumed that the addition to the Peace River system will not result in operational changes at the upstream projects. Therefore no changes in the average energy at the upstream projects are expected if the new plants are constructed downstream.

The physical characteristics assumed for the plants include:



- Local inflows into each plant;
- Reservoir characteristics such as storage curves, full supply levels and minimum operating levels;
- Spillway rating curves;
- Powerhouse characteristics such as powerhouse capacity and design flow, unit efficiency, and unit availability; and
- Tailwater levels.

As described in Section 2, the inflows into the Peace Cascade Development include the releases from Peace Canyon Dam and the inflows from a number of tributaries. The energy study used the average monthly outflows from Peace Canyon dam, which were available from 1972 to 2002, as shown in Table 2.3. The Halfway River enters the Peace Cascade Development at Site 7e and contributes about 75% of the total local inflow within the reach of the river between Peace Canyon and Site C. The average monthly Halfway River flows are available from 1984 to 2002 from Water Survey of Canada (WSC) station 07FA006 (see Table 2.4). For the purposes of the energy studies, average monthly inflows were assumed for the period of 1972 to 1983. The Moberly River contributes approximately 10% of the local inflow and enters the Peace River at Site 7g. The average monthly Moberly River flows are available from 1980 to 2002 from WSC station 07FB008 (see Table 2.5). For the purposes of the energy studies, average monthly inflows were assumed for the period of 1972 to 1979. The remaining 15% of the local inflow was assumed to be equally distributed between Sites 7b, 7c, 7d and 7f. No inflow to Site 7a was considered, as it has the smallest reservoir and there are no significant tributaries in that reach.

The reservoir storage curves were estimated based on typical river cross sections and reservoir lengths. A normal operating range of 1.0 m was assumed for the reservoir. The spillway rating curves were included assuming a maximum flood level 2.0 m above the full supply level.

The powerhouse characteristics include the plant's maximum powerhouse flow capacity and combined turbine capacity, unit availability, and turbine efficiency. The availability of the units was assumed to be 95%, and unit efficiency to be 88.9% (which includes turbine, generator and transformer losses and is representative of a Voith S-turbine).

This availability is typical of developments having larger, fewer units. In future studies, the availability should be considered in light of possible impacts of sediment downstream of Halfway River. It is possible that the availability may be as low as 90%, with a commensurate change in annual energy.

The tailwater levels used in the model were determined by backwater analysis of the river and included the backwater effects of downstream reservoirs.

The results of the energy study showed an estimated average annual energy of 4035 GWh for the 7 dam cascade development. The average annual energy is included in Table 6.1 and the average monthly energy produced at each plant from the historical inflows between 1972 and 2001 are summarized in Table 6.2 to 6.8. Detailed results of the average annual energy analysis are provided in Appendix A.

#### 6.2.2 Energy Losses Due to Ice Formation

Ice formation downstream of a hydroelectric project has the potential to increase the tailwater levels at the project, hence reducing the net head.

Currently, a stable ice sheet normally forms well downstream of Site C. However, the construction of a cascade of small dams will increase the probability of ice formation. Also, the construction of the Dunvegan Dam downstream of the BC/Alberta border will likely move the starting point of the stable ice sheet upstream. BC Hydro undertook an analysis of ice formation as a result of the construction of the Peace Cascade Development. The results of this analysis are included in Appendix B. The impacts on energy production are dependent on the resulting increase in tailwater levels, the duration that the ice sheet is expected to remain in place, and the expected frequency of ice sheet formation. The tailwater levels anticipated from ice formation was used in the energy model to estimate the energy impacts. The results of the simulation are presented in Table 6.10.

#### 6.2.3 Hourly Energy and Project Operation

Hourly average power studies were undertaken to confirm that all the available flow could be used for generation and not spilled, thus confirming the expected annual energy, and to evaluate potential operation strategies for the projects and in particular their ability to generate during High Load Hours (HLH).

To evaluate hourly average power, typical hourly releases were selected from Peace Canyon generating station and routed through the Peace Cascade Development. The selected data represented days when Peace Canyon Generating Station was used for load shaping. Two to three typical days were selected for each month to represent the various operations of the Peace River projects during the year, and also to represent the impacts of the un-regulated inflows within the Peace Cascade Development. Examples of typical load-shaped releases are shown in Figures 6.1 and 6.2.

The daily inflows were routed using two operating strategies. The first strategy involved setting the reservoirs at their full supply level and generating power as the flow reached the powerhouse. The time delay associated with the routing of the flow variations through seven reservoirs of the Peace Cascade Development resulted in some peak power being generated at low demand times of the day.

The other strategy synchronized generation flows at the plants with releases at Peace Canyon generating station, in anticipation of the inflows arriving from the upstream projects. This would ensure that the power is generated during HLH, but would result in some reservoir drawdown, which reduces the available head and therefore the amount of power generated.

In the simulation of both strategies, inflows from Halfway River and Moberly River were added to the river flows at Sites 7e and 7g, respectively.

The outflows from each project were then converted to power and daily energy. A powerhouse efficiency of 88.9% was assumed and net head was calculated by subtracting the calculated tailwater level from the reservoir level.

The results of the hourly power studies showed the following:

- Both strategies avoided spill, even during high inflows from the local tributaries. Therefore the average annual energy calculated in the monthly model is not over estimated.
- For the strategy in which the reservoirs was held at full supply level, the lag time of attenuated peak outflow between Site 7a and Site 7g was approximately 3 hours.
- For the synchronous operation strategy, the maximum reservoir drawdown was 0.6 m, which is well within the assumed 1.0 m operating range. The reduced net

head due to the temporary drawdown of the reservoir resulted in production of approximately 4% less energy. However, the peak energy was produced during HLH.

These strategies represent only two possible means of operation, covering the extremes of the range of independent operation of the Peace Cascade Development. It is possible that a higher value can be derived from all the generating stations on the Peace River by placing them all under a common dispatch centre. The estimated energy resulting from the two operating strategies is summarized in Table 6.10.

# 7. UNIT SELECTION

## 7.1 Criteria

Potential suitable units were initially identified using data provided by major equipment manufacturers. The following criteria was established for selecting the number and type of units:

1) The gross head on the generating units was taken as 7.5 m, which is approximately the maximum head developed in the Peace Cascade Development. This is in the range of low head turbines, so a propeller or Kaplan unit is required. Propeller units have high efficiency over a relatively narrow range of operating heads and flows, while Kaplan units are double-regulated to produce an acceptable efficiency over a wide operating range. Because there will be a significant range of tailwater levels during plant operation, a Kaplan unit is most suitable for the cascade plants. Kaplan-turbines are available from several manufacturers and in the following configurations:

   - Bulb turbines
   - Pit turbines
   - Tubular turbines, predominantly S-turbines.

2) The design flow for each plant was taken as 2000 $m^3/s$, the maximum power flow discharged by the Peace Canyon powerhouse. The contribution of most tributaries downstream is relatively small, but the number of units was increased downstream of Halfway River.

3) The largest standard units, or units with a demonstrated performance, were selected from the manufacturers' data to minimize both the powerhouse length and the number of units needing maintenance.

4) It was preferred that the units would have direct drive generators, rather than speed increaser gearboxes, to obtain higher efficiency and reduce maintenance requirements.

## 7.2 Alternatives Considered

Performance data for standard bulb, pit and tubular units from Voith Siemens, VA Tech and Alstom were reviewed. Kaplan S-turbines and pit turbines were initially identified as the likely choices based on the head and unit capacity data. The initial review, documented in the Interim Report (Klohn Crippen and SNC-Lavalin, 2002), concluded that an S-turbine would be appropriate for all sites and provide the largest installed capacity.

Due to the large number of standard "off-the-shelf" units that would be required at each site, it was decided to consider larger custom-designed units. VA Tech and Voith Siemens were both contacted and asked to provide budget pricing and basic technical information for four large custom units with a total capacity 2,000 $m^3/s$ (500 $m^3/s$ per unit) at a head of 7.5 m. The suppliers were also requested to provide pricing for S-turbines and any other appropriate alternative technology they favoured. The data provided by the suppliers are summarized in Table 7.1.

VA Tech provided data for two alternatives, four 34 MW bulb turbines each with a 7.8 m diameter runner, and twenty-five 5.2 MW Ecobulb units. When pressed, VA Tech declined to offer an S-turbine, preferring to champion the Ecobulb units, although these units do not have a long performance history.

The 34 MW units would have a unit setting approximately 8 m below tailwater and would require a maximum excavation depth of approximately 19 m below tailwater level. This would be an advantage on sites with weak shale foundations, and might not increase the total excavation volume because the powerhouse would be shorter. Removal and maintenance would be relatively difficult and would require large crane capacities. During maintenance periods, a larger portion of the plant capacity would be out of service.

The Ecobulb units would be unregulated, with only a shut-off gate for each unit, and therefore would be less efficient than regulated units under variable head or flow conditions. They are synchronous machines set at a fixed power factor (PF), with any PF changes requiring capacitor banks or solid-state adjustment.

Voith Siemens did not offer an alternative with only four turbines. They provided data for twenty-five 5 MW pit turbines, eleven 12 MW S-turbines and, as an innovative design, seven 17 MW vertical siphon units. Their subsidiary ESAC suggested twenty-five 5 MW S-turbines, however they did not provide any data or costs. Because of the low head, the 12 MW S-turbine would be the largest ever built, with a 6.8 m diameter runner, and was not considered further since a selection criterion was to use proven technology. Similarly, the 17 MW siphon unit is unproven (it is currently proposed for a powerhouse, to be used in conjunction with precast concrete elements to reduce civil costs) and was not considered further.

Voith Siemens was then asked to provide information on an S-turbine intermediate in size between 5 MW and 12 MW and subsequently provided data for an 8 MW S-turbine. For this unit the setting and deepest excavation would be approximately 3.6 m and 15 m below tailwater level, respectively. This S-turbine unit is expected to have a high efficiency at all heads and 8 MW is a proven size for such units. Although more expensive than the 5 MW pit turbines proposed by Voith Siemens, the improved efficiency over the wide head range would permit the S-turbines to generate more energy on an annual basis and provide more flexible operation of the cascade reservoirs. Considering these factors, the Voith Siemens 8 MW S-turbine was selected for the conceptual design of the plants.

# 8. PROJECT COMPONENTS

A set of standard components was developed and used at each site as appropriate, in order to simplify the layout and costing of the project facilities.

These components comprised the following:

- Roads;
- Powerhouse;
- Service Bay;
- Barrage;
- Earth Embankment;
- Transition Block;
- Navigation Lock;
- Fish way; and
- Switchyard.

This section of the report describes the development of each of these components and how they were used at each site.

The layouts of the proposed Dunvegan project were examined as an example of a low cost design approach. However, the project components defined in the present study were based on conventional hydroelectric practice. While the components and layouts were not optimized, they were subject to design and constructability reviews and are considered to be representative of the scope of work for the project.

## 8.1 Relative Levels

The majority of dams defined in the Interim Report had gross heads of about 7.5 m (from tailwater to full supply level) and this was also the largest height of impoundment in the Peace Cascade Development. The heights of all components were therefore selected for this gross head. Subsequent refinement of the site locations resulted in a range of slightly smaller dam heights, however the components designed for a gross head of 7.5 m were used for all seven sites.

Based on the limited amount of information available on river cross sections, it was assumed that the riverbed is 4.1 m below the river profile surveyed by Thurber in 1978. This assumed riverbed was taken as the zero datum to which all vertical dimensions of the components are referenced. The elevations relative to bed level are given in Table 8.1 and can also be seen on Figure 8.2.

These levels provide a freeboard of 2.5 m from flood level to the crest of earth embankments, and 1.0 m to the crest of concrete structures to allow for wind setup and wave runup. The flood control range extends 2.0 m above full supply level.

With the normal tailwater set at the surveyed river level (+4.1 m relative elevation) and an impoundment with a gross head of 7.5 m, the full supply level is:

- 4.1 m + 7.5 m = 11.6 m.

The maximum ice jam level was selected as the highest of the ice jam levels predicted by BC Hydro's ice modelling.

The tailwater flood level was based on the computed river profile for a flow of 8000 m³/s with all reservoirs at maximum flood level.

## 8.2 Road Component

Roads would be 7.0 m wide, cambered, with 0.5 m shoulders on either side. Roads on earth dam crests can be expected to settle, so these would comprise 200 mm thick base course with a 150 mm gravel wearing course. All other access roads would be asphalt paved at the end of construction. Grades would not exceed 10%.

## 8.3 Powerhouse and Service Bay Components

The powerhouse and service bay components are shown on Figures 8.1 and 8.2. The powerhouse is the most complex component. Because of its size and importance to the cost estimate, the layouts were developed sufficiently to ensure that they defined a functional and maintainable facility.

The layout is largely controlled by the geometry of the generating unit, which is an 8 MW horizontal-axis S-turbine. The geometry incorporates the relatively large generator diameter that would be required for units with no speed increaser. The layout provides adequate space for the turbine and generator ancillary equipment as well as the auxiliary powerhouse electrical and mechanical equipment.

The intake sill would have to be set at riverbed level to achieve the submergence required to suppress vortices. This means that any sediment moving in the reservoir at full supply level under normal turbine flows will pass through the units. It also means that the intakes are vulnerable to some degree of sedimentation during floods when the Peace River carries a significant sediment load.

The intake trashrack has an inclination of 15°, which is suitable for use of conventional trash rakes. Downstream of the trashrack there is a standard ASCE/EPRI short type intake transition with stoplog slots and an intake gate. This gate would be used for unit maintenance, but would be capable of closing without power under full flow in an emergency.

The level of the powerhouse roof is controlled by the clearance required for the crane trolley and lighting above the required elevation of the powerhouse crane. Since this results in a roof above the reservoir flood level, there would be no need to design the roof for overtopping flows.

Various locations were considered for the draft tube stop logs and it was decided to locate them inside the powerhouse where they can be installed in all weather conditions using one of the powerhouse cranes.

Various locations were also considered for the generator transformers and switchgear, including the intake and tailrace decks and the powerhouse roof. However, because there would be fewer transformers than units, these layouts would result in a poor use of space. As shown in Figure 8.3, the selected location for the transformers and switchgear was in a switchyard adjacent to each powerhouse. This decision, together with the inside location of the draft tube gate, enabled the tailrace deck to be eliminated.

A service bay would be located at the end of the powerhouse more directly accessible by road. In most layouts this is on the left side of the powerhouse (looking downstream). The service bay would be large enough for lay down of the major components of one generating unit. The powerhouse cranes would provide coverage of the entire service bay.

For the layout of equipment, a typical plant would be organized into four or more "power groups", each comprising four generating units as shown in the single line diagram in Figure 8.4. Each group would be designed to operate as a unit with common unit auxiliary service, power distribution, control, and alarm systems. Each group would include metal-clad vacuum generator breakers and a group isolating disconnect switch feeding the combined output to a step-up oil-filled transformer in the switchyard.

Grouping of the units would reduce the number of step-up transformers. Instead of one generator transformer per unit, there would be four medium sized transformers in total. This is considered a reasonable compromise between minimizing equipment and transformer count and maintaining reasonable plant availability.

The group transformers in the switchyard would be fed by 15 kV cables running from the switchgear of each power group in the powerhouse. The cables would be installed in cable trays inside a cable trench running the length of the powerhouse to outside the Service Bay where an underground concrete duct bank would distribute them to each transformer.

While each generating unit within each group would have the required individualized protective relay system, the hot-standby redundant digital control/alarm system would be common for control of all four units including the group common services.

This arrangement results in cost savings, however it may adversely affect operating flexibility as it will not be possible to synchronize unit(s) in the flour unit group while other unit(s) in the block are operating. As a result it will be necessary to shut down operating units to bring up other units in the same group. Grouping of the units in this manner may also adversely affect reliability. This should be considered in future studies.

## 8.4 Barrage Component

Several options were considered for regulation of the reservoir during floods and when the powerhouse is shut down. An ungated ogee crest would be the safest option, but the required crest length (1,250 m for a flood range of 2 m) would be costly and too great to accommodate at any of the sites. A gated ogee crest spillway could be designed with a suitable length. However, in a run-of-river development on a river with a significant sediment load, the spillway crest elevation should generally be set lower than the intake sill elevation to reduce sediment problems at the intake. Since the intake sill had to be set at riverbed level (see above), the sill of the spillway should also be set at riverbed level, so the spillway becomes a gated barrage.

As shown in Figure 8.5, the barrage would comprise an invert slab at riverbed level and a series of piers carrying vertical lift gates with one hoist per gate. Stoplog slots would be provided upstream of the gates to enable the gates to be tested or lifted for maintenance.

As shown in Table 8.2, the length of the barrage depends on the head available for discharging flow, and this in turn depends on the flood tailwater level relative to the flood level at each dam.

The flow remains sub-critical through three of the barrages and in the worst case is only slightly supercritical (Froude Number = 1.3), so no energy dissipater would be required. A riprap apron would be provided upstream of the spillway. Downstream, a short apron and cutoff wall would be required, with a self launching apron of riprap to protect against undermining. A hydraulic model study of the barrage would be required to confirm its design and operational characteristics, including the size and extent of the riprap.

## 8.5 Embankment Fill Component

A typical embankment section is shown in Figure 8.6. The dam section is similar to that developed for Site C, to accommodate the very weak foundation conditions. A central core of clay is bounded by filter zones upstream and downstream. The core width is a minimum of 50% of the upstream water level. The core is founded within bedrock and a single line grout curtain is installed in bedrock along the dam centreline. The shells are granular soils, with outer slopes of 2.5H:1V. The dam crest is 2.5 m above the maximum flood level to provide adequate freeboard and wave run-up range. The upstream slope is protected with riprap.

## 8.6 Transition Block Component

A transition is required between the concrete structures (with a crest elevation of 14.6 m relative to bed level) and embankment fills (with a crest elevation of 16.1 m relative to bed level). Concrete gravity structures would be provided for this purpose. As shown on

Figures 8.7 and 8.8, these would have a sloping crest and a length to suit the designed slope of the embankment fill.

A drainage and grouting gallery would be provided within the base of the transition block at the same elevation and on the same alignment as most other concrete components. Where the block abuts a powerhouse (the only component with a deeper gallery), the block foundation would be lowered locally to match the powerhouse foundation and a sloping gallery with stairs would be placed within the transition block to connect the two galleries.

Since galleries terminate within transition blocks, an access shaft would be provided in each transition block with a shaft and door for egress to the downstream side of the transition block at the elevation of a footpath on the embankment fill.

At sites where the transition blocks for nearby concrete structures would overlap, a concrete gravity dam is shown. This has the same characteristics as the transition block except that the crest level is constant and at the same level as adjacent concrete structures.

## 8.7 Navigation Lock Component

A navigation lock, shown on Figures 8.7 and 8.8, has been provided at each site. It has been sized for the passage of pleasure boats and it incorporates a guide wall on the downstream side to shelter the approach to the lock from hazardous currents generated by the powerhouse and spillway and to provide temporary moorage for boats awaiting access to the lock. The approach on the reservoir side would be protected with a log/boat boom.

Controls for the lock would be located on the top of the lock sidewall. These would comprise two hand wheels connected to the filling and drain valves.

Most of the piping for filling and emptying the lock would be located in the drainage and access galleries to allow easy inspection and maintenance. The filling and drain valves would be connected to ports in the lock sidewalls upstream and downstream of the lock gates. Four ports would be provided in the floor of the lock for filling and draining, to reduce mooring forces on boats within the lock.

The lock would be operated as follows, starting with the lock empty and the upstream gate closed:

1) Boats would enter the lock on the downstream side and moor loosely on vertical mooring rods running the full height of the lock range. The downstream lock gates would then be closed, the drain valve would be closed and the filling valve would be opened. Water would flow into the lock, raising the lock water level. When the lock level approaches the reservoir level, the upstream lock gate would be opened (by hand, using a chain winch or long timber booms attached to the gate) allowing boats to leave the lock and move upstream.

2) Boats moving downstream would then enter the lock and moor loosely. The upstream lock gate would be closed again. The filling valve would be closed and the drain valve would be opened to lower the water level in the lock. When the lock level approaches tailwater level, the downstream lock gate would be opened, allowing boats to leave, completing one cycle of operation.

## 8.8 Fish Way Component

The fish way component is shown on Figure 8.7 and 8.8. The design of the fish way was based on the EPRI/ASCE guidelines (Moore, 1989). At least one fish way has been provided at each site. A second fish way would also be provided where the layout would result in fish habitat areas remote from the fish way location. For example, at sites where there are two river channels downstream of the site, a fish way would be provided in each channel.

The alignment of the fish way has been folded in order to produce a standard component with a width that is compatible with the other dam components, such as the navigation lock, powerhouse and barrage.

## 8.9 Switchyard Component

The open-air switchyard would be constructed on a cut and fill area located in close proximity and at an elevation similar to that for the powerhouse. It would be accessed from a side of the main road to the plant. A typical layout of the powerhouse, service bay and switchyard is shown in Figure 8.3.

The layout of the switchyard, shown in Figure 8.9, includes space within the fenced area for the high voltage (138 kV) switching equipment, oil-filled transformers and the take-off tower for the transmission line. Underground cable ducts would run from all switchyard equipment foundations to the ancillary building at one corner of the switchyard. A concrete encased underground duct bank would be placed between the powerhouse and the switchyard to carry power, control and communication cables.

The 138 kV switching configuration would be a ring bus (refer to the single line diagram in Figure 8.4) for compactness and reliability. The transformer for each group of four units would tie into a bay in the ring. The incoming and outgoing transmission lines would each be connected to a bay. Each line and transformer bay consisting of the associated SF6 breaker, disconnects and current transformers would be connected with tubular aluminium bus bars supported on insulators. The 15 kV cables from the powerhouse would run from the underground duct bank to the low voltage side of each transformer.

The transmission line, ring bus and high voltage equipment protective relay system would be located in the ancillary building. Equipment panels for the digital power line carrier or microwave communication system would also be installed in the building.

## 8.10 Foundations

The foundation of all components except the powerhouse was around to be a constant level for the purposes of this study. The gallery would be placed on or in bedrock. At sites where the bedrock level is below the assumed base of the gallery, the gallery foundation would be lowered to the bedrock level.

The properties of the rock foundations are described in Section 3. In the weaker Shaftsbury formations, it is necessary to mobilize the cross-bedding strength of the rock strata to ensure the stability of the structures. Since this would require an uneconomical depth of shear key, it has been assumed that arrays of tensioned multi-strand anchors would be used. These would be sleeved and fully grouted for corrosion protection and installed in the foundation concrete. For this conceptual design, 37-strand, double-corrosion-protected anchors with a working load of 5700 kN are assumed for costing purposes. However, these anchors would require a substantial bond length, in the order of 25 m, for Sites 7b to 7g in the weak Shaftsbury shale. It is likely that a final arrangement would have more anchors with lower tension, to reduce the bond length. The type, capacity and location of anchors should be reviewed in future studies, taking into account the likely need for retensioning as well as the need to mobilize relatively low bond stresses in the weak shale.

Sites 7a and 7b would have foundations in the more competent gates sandstone and would require no anchors except for the powerhouse component.

To avoid gaps in the sealing plane of the dam and to ensure that the grout curtain is as short and linear as possible, all components are aligned to a single Dam Reference Line. This line passes through the centreline of the crest road and the centreline of the drainage gallery. The grout curtain has been located within the drainage gallery on a line 1.5 m upstream of the gallery centreline.

A drainage curtain has been located 1.5 m downstream of the gallery centreline although, at sites that would be subject to high tailwater levels due to ice jams downstream, the drains are not effective in lowering the large uplift forces acting on the structure.

# 9. PROJECT LAYOUT

## 9.1 General

The components described above were used at each site to develop the overall project layout. However, the sites differ in access, amount of area available for sitting components out of the stream (to avoid or minimize diversions) and in the channel characteristics, in particular whether islands exist at the site. The sites therefore vary somewhat in the locations of structures, and in the numbers of minor components such as transition blocks. The layout of each site is described in this section.

## 9.2 Site 7a

Site 7a is located at Hudson's Hope and is the site closest to Peace Canyon generating station. The site layout is controlled by the steep riverbanks, the large island in the Peace River and the access, which is available from the right bank of the river only.

As shown on Figure 9.1, the concrete dam components were placed close to the right bank and intrude on a minor branch of the river that could be blocked with cofferdams during construction. These components include a barrage and powerhouse, separated by a fish way and navigation block. The service bay of the powerhouse and the switchyard would both be located at the right bank, adjacent to the road access.

The dam would be completed with an earthfill embankment. It was considered unlikely that approval would be obtained to connect a road from this embankment to the streets of Hudson Hope, nor to run a transmission line from the site through the town.

The dam would develop a gross head of 5.0 m and the powerhouse would have an installed capacity of 77 MW.

## 9.3 Site 7b

Site 7b, shown on Figure 9.2, is the most attractive dam site in the river reach. It is located approximately 13 km downstream of the town of Hudson's Hope, near the downstream extent of the Gates Sandstone outcrops in the riverbed. In the cascade development defined in this study, the dam would have a full supply level of 454.1 m. The topography of the site would be suitable for a dam with a full supply level of 460 m, which is the highest possible reservoir level for no negative impact on generation at Peace Canyon Dam. However, while a higher dam at Site 7b would take advantage of the better foundation rock and eliminate the need for a dam at Site 7a, a dam of this height was beyond the scope of the present study.

The site is dominated by sandstone islands and vertical riverbanks incised in the sandstone bedrock. The layout takes advantage of the largest sandstone island for construction diversion. The spillway and powerhouse were sited in the two existing river channels to minimize excavation quantities.

The only road access to the site is from the left bank of the river, so the barrage would be constructed behind cofferdams in the left hand river channel, and the barrage crest road would provide access to the rest of the site once it was completed.

The powerhouse would be built in the right hand channel and the navigation lock would be placed adjacent to the powerhouse where the flow would be more regulated and there would be a safer, more linear approach to the facility in the river channel on the downstream side.

Since the dam straddles two distinct river channels, two fish ways would be provided: one at the spillway in the left river channel and one at the powerhouse in the right river channel.

The service bay would be located at the left side of the powerhouse, to suit the most direct road access.

The dam would develop a gross head of 7.4 m and the powerhouse would have an installed capacity of 118 MW.

## 9.4 Site 7c

As shown on Figure 9.3, Site 7c has a relatively low flood plain on the left bank and access to the site is also only available on the left bank.

The flood plain is not wide enough to accommodate all the project components, but it is suitable for a layout with a diversion channel. The barrage would be built on the flood plain. It was located approximately 50 m from the riverbank to allow for construction of cofferdams for each stage of construction. The barrage would then be connected to the river by excavation of the diversion channel.

The barrage crest bridge would be used to access the powerhouse construction site located between cofferdams in the original river channel. The service bay would be located on the left side of the powerhouse for the most direct road access.

Two fish ways were provided to service both sides of the divided downstream channel.

The navigation lock would be located in the main river channel, adjacent to the powerhouse.

The dam would develop a gross head of 6.9 m and the powerhouse would have an installed capacity of 107 MW.

## 9.5 Site 7d

As shown on Figure 9.4, the topography at Site 7d is similar to that of Site 7c, and access to the site is on the left bank only. The layout would therefore follow the philosophy described above.

The dam would develop a gross head of 6.6 m and the powerhouse would have an installed capacity of 101 MW.

## 9.6 Site 7e

Once again, the topography Site 7e is similar to that of Site 7c, and access to the site is on the left bank only. The layout, shown on Figure 9.5, would therefore follow the philosophy described for Sites 7c and 7d above. The powerhouse would have one extra generating unit (as would the powerhouses at Sites 7f and 7g below) to utilize the tributary inflows from the Halfway River, which has its confluence between Sites 7d and 7e.

The dam would develop a gross head of 5.6 m and the powerhouse would have an installed capacity of 94 MW.

## 9.7 Site 7f

As shown on Figure 9.6, Site 7f has a wide flood plain on the left bank, an island in the river, and a steep right bank. Access to the site is on the left bank only.

The river channels either side of the island are too narrow to accommodate the powerhouse or spillway, so the layout envisages a diversion channel through a barrage on the left bank, enabling the powerhouse to be built in the right hand river channel and across most of the island. The island is denoted as a sand bank on the mapping, so it is anticipated that excavation of the powerhouse approach and tailrace would be in overburden.

The dam would develop a gross head of 7.6 m and the powerhouse would have an installed capacity of 130 MW.

## 9.8 Site 7g

The layout for Site 7g is shown on Figure 9.7. The site has fairly steep slopes on the left bank, islands in midstream surrounded by channels of substantial width and a small flood plain on the right bank. Access to the site would be from the left bank.

The layout anticipates that the islands would be used for diversion, allowing the barrage to be built in the left hand channel while the river is confined to the right channel with cofferdams. After construction of the barrage, the river would be diverted through the left channel and the powerhouse would be constructed behind cofferdams in the right channel.

A fish way would be constructed in both river channels. The navigation lock would be located adjacent to the powerhouse.

The dam would develop a gross head of 7.2 m and the powerhouse would have an installed capacity of 121 MW.

# 10. TRANSMISSION

The proposed approach to power collection and transmission takes into account the dispersed nature of the cascade plants. This would require a transmission line along a route connecting the plants at Site 7g to Site 7a. From Site 7a, the collected power would be transmitted to Peace Canyon GS substation. The load carrying capacity of the line would vary from about 200 MW at Site 7g to approximately 1000 MW from Site 7a to Peace Canyon SF6 substation.

## 10.1 Transmission Line Routing

The existing 138 kV line 1L364 runs in a right-of-way from near Fort St. John in the east to Hudson's Hope in the west and from there to the switchyard at GMS generating station at W.A.C. Bennett Dam. The line is built on the higher ground north of the river away from the flood plain. Since the existing 138 kV line does not have the capacity to carry the power generated by the cascade plants, a new main line would be built along the existing line in a wider right-of-way. This would require the least amount of additional land acquisition and vegetation clearing, and would use the existing access road. The new line would deviate from this alignment near each plant site and take the shortest perpendicular route to the plant switchyard, except as required by local geographical features or to bypass concentrated population centres such as the town of Hudson's Hope near Site 7a.

## 10.2 Transmission Line Configuration

Various line configurations were studied which included single circuit with single and bundled conductors, and double circuits with single and bundled conductors. ACSR conductors 795 kcmils and 1033 kcmils in size and transmission voltages of 138 kV and 230 kV were also studied. Table 10.1 tabulates the estimated costs for the various transmission line options. These costs do not include the cost of land acquisition for widening the existing right-of-way nor the new right-of-way between each detour point and the switchyard.

The optimum line configuration would be Option 2B consisting of a double circuit 230 kV line on wood poles with single or bundled 795 kcmils ACSR conductors as required to transmit the power. At a cost premium of approximately one percent, the double circuit line offers a higher availability for the generated power when compared with a single circuit line used in Option 1A and 2A. Since each circuit of the line would carry approximately half the current, outage of one circuit would reduce the transmitted power by half whereas the loss of a single circuit line would result in a total loss of generated power. The transmission line voltage of 230 kV was selected because the losses incurred would be much lower compared to those of a 138 kV line. Additional transformation cost would also be incurred at Peace Canyon substation if a 138 kV line is used since the GIS substation there is designed for 230 kV.

With Option 2B, each of the double circuits would detour at the nearest point on its route to every other site and back to connect to the next line section. Since each switchyard is in a ring bus configuration, the incoming line would be connected to the ring at one point and exit at another. This connecting line would be a single pole double circuit line between each detour point and the switchyard at each site. Each of the double circuits would connect to alternating sites along the route, i.e. Circuit # 1 would connect Sites 7g, 7e, 7c and 7a together while circuit # 2 would connect Sites 7f, 7d, and 7b. This arrangement would ensure no more than half the cascade plant output is lost due to outage of a single circuit. In keeping with BC Hydro practice, overhead ground wire would be provided only for the first half kilometer of each line into the switchyard for protection against lightning strikes. Breakers for each line section of the bus would be designed for single-phase operation to clear line to ground faults resulting from lighting strikes.

# 11. CONSTRUCTION PLANNING AND SCHEDULING

## 11.1 General

Seven sites are planned, all of which have a combination of common elements and some unique elements. In order to simplify the planning, scheduling and cost estimates, one site, Site 7f, was chosen as a base case for which the planning and scheduling are presented. However, a brief description of each site follows and a sequencing drawing has been produced for each site location and shown on Figures 11.1 to 11.7.

### 11.1.1 Site 7a

This is the only site that access can be economically developed from the right bank. The bridge over the Peace River just downstream of the existing Peace Canyon Dam provides a convenient crossing to the right bank. An access road can be constructed from Highway 29, starting just south of the bridge and terminating at the right abutment area of the site.

The elements included at this site are as follows:

- A 16 unit Intake, Powerhouse and Tailrace;
- A 14 bay Barrage;
- 2 Transition Blocks;
- A Fish Way;
- A Navigation Lock;
- A Switchyard;
- An Earthfill Dam; and
- A Transmission Line.

### 11.1.2 Site 7b

An access road can be constructed from Highway 29 on the left bank and terminating at the left abutment area of the site.

The elements included at this site are as follows:

- A 16 unit Intake, Powerhouse and Tailrace;
- A 10 bay Barrage;
- 3 Transition Blocks;
- 2 Fish Ways;
- A Navigation Lock;
- A Switchyard; and
- A Transmission Line.

#### 11.1.3 Site 7c

An access road can be constructed from Highway 29 on the left bank and terminating at the left abutment area of the site.

The elements included at this site are as follows:

- A 16 unit Intake, Powerhouse and Tailrace;
- A 10 bay Barrage;
- 2 Transition Blocks;
- A Concrete Gravity Dam;
- 2 Fish Ways;
- A Navigation Lock;
- A Switchyard; and
- A Transmission Line.

#### 11.1.4 Site 7d

An access road can be constructed from Highway 29 on the left bank and terminating at the left abutment area of the site.

The elements included at this site are as follows:

- A 16 unit Intake, Powerhouse and Tailrace;
- A 14 bay Barrage;

- 2 Transition Blocks;
- A Concrete Gravity Dam;
- 2 Fish Ways;
- A Navigation Lock;
- A Switchyard; and
- A Transmission Line.

#### 11.1.5 Site 7e

An access road can be constructed from Highway 29 on the left bank and terminating at the left abutment area of the site.

The elements included at this site are as follows:

- A 17 unit Intake, Powerhouse and Tailrace;
- A 17 bay Barrage;
- 2 Transition Blocks;
- A Concrete Gravity Dam;
- 2 Fish Ways;
- A Navigation Lock;
- A Switchyard; and
- A Transmission Line.

#### 11.1.6 Site 7f

The access to this site will utilize and upgrade local gravel roads from Highway 97 and some new construction is required. The road will terminate at the left abutment area of the site.

The elements included at this site are as follows:

- A 17 unit Intake, Powerhouse and Tailrace;
- A 14 bay Barrage;

- 4 Transition Blocks;
- An Earthfill Dam;
- 2 Fish Ways;
- A Navigation Lock;
- A Switchyard; and
- A Transmission Line.

### 11.1.7 Site 7g

The access to this site is via an existing gravel pit downstream of the site on the left bank. The road will terminate at the left abutment area of the site.

The elements included at this site are as follows:

- A 17 unit Intake, Powerhouse and Tailrace;
- An 18 bay Barrage;
- 2 Transition Blocks;
- A Concrete Gravity Dam;
- 2 Fish Ways;
- A Navigation Lock;
- A Switchyard; and
- A Transmission Line.

## 11.2 Planning for Site 7f

As mentioned above, Site 7f has been chosen to illustrate the sequencing and scheduling of the construction work involved. The other sites follow a similar sequence, but each will have some variations to accommodate specific conditions at the sites.

### 11.2.1 Site Access

An access road will be constructed which utilizes some existing gravel roads which link back to Highway 97 northwest of Fort St. John. The gravel roads will be upgraded and a new portion of road will be constructed to link the gravel road system to the left bank abutment area. It will be a two-lane road, constructed up to subbase level and used in this state during construction. On completion of the construction of the plant, the road will be repaired as necessary and a final surfacing layer will be laid. This will then provide all weather permanent access to the power plant.

### 11.2.2 Construction Facilities

The labour required for construction will be drawn firstly from Fort St. John and the surrounding area. However, the amount of skilled labour required will most likely warrant installing a construction camp. This will be set up close to the work site on the left bank. Site offices and workshops will also be set up in this area.

Aggregates and other processed materials can be used from two sources. Some of the materials from the excavation work can be stockpiled and processed on site and therefore an aggregate process plant will be installed, also on the left bank close to the work site. Commercial sources of aggregates may also be required from suppliers in the vicinity of Fort St. John.

Concrete can also be supplied from on-site batch plants, commercial sources or a combination of both. The batch plants will also be set up on the left bank close to the work.

### 11.2.3 Construction Sequencing

The sequence of construction is illustrated on Figure 11.6.

#### (a) Stage 1

Excavation for the barrage, the left fish way, transition blocks adjacent to the barrage, the earthfill dam and the left side powerhouse transition block will commence, working from the barrage axis both ways in the approach channel and discharge channel and along the Dam Reference Line toward the future powerhouse. Sections of the approach channel and the discharge channel will be left in place adjacent to the river to act as plugs during construction of the barrage. The construction of the barrage, left fish way and left and right transition blocks will commence as soon as the excavation has proceeded far enough away from the barrage vicinity. Construction of the left side powerhouse transition block, then earthfill dam, will follow in sequence.

Upon completion of the construction of the left fish way, the left transition and the left side bays of the barrage, the bridge steelwork will be erected and bridge decks constructed. Gate installation will also commence at this time.

Riprap will be placed upstream and downstream of the barrage structure.

After all of the gates have been installed, tested and left open the channel plugs will be removed, allowing the river to be diverted to flow through the barrage.

(b) Stage 2

Access to Stage 2 is via the barrage bridge and earthfill dam. The access ramp to the switchyard will provide access to the work area for Stage 2.

The upstream cofferdam will be constructed first. A typical section is shown on Figure 8.4. Initially, rock will be dumped and dozed into the river to form a starter dam to facilitate diversion of the river into the barrage channel. The main cofferdam fills will then be placed behind the starter dam and a cut-off wall will be installed. The construction of the downstream cofferdam is similar and will follow closely behind the upstream cofferdam.

The powerhouse site will then be dewatered by pumping between the cofferdams. Dewatering will be maintained during the construction of the powerhouse. Excavation for the Powerhouse, the right fish way, the navigation lock and the right transition block can commence prior to start of dewatering and progress down during and after dewatering is complete.

The powerhouse, the right fish way, the navigation lock and the right transition block will be constructed with work proceeding on several fronts. When the Stage 1 concrete work in the service bay and sufficient unit bays in the powerhouse have been completed, the steel superstructure will commence. The powerhouse cranes can then be installed and roofing and cladding commenced. After the powerhouse cranes are installed and sufficient roofing and cladding installed, the unit installation can commence. Temporary screen walls will probably be required in order to install units during construction of adjacent unit bays.

Stage 2 concrete will commence after the complete installation of the first unit and the auxiliary mechanical and electrical work will be completed in stages to allow for units coming on line in a phased manner.

Due to the relatively large number of units, it is expected that wet testing of the first unit will commence well before many of the units are completely installed. For the purpose of this study it is assumed that draft tube stop logs are required for 50% of the unit bays. In order to commence wet testing of the first unit the following need to be complete:

- Stage 1 concrete to all unit bays;
- Intake gates in every unit bay;
- Breaching and substantial removal of the upstream cofferdam;
- The installation of the draft tube stop logs in 50% of the unit bays; and
- Breaching and substantial removal of the downstream cofferdam.

The portion of the approach and tailrace channels between the cofferdams will be excavated in the dry. The majority of the excavation, however, will be dredged after the cofferdams have been removed. Silt curtains will be installed upstream and downstream of dredging operations to prevent silty water from travelling downstream. Careful execution of the work will be required to comply with environmental standards.

(c) Schedule

The construction schedule was prepared using PRIMAVERA P3 and is presented as Figure 11.8. The schedule Work Breakdown Structure (WBS) includes level one, Stages and level two, Work Areas.

The overall construction period from Award to all Units On line is 55 months with the first Unit coming on line in 48 months.

There is no allowance for winter shut-down. It is assumed that the start date would be selected to permit work to advance to a stage where areas of concrete construction could be hoarded for winter work.

# 12. COST ESTIMATE

## 12.1 General

Individual cost estimates have not been prepared for each site. Instead, two individual estimates were produced. One estimate contains components that are similar on each site and the second estimate contains elements that are unique to each site. These estimates were prepared using the G2 Estimating system. The cost elements from each estimate were then used to produce a summary of costs for each site using Excel spreadsheets. These are presented as Table 11.1.

The estimate for the similar components includes the following:

- A typical Intake Bay;
- A typical Powerhouse Unit Bay;
- A typical Tailrace Bay;
- A typical Service Bay;
- A typical Barrage Bay;
- A typical Navigation Lock;
- A typical Fish Ladder;
- A typical Transition Block; and
- A typical Switchyard.

It should be noted that all typical components are based on the components described in Section 8, designed for a head of 7.5 metres. In fact, all sites vary and some cost saving may be made if each individual site was completely detailed and quantified. However, this would require development of a unique set of components for each site, which is beyond the terms of reference for this study.

The estimate for unique elements includes the following:

- Access Roads and Bridges;
- River Diversions;

- Excavation and Foundation Preparation;
- Grouting and Drainage;
- Transmission Lines;
- Anchor Systems;
- Gravity Dams (Sites 7c, 7d, 7e and 7g only); and
- Earthfill Dams (Sites 7a and 7f only).

Transmission Line costs are based on a length of line from each site to the next site upstream, or to Peace Canyon Dam in the case of Site 7a, since it is unknown at this time which plant might be built first. If the sites were to be constructed in an order other than from upstream to downstream, transmission costs would vary from those given in Table 12.1.

## 12.2 Basis of Estimate

A quantity take-off was produced for the main elements of the work. Quantities for typical components were produced for one bay only and used in costing a single bay. These costs were multiplied in the summary sheets depending on the number of bays at each site. Quantities for the unique elements were produced for each site. For areas of work that have not been quantified, lump sum allowances have been included. Other costs have been abstracted from projects similar in nature.

The cost estimate has been formulated using the construction methods and planning previously described. It should be noted that the planning and methods used to formulate the estimate might not necessarily represent those finally adopted. Methods used will vary and depend largely on equipment holdings and personnel available from the contractors at the time of construction.

The estimates for the civil work have been prepared using the G2 ESTIMATOR estimating system. This system is a database system using resource data banks for labor, equipment, materials and other designated or special costs. Worksheets are established within the system for all items of work. These worksheets give descriptions, productivity assessment, crew make-up and materials consumption for the work to be performed. The labour, equipment and materials are drawn from the data banks. The resource data banks have been updated to reflect the costs of labour, equipment and materials for the work in this location and to 2002 cost levels.

The labour costs are based on unionized labour similar to the Columbia Hydro Constructors Ltd (CHC) Agreement and include basic rates, overtime and shift differentials, vacation and holiday pay and fringe benefits where applicable for the various trades required. All other related labour costs such as travel and small tools are included as part of the mark up for indirect costs.

The equipment costs are based on what are considered to be average costs for equipment depreciation, financing and spare parts. The operator, maintenance labour, fuel, oils and grease have been adjusted to suit local conditions and prices.

The materials data banks for both permanent materials and job supplies have been modified to local costs where applicable and include shipping, handling, duties and taxes where applicable.

The contractors' direct construction costs are formulated using methods, equipment, materials, crews and productivities usually associated with the type of work under consideration.

The direct costs include all labour categories up to working foreman level. All supervisory personnel including staff and nonworking foreman level are included in the indirect cost mark-up.

The mechanical and electrical costs are a combination of budget prices obtained from equipment manufacturers and from historical costs.

Where appropriate a markup of 35% has been used to cover the contractors' indirect costs and profit.

All pricing is in 2002 Canadian dollars.

At this time no borrow sources nor waste disposal sites have been identified. Therefore, the pricing for both borrowed material and waste disposal are been based on haul distances of 5 km. It is conceivable that, should the haul distances for disposal of the overburden material from the excavations be shorter, a different method of excavation may be used. Currently all excavation is priced using loaders or backhoes loading into trucks. Considerable savings can be made if haul distances become short enough to utilize scrapers.

As noted above, it is assumed that draft tube stop logs are required for 50% of the powerhouse bays, to enable watering up for unit testing to commence at an early stage as the first units are completed. Some savings can be made if the schedule can be modified to minimize stop log requirements, or if stop logs can be shared between the various sites. This will depend on the overall construction strategy for all sites.

## 12.3 Estimate Summaries

The estimate summaries are presented in Table 12.1. The individual cost lines above the subtotal have been brought forward from the detailed cost estimate prepared in the G2 ESTIMATOR system.

An allowance of 6% has been added for Engineering Fees and an allowance of 6% has been added for Project Management Fees.

A contingency of 30% has been applied to all costs.

In summary the estimated cost for each site, including contingency, is:

- Site 7a, $498,200,000;
- Site 7b, $453,300,000;
- Site 7c, $476,700,000;
- Site 7d, $517,000,000;
- Site 7e, $537,000,000;
- Site 7f, $549,800,000; and
- Site 7g, $548,900,000.

The total estimated cost is $3,580,900,000. For comparison, the recent cost estimate review for the Site C project, with 900 MW installed, indicated a direct cost of approximately $2.0 billion, in October 2001 Canadian dollars.

# 13. PROJECT ECONOMICS

An economic analysis was carried out on the cascade development. This was based on the following parameters, which were adopted after discussion with BC Hydro:

- Required Internal Rate of Return: 8%
- Project Life: 70 years
- BC Hydro Corporate Overhead: 2% of project cost
- Interest During Construction: 6% per year of cumulative expenditures
- Operation and Maintenance: 1% of project cost per year
- Inflation: 2% per year.

Cost and benefit streams were developed as described below.

## 13.1 Costs

The capital cost was spread uniformly over a four-year construction period. The engineering and project management costs, totalling 12% of project cost, were distributed as follows:

- 6% of the project cost is in the year before the start of construction; and
- 1.5% of the project cost during each year of construction.

The BC Hydro Corporate overhead was computed on the above cost stream. The cumulative project cost stream was developed and used to compute the interest during construction (IDC). The cost stream for Operation & Maintenance was added, starting in the first year of operation and running for the 70-year life of the project. All components of the cost stream were summed for each year of the construction period and facility life.

A cost stream was developed for each project in the cascade development, starting with Site 7a and developing the cascade in the downstream direction, since this would minimize the net present value of transmission line costs. A two-year delay was assumed between the start of each project, in order to provide fairly continuous work for excavation, concrete and equipment erection crews. The cost streams for the projects were summed to obtain a cost stream for the entire cascade development. This was corrected for inflation to produce the final cost stream.

## 13.2 Benefits

It was assumed that generation at the Cascade Development plants would be synchronized with Peace Canyon generating station to maximize peak power production. No reduction in energy was made for ice. It was assumed that this average annual energy would be produced in each year of operation. The annual benefit from the generation was computed from this energy and the unit energy cost. An initial value was assumed for the unit energy cost and finalized as described below. The annual benefit stream was distributed over the 70-year life of the project.

A benefit stream was developed for each project and the streams were summed to obtain the total benefit stream for the cascade development. This was adjusted for inflation to give the final benefit stream.

The net benefit cash flow was computed by subtracting the final cost for each year from the final benefit in the same year. The Net Present Value of the cash flow was computed based on the required Internal Rate of Return. This Net Present Value was made zero by changing the value of the unit energy cost.

## 13.3 Results

The economic analysis shows that the project would have a unit energy cost of 8.13 cents / kWh. This may be compared to a unit energy cost of 5.5 cents / kWh for Site C and 6.5 to 10.5 cents / kWh determined in recent studies of two-to four-dam cascade developments.

# 14. ENVIRONMENTAL AND SOCIO-ECONOMIC ASPECTS

## 14.1 Environmental Impacts

The cascade development of low head hydroelectric dams in the Peace River between Hudson’s Hope and Fort St. John would essentially return the river to its pre-regulation width. Since regulation, the river has contracted and seasonally wetted side channels and bars have succeeded to permanently vegetated upland habitat of coniferous and deciduous trees and shrubs. In some locations, side channel habitats are low enough or close enough to the river to receive water at higher flows. Some of these areas have become non-vegetated wetlands providing low quality habitat for amphibians and reptiles, previously unable to colonize the unregulated river valley. Similarly, regulation and the increase in upland habitat within the river valley have increased the habitat opportunities for a number of mammals such as beaver, deer and moose. Conversely, the contraction of the wetted area of the river and loss of side channel habitats has reduced habitat for fish species. Generally, these trends would be reversed with the introduction of a series of low-head dams in the river.

Fish would benefit from the increase in the wetted width of the river and the higher water. While the higher water may reduce the complexity of fish habitats in the river, it would significantly increase the area of productive shallow water habitat, as many of the low-lying islands and bars would be flooded. With unrestricted passage between segments of the river via the fish ways, fish would still have access to the many tributary rivers and streams of the Peace River. In contrast, Site C dam as proposed would not include a fish way, so fish passage would effectively be blocked at the dam site. The single, deeper reservoir upstream of Site C would produce much less new, shallow water habitat.

Existing riparian habitat would be affected close to the dams along the Peace River, and for relatively short distances up tributary streams. This is in contrast to the Site C development that would flood more existing shoreline as well as more of the tributaries in the vicinity of the river, and significant valley habitat as well.

The cascade development would have little impact on existing residences along the valley, with none having to be relocated due to flooding. This is in contrast to Site C, where several residences would have to be relocated. The cascade development would not impact the existing Highway 29, whereas the reservoir behind Site C dam would result in the relocation of several kilometres of the highway. The cascade development would cause much less flooding of agricultural land than would Site C.

Water quality is unlikely to be significantly impacted by the cascade development. With the barrages operating there would be less opportunity for gas entrainment than with spillways.

It should be noted that BC Hydro owns all land that would be impacted by the cascade development.

In early 2002, BC Hydro's Environmental Resources group prepared impact rankings for biophysical factors, to compare the construction of Site C Dam and a cascade development comprising eight plants between Peace Canyon Dam and Site C Dam. The eight plants in the cascade were assumed to be similar to the proposed Dunvegan, Alberta power development, i.e. having installed capacities of 84 MW each. With eight dams, the cascade scheme would have a lower average dam height, and therefore a slightly smaller total flooded area, than would the cascade development presented in this report. However, the impacts of the eight-plant development assessed by BC Hydro and the seven-plant development presented in this report are thought to be similar.

Table 14.1, extracted from BC Hydro's assessment of the eight-plant development, presents a summary of impacts on biophysical factors due to construction of Site C Dam and to construction of the cascade development. The table presents a comparative ranking of eight aspects that would be impacted by either hydroelectric development. The single site option, represented by Site C, was taken as the base case. The individual score for each category for Site C reflects the relative importance of the category. For example, impacts to fish (given a weighting of 5) were considered to be more critical than impacts to climate (given a weighting of 2).

The cascade option was compared against the single site option and impacts were rated as better than (lower score) or worse than (higher score) for each category. The significantly lower score for the cascade development reflects a lower environmental impact. The main reasons for the lower overall impact are a smaller impact on fish, with a benefit in the form of shallow habitat, and the smaller impact on wildlife due to the smaller flooded area in the cascade development.

Under the category Water Quality and Quantity in Table 14.1, a note on sediment accumulation downstream of Halfway River has been added to the original table. This aspect was apparently not considered for the earlier cascade development. However, as noted in Section 2, there is potential for a substantial sediment accumulation with time that could have impacts on the water quality and, possibly, navigation. The score for that category has not been changed from the original score assigned by BC Hydro.

It should be noted that the ranking scores do not represent an absolute assessment of environmental impact. They are intended solely as a comparison of the relative environmental effects of the two alternative options.

## 14.2 Socio-economic Impacts

BC Hydro compared social and economic impacts of Site C Dam and the eight-plant cascade development described above. The comparative ranking is presented in Table 14.2. The socio-economic impact of the seven-plant cascade development presented in this report is considered to be similar to that for the cascade development presented in Table 14.2. As for Table 14.1, the individual scores for Site C reflect the relative importance of each category, and the rankings are relative, not reflecting a quantitative assessment of impacts.

The overall impacts are considered to be similar for development of one dam or a cascade of dams. The smaller flooded area of the cascade development would result in reduced impacts on existing land use and accessibility, which accounts for a slightly lower impact. Recreation opportunities are considered, on balance, to be less favourable with the cascade development as travel on the river would be impeded by the many dams, although navigation locks would be provided.

Arguably, recreation opportunities have increased as a result of the existing regulation. Flows are more consistent and predictable and access to and safe use of the river is facilitated as a result. As well, the increase in instream bars and vegetated islands now offers a number of primitive and secluded recreation sites for the recreationist. However, the cascade development would significantly affect the recreational use of the river. While the dam sites along the river would provide seven well-maintained access points to the river, the dams themselves would impede travel along the river. The river would essentially be segmented and passage between segments would require the use of boat locks. Boaters and canoeists would have to become used to the location and dangers of the many flooded islands and bars, a number of which may be inundated to a depth of a metre or less. Additionally, higher water would flood the majority of the primitive recreation sites along the river. Due to these disbenefits, the impact of the cascaded development is considered a negative impact, compared to the impact of the singe reservoir behind Site C Dam, as documented in Table 14.2.

Whether the cascade development is a benefit or disbenefit for recreation depends on one's preference for boating experience. Site C would result in a single deep reservoir with slower moving water and would flood much more existing shoreline, compared to the cascade development.

Under the category "Pressure on Community" BC Hydro noted that the smaller workforce and longer construction period of the cascade development may reduce impacts. The long construction period for a cascade development, 16 years in the case of the cascade development presented in this report, would permit a stable workforce to develop in the region, with resulting economic benefits to the local economy. This note has been added under the category "Economic Benefits to Region / Land Use" in Table 14.2 for this report, but the score for that category has not been modified from the original score assigned by BC Hydro.

## 14.3 Specific Effects

This section describes effects of the individual proposed cascade development.

### (a) Site 7a

The first dam is located adjacent to Hudson's Hope and will maintain a reservoir elevation of 460 metres. However, because of the river gradient in this section of the river very little vegetation habitat will be flooded. Unvegetated point bars will be inundated. Construction of the dam and access to the dam will result in a loss of approximately 10.5 hectares of, primarily upland treed and shrub habitat. The recreation site at the Maurice Creek delta will be excavated to accommodate tailwaters from the dam. Access to the rocky beach at Alvin Holland Municipal Park will be reduced as a result of higher water levels.

(b) Site 7b

Site 7b would be located about three kilometres upstream of Farrell Creek and have a reservoir water level of 454.1 metres. It would flood back almost to Hudson's Hope and inundate most of the exposed bars and islands upstream of the site. Construction would impact a small amount of upland shrub habitat and gravel bars. Flooding would likely inundate all of the vegetated islands in the river with the exception of the most upstream one immediately downstream of Hudson's Hope. Much of this large island would remain above high water but the vegetation may be significantly impacted by the higher water table.

There is a primitive recreation site immediately downstream of the barrage and the Powell boat launch site is immediately upstream of the dam site. The location of the dam is know as "The Gates" and from the viewpoint off Highway 29 above the site there are unrestricted views, upstream and downstream, of the Peace River.

(c) Site 7c

This dam would be sited approximately equidistant between Farrell Creek and Halfway River. The reservoir water elevation would be 446.2 metres. Construction would directly impact about 30.5 hectares of upland treed, upland shrub and gravel bar habitats. As well, some unvegetated wetland habitat would be lost due to excavation for the barrage and sitting of the access road. An additional 33 hectares of upland treed habitat on an instream island would be flooded by the higher reservoir water levels. On the north shore opposite the dam site additional unvegetated wetland habitat would be inundated with the higher water.

The excavation for the barrage may directly impact the Raspberry Island boat launch and the dam would restrict access to the primitive campsite immediately downstream of the dam. This primitive site is the primary destination for recreationists using the Raspberry Island boat launch. The Fossil Bed primitive campsite, upstream on the south bank, would likely be inundated by higher reservoir water levels.

(d) Site 7d

This dam would be sited about 3 kilometres above the confluence with Halfway River and have a reservoir elevation of 438.2 metres. Approximately 22.5 hectares of upland treed, upland shrub and exposed gravel bar habitat would be directly impacted by construction of the dam. Road access would cut off a remnant channel that likely flowed at high discharges.

The Attachie Slide Primitive Campsite and river access is immediately downstream of the barrage excavation and may be impacted by construction.

(e) Site 7e

The site for this dam is at Bear Flats and reservoir water levels will be 431 metres. Construction for the dam would impact about 38 hectares of cultivated land and an additional approximately 4 hectares of upland treed and shrub habitat, some of which has small creek riparian values.

Flooding from higher reservoir water levels would have significant impact on the riparian terraces on the north side of the river with inundation of the upland shrub habitat below 431 metres. Upland treed habitat may be high enough to escape flooding but could be impacted by the higher water table. Approximately half of a 125 hectare upstream island would be inundated and, again, the upland treed habitat may escape direct flooding. As well, a 50 hectare section of a larger cultivated field on the north side of the river would be inundated by the reservoir.

(f) Site 7f

This dam would be located immediately downstream of Wilder Creek and have a reservoir elevation of 425 metres. Dam construction impacts would be limited to a minor amount of upland shrub habitat and exposed gravel bars. Upstream, the reservoir would inundate about 212 hectares of upland shrub and upland treed habitat. On the south side of the river, opposite Wilder Creek, there is an unvegetated wetland habitat that would be inundated by the reservoir. As well, there is one primitive campsite and a mineral spring that would be impacted by the reservoir.

(g) Site 7g

The final dam in the cascade development would be located immediately downstream of the Moberly River confluence and have a reservoir elevation of 417 metres. Construction at this site would have modest impacts on instream habitats and there are no primitive campsites in the upstream section of the river. In total, about 15 hectares of upland shrub, upland treed and exposed gravel bar habitat would be impacted by the reservoir.

# 15. CONCLUSIONS

This conceptual study of a cascade development on the Peace River, between the existing Peace Canyon Dam and the proposed Site C, concludes that seven individual sites would be required to satisfy the BC Dam Safety Regulation for a "Low" Consequence Category water retaining structure. These sites may not satisfy BC Hydro's criteria for "Low" Consequence structures, because BC Hydro includes the cost of damage to its structure in the case of failure, while the BC Dam Safety Regulation does not. This aspect will require further review if additional studies on a cascade development are carried out.

The seven sites would develop between 5.0 m and 7.6 m gross head (full supply level to tailwater level). Installed capacities would range from 77 MW to 130 MW, with the design power flow equal to the design power flow from Peace Canyon Dam for the upstream four sites. For the three sites downstream of the Halfway River confluence, the average flow from that tributary is added to the Peace Canyon Dam releases. Total installed capacity would be 748 MW, compared to 900 MW for Site C. The Peace Cascade Development would develop an annual average energy of approximately 4,000 GWh, or 86% of the 4,710 GWh anticipated from Site C.

Project components have been designed to a conceptual level to permit development of a cost estimate. The components are of proven design, rather than introducing innovation that might not be supportable at the detail design stage. The design and layout of the components have been reviewed for constructability aspects, and construction sequencing has been considered for each site.

Cost estimates were developed for standard units of the various components. For example, the powerhouses were estimated in terms of cost per unit bay. The components at each site were then estimated as the unit cost times number of units (or length, for earthfill dams) at each site. Unique aspects at each site, for example the quantity of excavation, were estimated separately for each site. These costs were then combined to yield the cost estimate for each site.

Direct costs for the seven sites, including contingency, range from $450 million to $550 million and total $3.58 billion. Cost per installed megawatt range from $4 million to $6.5 million. The unit energy cost would be 8.1 cents / kWh. In comparison, the respective values for Site C, based on a recent estimate by BC Hydro, are $2.0 billion, $2.2 million / MW and 5.5 cents / kWh. Thus, while a cascade development would require less capital in the initial development, the cost of energy is substantially higher than for the single, Site C development.

Ranking of biophysical factors indicates that the Peace Cascade Development would have approximately one-half the environmental impact of Site C Dam, while a similar ranking of socio-economic factors indicates a slightly smaller negative impact for the cascade development. However, the rankings are relative and do not provide absolute measures of the impacts. Further work would be required, beyond the scope of this study, to formulate quantitative environmental and social “costing” or ranking methods to permit a more complete comparison of the two alternatives and to determine whether the higher unit energy cost of the Peace Cascade Development is justified.

If a decision is made to pursue the cascade option to the next level of study, the following additional studies would also be required:

1) As discussed in Section 5, the survey of the river reach needs to be updated. River cross sections would be needed at 500 m intervals in the vicinity of proposed dam sites and in steep parts of the river reach. River cross sections would be needed at 2 km intervals elsewhere. The survey should extend above the anticipated flood levels in the cascade. In addition, a level control survey would be required to ensure that all river sections are based on a common level datum, and river profiles would be required at known flow rates in order to calibrate the hydraulic models.

2) If the new river survey differs significantly from the river bed profile assumed in the present study, the locations and heights of the dams should be adjusted.

3) Consideration should be given to replacing Site 7a with a higher-head dam at Site 7b, since Site 7b is the most favourable dam site in the reach in terms of topography and foundation geology.

4) Operation studies for W.A.C. Bennett and Peace Canyon Dams would be required in order to determine the 1000-year outflows expected on the basis of the flood

operating procedure. This flow rate controls the flood capacity required for the Peace Cascade Development.

5) While the Peace Cascade Development would satisfy the CDA Guidelines and BC Dam Regulation for Low Consequence Category dams, the economic loss to BC Hydro from failure of a cascade component would probably exceed the internal limit of $40 million. A policy review is therefore required to determine the required flood capacity of the cascade sites.

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# TABLES

## TABLES

| | Jan | Feb | Mar | April | May | June | July | Aug | Sept | Oct | Nov | Dec | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1968 | | | | | | | | 787 | 810 | 804 | 674 | 329 | |
| 1969 | 208 | 172 | 190 | 496 | 2151 | 2967 | 923 | 980 | 1227 | 823 | 583 | 449 | 931 |
| 1970 | 230 | 240 | 230 | 343 | 1791 | 3986 | 1371 | 832 | 751 | 618 | 283 | 220 | 908 |
| 1971 | 137 | 320 | 120 | 381 | 2172 | 3776 | 1908 | 820 | 1051 | 802 | 480 | 273 | 1020 |
| 1972 | 257 | 176 | 235 | 395 | 3089 | 5593 | 2253 | 1371 | 616 | 665 | 439 | 365 | 1288 |
| 1973 | 300 | 245 | 236 | 379 | 2788 | 4132 | 2150 | 773 | 861 | 570 | 251 | 371 | 1088 |
| 1974 | 181 | 245 | 283 | 570 | 2094 | 3775 | 3118 | 1515 | 847 | 1383 | 544 | 415 | 1248 |
| 1975 | 292 | 312 | 204 | 319 | 1726 | 3076 | 1839 | 1147 | 570 | 419 | 359 | 196 | 871 |
| 1976 | 339 | 222 | 189 | 440 | 2812 | 4191 | 3347 | 1874 | 946 | 743 | 565 | 376 | 1337 |
| 1977 | 278 | 260 | 214 | 701 | 2631 | 3332 | 2325 | 1111 | 752 | 719 | 433 | 395 | 1096 |
| 1978 | 279 | 196 | 210 | 457 | 1482 | 2896 | 953 | 667 | 699 | 855 | 613 | 355 | 805 |
| 1979 | 227 | 304 | 196 | 333 | 2003 | 3946 | 2461 | 791 | 708 | 614 | 263 | 199 | 1004 |
| 1980 | 233 | 129 | 177 | 517 | 1860 | 2194 | 1498 | 792 | 1121 | 1002 | 763 | 416 | 892 |
| 1981 | 549 | 364 | 221 | 535 | 3872 | 3622 | 1798 | 762 | 644 | 573 | 544 | 304 | 1149 |
| 1982 | 266 | 230 | 293 | 238 | 1921 | 4406 | 2033 | 1099 | 935 | 907 | 638 | 313 | 1106 |
| 1983 | 278 | 274 | 237 | 663 | 2159 | 3035 | 2207 | 1026 | 816 | 704 | 600 | 280 | 1023 |
| 1984 | 276 | 281 | 266 | 603 | 1734 | 4175 | 2473 | 1222 | 1185 | 1260 | 460 | 334 | 1189 |
| 1985 | 439 | 214 | 272 | 435 | 2901 | 3274 | 2197 | 727 | 870 | 706 | 256 | 371 | 1055 |
| 1986 | 247 | 244 | 237 | 389 | 1700 | 4051 | 2385 | 761 | 411 | 896 | 554 | 392 | 1022 |
| 1987 | 289 | 280 | 280 | 565 | 2797 | 4333 | 2169 | 1088 | 997 | 768 | 750 | 393 | 1226 |
| 1988 | 330 | 314 | 308 | 755 | 3638 | 3713 | 2041 | 1083 | 576 | 689 | 519 | 379 | 1195 |
| 1989 | 311 | 243 | 244 | 608 | 2869 | 2860 | 1312 | 893 | 561 | 665 | 586 | 499 | 971 |
| 1990 | 415 | 298 | 262 | 689 | 3138 | 5083 | 1558 | 559 | 414 | 428 | 291 | 349 | 1124 |
| 1991 | 251 | 318 | 252 | 728 | 3228 | 2908 | 1492 | 735 | 908 | 1191 | 710 | 503 | 1102 |
| 1992 | 450 | 255 | 486 | 1366 | 2645 | 4841 | 1422 | 495 | 912 | 1379 | 630 | 384 | 1272 |
| 1993 | 350 | 288 | 250 | 717 | 3497 | 2410 | 1582 | 1086 | 579 | 479 | 461 | 359 | 1005 |
| 1994 | 378 | 323 | 331 | 949 | 3075 | 3076 | 1782 | 875 | 1020 | 821 | 475 | 413 | 1127 |
| 1995 | 347 | 284 | 255 | 696 | 2969 | 2427 | 1784 | 1026 | 578 | 613 | 460 | 359 | 983 |
| 1996 | 370 | 279 | 319 | 988 | 2097 | 5068 | 3538 | 1442 | 1078 | 1032 | 546 | 425 | 1432 |
| 1997 | 366 | 338 | 345 | 718 | 3598 | 4763 | 1995 | 1049 | 929 | 1155 | 759 | 423 | 1370 |
| 1998 | 431 | 349 | 326 | 655 | 3805 | 2019 | 1003 | 582 | 480 | 846 | 484 | 363 | 945 |
| 1999 | 371 | 316 | 275 | 778 | 2280 | 4732 | 2121 | 943 | 681 | 566 | 518 | 383 | 1164 |
| 2000 | 339 | 259 | 238 | 497 | 1585 | 3980 | 2194 | 1156 | 1332 | 916 | 755 | 361 | 1134 |
| 2001 | 352 | 262 | 201 | 448 | 1647 | 4895 | 2513 | 1161 | 815 | | | | |
| Max | 549 | 364 | 486 | 1366 | 3872 | 5593 | 3538 | 1874 | 1332 | 1383 | 763 | 503 | 1432 |
| Average | 314 | 268 | 254 | 586 | 2538 | 3743 | 1992 | 977 | 814 | 806 | 523 | 362 | 1096 |
| Min | 137 | 129 | 120 | 238 | 1482 | 2019 | 923 | 495 | 411 | 419 | 251 | 196 | 805 |

**TABLE 2.1**
**Williston Reservoir**
**Monthly Average Historical Inflows ($m^3/s$)**

| | Jan | Feb | Mar | April | May | June | July | Aug | Sept | Oct | Nov | Dec | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1980 | | | | 522 | 330 | 248 | 246 | 624 | 912 | 1241 | 1067 | 800 | |
| 1981 | 570 | 1048 | 1429 | 1309 | 605 | 442 | 755 | 715 | 1173 | 1408 | 1561 | 1441 | 1038 |
| 1982 | 1604 | 1414 | 962 | 1096 | 589 | 388 | 351 | 823 | 1039 | 1224 | 1448 | 1431 | 1031 |
| 1983 | 816 | 543 | 454 | 565 | 1094 | 719 | 2025 | 1093 | 1461 | 1255 | 1054 | 1340 | 1035 |
| 1984 | 1136 | 818 | 603 | 1069 | 1297 | 856 | 1186 | 1306 | 1320 | 1432 | 1451 | 1571 | 1170 |
| 1985 | 957 | 945 | 1365 | 1421 | 1067 | 1227 | 1141 | 992 | 1403 | 1423 | 1528 | 1618 | 1257 |
| 1986 | 1380 | 934 | 685 | 1057 | 874 | 272 | 188 | 332 | 587 | 859 | 1155 | 1142 | 789 |
| 1987 | 1288 | 1578 | 1650 | 1650 | 1088 | 1316 | 1148 | 834 | 1213 | 1349 | 1357 | 1695 | 1347 |
| 1988 | 1774 | 1708 | 1708 | 1474 | 875 | 1128 | 1274 | 1209 | 1268 | 1359 | 1514 | 1110 | 1367 |
| 1989 | 1334 | 1463 | 1271 | 847 | 560 | 710 | 1111 | 1149 | 869 | 905 | 721 | 1027 | 997 |
| 1990 | 1449 | 1344 | 977 | 958 | 777 | 707 | 644 | 702 | 1175 | 1447 | 1419 | 1621 | 1102 |
| 1991 | 1091 | 602 | 1171 | 908 | 661 | 508 | 328 | 460 | 733 | 1572 | 1530 | 1620 | 932 |
| 1992 | 1577 | 1709 | 1376 | 1626 | 1446 | 657 | 574 | 779 | 1015 | 1084 | 1567 | 1765 | 1265 |
| 1993 | 1797 | 1726 | 1703 | 1365 | 468 | 254 | 320 | 727 | 950 | 1034 | 1620 | 1798 | 1147 |
| 1994 | 1656 | 1665 | 1561 | 906 | 378 | 336 | 461 | 758 | 918 | 1171 | 1626 | 1670 | 1092 |
| 1995 | 1544 | 1026 | 766 | 580 | 304 | 349 | 568 | 356 | 531 | 873 | 1069 | 1442 | 784 |
| 1996 | 1294 | 1271 | 1297 | 1247 | 960 | 1968* | 4808* | 2476* | 1585 | 1113 | 1335 | 1514 | 1739* |
| 1997 | 1398 | 1188 | 1360 | 1230 | 833 | 509 | 477 | 537 | 807 | 945 | 1720 | 1833 | 1070 |
| 1998 | 1563 | 1459 | 1344 | 1353 | 604 | 433 | 642 | 905 | 1002 | 1180 | 1621 | 1714 | 1152 |
| 1999 | 1371 | 1660 | 1283 | 1322 | 1227 | 680 | 620 | 612 | 1144 | 1159 | 850 | 1399 | 1110 |
| 2000 | 1408 | 1612 | 1554 | 1053 | 1265 | 787 | 831 | 877 | 841 | 959 | 1576 | 1502 | 1189 |
| 2001 | 1398 | 1419 | 1265 | 1271 | 743 | 408 | 515 | 602 | 670 | | | | |
| Max | 1797 | 1726 | 1708 | 1650 | 1446 | 1316 | 2025 | 1306 | 1585 | 1572 | 1720 | 1833 | 1367 |
| Average | 1353 | 1292 | 1228 | 1129 | 820 | 616 | 733 | 781 | 1028 | 1190 | 1371 | 1479 | 1099 |
| Min | 570 | 543 | 454 | 522 | 304 | 248 | 188 | 332 | 531 | 859 | 721 | 800 | 784 |

* Note, in 1996 spill was initated to lower the Williston Reservoir. This is not concerned as a normal hydrologic event, therefore not considered in the averaged inflows.



**TABLE 2.2**
**W.A.C. Bennett Dam**
**Monthly Average Releases ($m^3/s$)**

| | Jan | Feb | March | April | May | June | July | Aug | Sept | Oct | Nov | Dec | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1972 | 837 | 870 | 812 | 811 | 658 | 1956 | 2128 | 1363 | 933 | 955 | 1145 | 1252 | 1145 |
| 1973 | 1339 | 1404 | 1353 | 1193 | 1018 | 1151 | 1135 | 1128 | 1036 | 1091 | 1120 | 893 | 1153 |
| 1974 | 1117 | 1104 | 1108 | 1030 | 992 | 1010 | 1185 | 1500 | 1112 | 1293 | 1457 | 1433 | 1196 |
| 1975 | 1380 | 1514 | 1389 | 1447 | 964 | 719 | 414 | 367 | 798 | 896 | 1080 | 1072 | 999 |
| 1976 | 1128 | 1140 | 1275 | 1034 | 969 | 1093 | 1312 | 1750 | 1233 | 1567 | 1592 | 1601 | 1310 |
| 1977 | 1402 | 951 | 741 | 976 | 800 | 897 | 1388 | 1113 | 863 | 1216 | 1493 | 1654 | 1127 |
| 1978 | 1544 | 1546 | 1244 | 1031 | 802 | 732 | 591 | 681 | 474 | 807 | 994 | 1529 | 996 |
| 1979 | 1610 | 1511 | 941 | 799 | 817 | 1020 | 1037 | 788 | 1002 | 977 | 1347 | 964 | 1064 |
| 1980 | 1297 | 1003 | 761 | 539 | 330 | 248 | 246 | 624 | 912 | 1241 | 1067 | 800 | 754 |
| 1981 | 570 | 1048 | 1429 | 1309 | 605 | 442 | 755 | 715 | 1173 | 1408 | 1561 | 1441 | 1037 |
| 1982 | 1604 | 1414 | 962 | 1096 | 589 | 388 | 351 | 823 | 1039 | 1224 | 1448 | 1431 | 1028 |
| 1983 | 816 | 543 | 454 | 565 | 1094 | 719 | 2025 | 1093 | 1461 | 1255 | 1054 | 1340 | 1040 |
| 1984 | 1175 | 835 | 601 | 1072 | 1268 | 850 | 1199 | 1318 | 1359 | 1449 | 1440 | 1562 | 1180 |
| 1985 | 955 | 957 | 1362 | 1391 | 839 | 1246 | 1148 | 1012 | 1448 | 1456 | 1548 | 1647 | 1252 |
| 1986 | 1430 | 954 | 702 | 1097 | 908 | 284 | 200 | 801 | 590 | 859 | 1158 | 1133 | 843 |
| 1987 | 1302 | 1619 | 1691 | 1692 | 1100 | 1302 | 1144 | 852 | 1197 | 1311 | 1338 | 1679 | 1350 |
| 1988 | 1755 | 1706 | 1688 | 1431 | 856 | 1112 | 1229 | 1144 | 1211 | 1310 | 1454 | 1061 | 1328 |
| 1989 | 1285 | 1437 | 1227 | 816 | 556 | 698 | 1064 | 1099 | 840 | 871 | 694 | 977 | 962 |
| 1990 | 1390 | 1290 | 938 | 932 | 764 | 714 | 639 | 683 | 1144 | 1419 | 1387 | 1606 | 1074 |
| 1991 | 1074 | 586 | 1153 | 890 | 649 | 506 | 348 | 459 | 717 | 1533 | 1500 | 1599 | 921 |
| 1992 | 1555 | 1702 | 1361 | 1617 | 1409 | 640 | 553 | 761 | 1000 | 1089 | 1584 | 1790 | 1253 |
| 1993 | 1832 | 1759 | 1738 | 1384 | 477 | 263 | 332 | 742 | 955 | 1040 | 1648 | 1821 | 1162 |
| 1994 | 1683 | 1690 | 1553 | 925 | 396 | 356 | 481 | 775 | 924 | 1175 | 1651 | 1712 | 1107 |
| 1995 | 1581 | 1065 | 799 | 597 | 333 | 368 | 606 | 364 | 545 | 891 | 1092 | 1493 | 811 |
| 1996 | 1338 | 1312 | 1333 | 1276 | 990 | 1993* | 4796* | 2555* | 1622 | 1135 | 1363 | 1527 | 1775* |
| 1997 | 1395 | 1183 | 1364 | 1245 | 875 | 536 | 493 | 549 | 818 | 958 | 1734 | 1854 | 1083 |
| 1998 | 1578 | 1470 | 1364 | 1365 | 618 | 439 | 657 | 919 | 1018 | 1199 | 1655 | 1749 | 1167 |
| 1999 | 1400 | 1695 | 1308 | 1347 | 1253 | 691 | 626 | 616 | 1164 | 1180 | 858 | 1416 | 1126 |
| 2000 | 1427 | 1642 | 1587 | 1073 | 1289 | 813 | 864 | 909 | 853 | 992 | 1634 | 1555 | 1219 |
| 2001 | 1437 | 1454 | 1297 | 1324 | 780 | 448 | 547 | 618 | 683 | 1329 | 1369 | 1813 | 1090 |
| 2002 | 1542 | 1662 | 1500 | 1312 | 587 | 335 | | | | | | | |
| Max | 1832 | 1759 | 1738 | 1692 | 1409 | 1956 | 2128 | 1750 | 1622 | 1567 | 1734 | 1854 | 1350 |
| Average | 1348 | 1293 | 1195 | 1117 | 825 | 732 | 852 | 882 | 1004 | 1171 | 1349 | 1447 | 1096 |
| Min | 570 | 543 | 454 | 539 | 330 | 248 | 200 | 364 | 474 | 807 | 694 | 800 | 754 |

* Note, in 1996 spill was initated to lower the Williston Reservoir. This is not concerned as a normal hydrologic event, therefore not considered in the averaged inflows.

**TABLE 2.3**
**Peace Canyon Dam**
**Monthly Average Release ($m^3/s$)**

WSC Station: 07FA006
Lat./Long.: 56° 15' 4" N / 121° 37' 39" W

Drainage Area 9,350 km²
Natural Flow

| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1984** | 8.3 | 9.3 | 10.4 | 17.5 | 120.0 | 399.0 | 116.0 | 46.1 | 67.5 | 52.4 | 23.6 | 17.4 | 73.7 |
| **1985** | 12.6 | 9.3 | 9.1 | 23.2 | 55.8 | 168.0 | 130.0 | 43.9 | 118.0 | 51.1 | 18.4 | 16.7 | 54.7 |
| **1986** | 14.0 | 10.3 | 9.4 | 22.7 | 114.0 | 123.0 | 213.0 | 93.4 | 45.5 | 60.4 | 30.5 | 19.9 | 63.5 |
| **1987** | 14.4 | 12.0 | 9.8 | 33.6 | 143.0 | 229.0 | 211.0 | 311.0 | 87.6 | 50.3 | 25.9 | 16.0 | 96.0 |
| **1988** | 11.0 | 10.9 | 11.2 | 50.9 | 193.0 | 218.0 | 113.0 | 53.1 | 31.7 | 30.6 | 22.4 | 19.0 | 63.8 |
| **1989** | 11.9 | 9.1 | 10.0 | 33.1 | 206.0 | 198.0 | 149.0 | 116.0 | 56.8 | 45.5 | 20.5 | 18.5 | 73.3 |
| **1990** | 12.4 | 8.6 | 9.5 | 29.0 | 218.0 | 497.0 | 183.0 | 43.0 | 25.3 | 19.9 | 14.3 | 11.6 | 89.4 |
| **1991** | 9.1 | 10.1 | 9.3 | 19.9 | 130.0 | 198.0 | 110.0 | 29.6 | 36.3 | 31.3 | 17.8 | 13.9 | 51.4 |
| **1992** | 10.4 | 10.1 | 14.7 | 53.5 | 107.0 | 228.0 | 83.0 | 26.0 | 24.8 | 41.0 | 18.6 | 11.6 | 52.3 |
| **1993** | 8.3 | 7.7 | 8.3 | 21.9 | 100.0 | 262.0 | 306.0 | 266.0 | 112.0 | 43.1 | 23.4 | 18.0 | 98.7 |
| **1994** | 14.3 | 12.3 | 15.1 | 64.6 | 155.0 | 233.0 | 233.0 | 96.7 | 55.0 | 36.5 | 20.3 | 20.0 | 80.1 |
| **1995** | 11.7 | 10.6 | 11.8 | 20.8 | 99.1 | 194.0 | 296.0 | 135.0 | 72.3 | 36.2 | 25.4 | 22.0 | 78.5 |
| **1996** | 16.3 | 13.4 | 14.8 | 30.3 | 149.0 | 584.0 | 599.0 | 111.0 | 61.3 | 52.5 | 32.8 | 20.8 | 140.7 |
| **1997** | 17.3 | 13.8 | 11.4 | 30.3 | 232.0 | 300.0 | 198.0 | 93.6 | 126.0 | 110.0 | 35.5 | 15.7 | 99.1 |
| **1998** | 12.2 | 13.5 | 20.3 | 65.4 | 239.0 | 143.0 | 81.8 | 39.6 | 26.4 | 29.5 | 17.1 | 14.3 | 58.8 |
| **1999** | 12.5 | 12.1 | 12.5 | 42.7 | 79.4 | 251.0 | 118.0 | 43.2 | 22.5 | 16.3 | 12.6 | 10.4 | 52.8 |
| **2000** | 7.9 | 8.1 | 8.5 | 15.6 | 45.0 | 277.0 | 261.0 | 94.7 | 98.5 | 42.6 | 26.3 | 15.9 | 75.1 |
| **2001** | 15.8 | 13.8 | 12.1 | 16.4 | 95.4 | 687.0 | 274.0 | 95.8 | 46.9 | 29.2 | 15.6 | 12.3 | 109.4 |
| **Min** | 7.9 | 7.7 | 8.3 | 15.6 | 45.0 | 123.0 | 81.8 | 26.0 | 22.5 | 16.3 | 12.6 | 10.4 | 51.4 |
| **Average** | 12.2 | 10.8 | 11.6 | 32.9 | 137.8 | 288.3 | 204.2 | 96.5 | 61.9 | 43.2 | 22.3 | 16.3 | 78.4 |
| **Max** | 17.3 | 13.8 | 20.3 | 65.4 | 239.0 | 687.0 | 599.0 | 311.0 | 126.0 | 110.0 | 35.5 | 22.0 | 140.7 |

**TABLE 2.4**
**Halfway River**
**WSC Recorded Flows ($m^3/s$)**

WSC Station: 07FB008
Lat./Long.: 56° 5' 35" N / 121° 20' 48" W

Drainage Area 1,520 km²
Natural Flow

| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1980 | 0.60 | 0.48 | 0.50 | 1.79 | 13.30 | 41.70 | 24.50 | 10.60 | 13.50 | 13.50 | 7.17 | 4.83 | 11.0 |
| 1981 | 3.63 | 2.71 | 2.61 | 8.46 | 61.80 | 51.50 | 11.40 | 3.38 | 1.41 | 1.40 | 2.27 | 1.71 | 12.7 |
| 1982 | 1.22 | 0.98 | 0.86 | 2.24 | 18.80 | 43.50 | 39.20 | 23.60 | 8.97 | 6.49 | 10.10 | 5.30 | 13.5 |
| 1983 | 2.97 | 1.92 | 1.62 | 7.44 | 27.50 | 37.50 | 56.70 | 14.90 | 4.49 | 4.47 | 3.49 | 2.07 | 13.9 |
| 1984 | 1.65 | 1.55 | 1.94 | 3.26 | 24.60 | 58.30 | 21.70 | 5.16 | 7.55 | 12.80 | 7.30 | 3.62 | 12.4 |
| 1985 | 2.62 | 1.98 | 2.04 | 5.32 | 26.40 | 36.10 | 10.50 | 3.04 | 5.20 | 7.11 | 3.01 | 2.07 | 8.8 |
| 1986 | 2.03 | 1.69 | 1.87 | 3.09 | 19.70 | 44.30 | 19.00 | 8.56 | 3.12 | 6.26 | 4.23 | 3.22 | 9.8 |
| 1987 | 2.37 | 1.83 | 1.35 | 8.89 | 40.80 | 40.40 | 24.50 | 55.30 | 11.70 | 4.06 | 5.11 | 4.35 | 16.8 |
| 1988 | 1.90 | 0.91 | 1.09 | 7.09 | 33.00 | 43.30 | 11.30 | 4.15 | 2.61 | 2.64 | 1.73 | 1.19 | 9.2 |
| 1989 | 0.99 | 0.82 | 0.86 | 2.84 | 31.40 | 30.90 | 20.40 | 12.90 | 11.20 | 5.64 | 6.13 | 5.57 | 10.9 |
| 1990 | 3.91 | 1.87 | 2.55 | 8.46 | 38.20 | 83.20 | 17.00 | 4.03 | 1.77 | 1.15 | 1.03 | 1.44 | 13.7 |
| 1991 | 1.48 | 1.88 | 2.04 | 5.41 | 32.00 | 39.60 | 14.20 | 3.12 | 2.40 | 3.80 | 4.20 | 3.34 | 9.5 |
| 1992 | 2.51 | 1.96 | 8.08 | 14.80 | 24.70 | 30.60 | 9.67 | 2.52 | 0.61 | 5.67 | 3.66 | 1.50 | 8.9 |
| 1993 | 0.70 | 0.47 | 0.61 | 1.54 | 23.00 | 18.70 | 25.50 | 22.10 | 13.00 | 5.41 | 2.92 | 1.62 | 9.7 |
| 1994 | 1.71 | 1.76 | 2.41 | 15.70 | 47.60 | 48.70 | 19.50 | 6.32 | 3.44 | 3.56 | 4.22 | 2.41 | 13.2 |
| 1995 | 1.63 | 1.29 | 1.49 | 3.41 | 40.90 | 36.30 | 43.50 | 8.76 | 4.22 | 2.69 | 2.23 | 1.93 | 12.5 |
| 1996 | 1.47 | 1.44 | 1.55 | 13.20 | 36.10 | 57.20 | 27.00 | 9.31 | 6.81 | 7.25 | 3.09 | 2.13 | 13.9 |
| 1997 | 1.50 | 1.32 | 1.62 | 17.10 | 68.80 | 61.50 | 29.30 | 8.39 | 5.16 | 12.60 | 11.20 | 2.61 | 18.5 |
| 1998 | 2.08 | 1.92 | 2.06 | 6.17 | 44.00 | 24.60 | 7.66 | 2.79 | 0.95 | 0.97 | 1.62 | 1.65 | 8.1 |
| 1999 | 1.47 | 1.42 | 1.54 | 5.74 | 25.00 | 38.90 | 17.00 | 4.88 | 1.61 | 0.54 | 0.41 | 0.41 | 8.3 |
| 2000 | 0.48 | 0.81 | 1.29 | 1.91 | 4.51 | 34.60 | 28.00 | 9.87 | 20.10 | 8.82 | 7.03 | 4.01 | 10.1 |
| 2001 | 2.09 | 1.56 | 1.47 | 2.12 | 14.20 | 60.30 | 45.20 | 19.00 | 4.44 | 2.66 | 2.36 | 2.20 | 13.2 |
| Max | 3.9 | 2.7 | 8.1 | 17.1 | 68.8 | 83.2 | 56.7 | 55.3 | 20.1 | 13.5 | 11.2 | 5.6 | 18.5 |
| Average | 1.9 | 1.5 | 1.9 | 6.6 | 31.7 | 43.7 | 23.8 | 11.0 | 6.1 | 5.4 | 4.3 | 2.7 | 11.8 |
| Min | 0.48 | 0.47 | 0.50 | 1.54 | 4.51 | 18.70 | 7.66 | 2.52 | 0.61 | 0.54 | 0.41 | 0.41 | 8.09 |

**TABLE 2.5**
**Moberly River**
**WSC Recorded Flows (m³/s)**

## Table 3.1

## SOIL AND BEDROCK PARAMETERS

| Materials | Unit Weight (kN/m$^3$) | | Effective Shear Strength | | Comments |
|---|---|---|---|---|---|
| | Moist | Saturated | Cohesion c´ (kPa) | Friction Angle, $\phi$´ (deg.) | |
| **Gates Formation** | | | | | Data from BC Hydro (December 1987) |
| Overburden | Not recorded | 21 | 0 | 30 | |
| Sandstone, siltstone, shale (cross-bedding) | 25 to 27 | - | 2068 | 50 | |
| Sandstone, siltstone, shale (along bedding) | 25 to 27 | - | 0 | 40 | |
| **Shaftsbury Formation** | | | | | Data from BC Hydro (September 1989) and Klohn Leonoff (1980, 1982) |
| Colluvium | 19.6 | 20.1 | 0 | 23 | Values from CU triaxial tests carried out in 1981 and 1989. |
| Alluvium | - | 20.5 | 0 | 32 | Values based on grain size analyses and Becker penetration tests. |
| Shale (cross-bedding) | - | 24.5 | 250 | 45 | |
| Shale (along bedding) | - | 24.5 | 0 | 10 | See Note 1 |

Note:

1. Effective friction angles of 10$^o$ and 13.5$^o$ for continuous bedding planes BP-25, BP-28 and BP30 at Site C were based on laboratory and in situ shear strength tests. For the cascade dams founded in the Shaftsbury foundation, a friction angle of 10$^o$ and no cohesion are assumed.

**Table 4.1**

**Low Consequence Classification**

BC Hydro's current consequence classification

BC Hydro's policy on consequence classifications takes into consideration the recommendations from the Canadian Dam Association, Dam Safety Guidelines and the provincial dam safety regulation. Low Consequence Category Dams are suggested to meet the following criteria:

| | |
|---|---|
| Loss of Life | No fatalities anticipated [<1] |
| Economic and Social Losses | Moderate damages [$0.1 to $40 Million] |
| Environmental and Cultural Losses | Based on the recommended criteria in the BC Dam Safety Regulation. |

**BC Dam Safety Regulation**

Schedule 1 provides a Downstream Consequence Classification Guide. Low Consequence Dams are suggested to meet the following criteria:

| | |
|---|---|
| Loss of Life | Low potential for multiple loss of life. Inundation area is typically undeveloped except for minor roads, temporarily inhabited or non-residential farms and rural activities. There must be a reliable element of natural warning if larger development exists. |
| Economic and Social Losses | Low economic losses to limited infrastructure, public and commercial activities. Estimated direct and indirect (interruption of service) costs could exceed $100 000. |
| Environmental and Cultural Losses | Loss or significant deterioration of regionally important fisheries habitat (including water quality), wildlife habitat, rare and endangered species, unique landscapes or sites of cultural significance. Feasibility and practicality of restoration and/or compensation is high. Includes situations where recovery would occur with time without restoration. |

**Table 4.2**

**Estimated Peak Outflows at Each Site**

**due to a Fair Weather Dam Failure ($m^3/s$)**

| Dam | 7a | 7b | 7c | 7d | 7e | 7f | 7g |
|---|---|---|---|---|---|---|---|
| 7a | 5,620 | 3,620 | 3,270 | 3,000 | 2,500 | 2,660 | 2,200 |
| 7b | --- | 9,620 | 5,850 | 4,900 | 3,800 | 3,790 | 3,820 |
| 7c | --- | --- | 8,770 | 5,670 | 4,010 | 4,150 | 4,060 |
| 7d | --- | --- | --- | 5,020 | 2,950 | 3,080 | 2,210 |
| 7e | --- | --- | --- | --- | 4,500 | 3,830 | 2,740 |
| 7f | --- | --- | --- | --- | --- | 4,640 | 3,830 |
| 7g | --- | --- | --- | --- | --- | --- | 5,850 |

**Table 4.3**

**Estimated Peak Outflows at Each Site**

**due to an IDF Dam Failure ($m^3/s$)**

| Dam | 7a | 7b | 7c | 7d | 7e | 7f | 7g |
|---|---|---|---|---|---|---|---|
| 7a | 8,610 | 8,220 | 8,120 | 8,100 | 8,250 | 8,240 | 8,240 |
| 7b | --- | 9,870 | 8,770 | 8,540 | 8,470 | 8,450 | 8,440 |
| 7c | --- | --- | 9,730 | 8,840 | 8,460 | 8,450 | 8,440 |
| 7d | --- | --- | --- | 8,300 | 8,200 | 8,200 | 8,200 |
| 7e | --- | --- | --- | --- | 8,600 | 8,380 | 8,330 |
| 7f | --- | --- | --- | --- | --- | 9,300 | 8,670 |
| 7g | --- | --- | --- | --- | --- | --- | |

Note: These tables are to be read horizontally only. For example Table 4.3, row 7c gives 9730 $m^3/s$ as the dam breach outflow from dam 7c, 8840 $m^3/s$ discharge from dam 7d, 8460 $m^3/s$ discharge from dam 7e, etc.

**Table 6.1**

**Maximum Generating Capacity and Capacity Factors**

| Site | Maximum Power Flow, m³/s | Maximum Capacity, (MW) | Average Energy, (ave MW) | Capacity Factor, (%) |
|---|---|---|---|---|
| G.M. Shrum GS* | 1980 | 2,730 | 1,441 | 53 |
| Peace Canyon GS | 1980 | 716 | 400 | 56 |
| Site 7a | 1980 | 77 | 47 | 61 |
| Site 7b | 1980 | 118 | 71 | 60 |
| Site 7c | 1980 | 107 | 67 | 63 |
| Site 7d | 1980 | 101 | 64 | 63 |
| Site 7e | 2100 | 94 | 58 | 61 |
| Site 7f | 2100 | 130 | 79 | 61 |
| Site 7g | 2100 | 121 | 76 | 63 |

*Source: BC Hydro, July 1972

## Annual Energy Production (GWh)

| Dam Site | Monthly Model | Hourly Model - Operation synchronized with PCN | Hourly Model - Operation at Constant Pool | |
|---|---|---|---|---|
| | | | Time Lag, hrs | Total |
| 7a | 413.73 | 397.18 | 0 | 413.73 |
| 7b | 620.57 | 595.75 | 0.5 | 620.57 |
| 7c | 587.54 | 564.04 | 0.9 | 587.54 |
| 7d | 557.32 | 535.03 | 0.9 | 557.32 |
| 7e | 505.06 | 484.86 | 2.1 | 505.06 |
| 7f | 688.20 | 660.67 | 2.3 | 688.20 |
| 7g | 662.08 | 635.60 | 3 | 662.08 |
| TOTAL | 4034.5 | 3873.12 | | 4034.5 |

[For comparison, the projected annual energy production at Site C is 4710 GWh.]

**TABLE 6-2**
**Summary of Annual Energy Production (GWh)**

| YEAR | JAN 31 | FEB 28 | MAR 31 | APR 30 | MAY 31 | JUN 30 | JUL 31 | AUG 31 | SEP 30 | OCT 31 | NOV 30 | DEC 31 | SUM 365 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1972 | 29.33 | 27.38 | 28.57 | 27.62 | 23.75 | 52.67 | 54.42 | 41.67 | 31.13 | 32.71 | 34.79 | 38.28 | 422.32 |
| 1973 | 40.93 | 38.77 | 41.36 | 35.42 | 33.90 | 34.88 | 35.81 | 35.71 | 33.12 | 35.14 | 34.44 | 31.00 | 430.47 |
| 1974 | 35.54 | 31.92 | 35.41 | 33.02 | 33.42 | 32.67 | 36.50 | 45.85 | 34.32 | 39.53 | 43.10 | 43.80 | 445.08 |
| 1975 | 42.19 | 41.68 | 42.46 | 42.80 | 32.88 | 24.86 | 15.45 | 13.76 | 27.24 | 31.08 | 33.84 | 34.83 | 383.08 |
| 1976 | 35.71 | 32.41 | 38.98 | 33.08 | 32.98 | 34.04 | 40.11 | 50.70 | 36.48 | 47.23 | 46.19 | 47.90 | 475.81 |
| 1977 | 42.86 | 29.47 | 26.38 | 32.05 | 28.21 | 30.11 | 42.43 | 35.48 | 29.14 | 37.18 | 44.16 | 48.93 | 426.40 |
| 1978 | 46.76 | 42.27 | 38.03 | 33.03 | 28.27 | 25.26 | 21.56 | 24.49 | 17.02 | 28.42 | 32.38 | 46.45 | 383.95 |
| 1979 | 48.08 | 41.62 | 32.40 | 27.27 | 28.72 | 32.84 | 34.24 | 27.84 | 32.53 | 33.14 | 39.85 | 32.88 | 411.41 |
| 1980 | 39.65 | 30.37 | 27.00 | 19.19 | 12.42 | 9.08 | 9.31 | 22.65 | 30.54 | 37.94 | 33.63 | 28.21 | 299.98 |
| 1981 | 20.87 | 31.10 | 43.68 | 38.73 | 22.02 | 15.92 | 26.82 | 25.57 | 35.17 | 43.04 | 45.59 | 44.05 | 392.55 |
| 1982 | 47.96 | 39.04 | 32.84 | 34.08 | 21.50 | 14.05 | 13.18 | 28.91 | 33.17 | 37.42 | 42.83 | 43.74 | 388.74 |
| 1983 | 28.69 | 18.03 | 16.88 | 20.03 | 35.19 | 24.86 | 54.42 | 38.01 | 43.22 | 38.37 | 33.42 | 40.97 | 392.10 |
| 1984 | 36.37 | 26.44 | 21.89 | 33.71 | 38.77 | 28.76 | 36.68 | 40.29 | 40.21 | 44.29 | 42.60 | 47.13 | 437.13 |
| 1985 | 32.71 | 29.58 | 41.64 | 41.15 | 28.97 | 36.87 | 36.00 | 33.79 | 42.83 | 44.51 | 45.33 | 48.80 | 462.16 |
| 1986 | 43.71 | 29.52 | 25.15 | 34.10 | 31.44 | 10.38 | 7.58 | 32.40 | 20.84 | 29.99 | 34.97 | 35.78 | 335.86 |
| 1987 | 39.81 | 43.59 | 49.63 | 48.04 | 35.28 | 38.52 | 35.94 | 29.78 | 35.47 | 40.08 | 39.59 | 49.40 | 485.12 |
| 1988 | 50.79 | 45.07 | 49.57 | 42.33 | 29.90 | 34.32 | 37.58 | 35.94 | 35.83 | 40.05 | 43.01 | 34.65 | 479.04 |
| 1989 | 39.29 | 39.68 | 37.52 | 27.77 | 20.40 | 24.22 | 34.70 | 35.27 | 28.47 | 30.35 | 24.10 | 33.14 | 374.88 |
| 1990 | 42.49 | 35.62 | 32.31 | 31.10 | 27.10 | 24.71 | 23.13 | 24.55 | 34.78 | 43.38 | 41.03 | 48.00 | 408.21 |
| 1991 | 34.87 | 19.33 | 36.07 | 29.91 | 23.46 | 18.11 | 13.07 | 17.06 | 24.80 | 46.54 | 44.37 | 47.86 | 355.44 |
| 1992 | 46.98 | 45.01 | 41.61 | 46.66 | 43.07 | 22.42 | 20.30 | 27.01 | 32.49 | 35.11 | 46.03 | 51.40 | 458.09 |
| 1993 | 52.11 | 45.94 | 50.48 | 40.94 | 17.70 | 9.62 | 12.49 | 26.41 | 31.65 | 34.29 | 47.24 | 51.93 | 420.82 |
| 1994 | 49.48 | 44.81 | 46.94 | 30.90 | 14.81 | 12.93 | 17.84 | 27.44 | 30.88 | 36.37 | 47.30 | 50.01 | 409.70 |
| 1995 | 47.51 | 31.36 | 28.18 | 21.06 | 12.53 | 13.35 | 22.06 | 13.65 | 19.39 | 30.94 | 34.02 | 45.64 | 319.67 |
| 1996 | 40.90 | 36.23 | 40.75 | 37.75 | 33.38 | 52.67 | 34.22 | 50.98 | 50.84 | 35.81 | 40.32 | 46.41 | 500.27 |
| 1997 | 42.64 | 32.94 | 41.70 | 36.84 | 30.46 | 19.09 | 18.26 | 20.17 | 27.83 | 32.76 | 48.79 | 52.48 | 403.97 |
| 1998 | 47.45 | 40.59 | 41.70 | 40.38 | 22.45 | 15.82 | 23.72 | 31.76 | 32.81 | 36.68 | 47.37 | 50.68 | 431.40 |
| 1999 | 42.80 | 44.89 | 39.99 | 39.85 | 38.31 | 24.01 | 22.71 | 22.38 | 35.05 | 36.43 | 28.99 | 43.29 | 418.70 |
| 2000 | 43.62 | 43.99 | 47.63 | 33.73 | 39.41 | 27.68 | 30.14 | 31.47 | 28.85 | 33.42 | 46.98 | 46.98 | 453.89 |
| 2001 | 43.93 | 40.14 | 39.65 | 39.17 | 27.59 | 16.13 | 20.10 | 22.45 | 23.76 | 40.63 | 40.50 | 51.79 | 405.85 |
| AVG | 41.20 | 35.96 | 37.21 | 34.39 | 28.28 | 25.36 | 27.69 | 30.45 | 31.99 | 37.09 | 40.23 | 43.88 | 413.74 |
| STD | 7.10 | 7.70 | 8.56 | 7.18 | 7.91 | 11.33 | 12.29 | 9.56 | 7.07 | 5.06 | 6.33 | 7.02 | 47.49 |
| MIN | 20.87 | 18.03 | 16.88 | 19.19 | 12.42 | 9.08 | 7.58 | 13.65 | 17.02 | 28.42 | 24.10 | 28.21 | 299.98 |
| MAX | 52.11 | 45.94 | 50.48 | 48.04 | 43.07 | 52.67 | 54.42 | 50.98 | 50.84 | 47.23 | 48.79 | 52.48 | 500.27 |

**TABLE 6-3**
**Annual Energy Production at Site 7a (GWh)**

| YEAR | JAN 31 | FEB 28 | MAR 31 | APR 30 | MAY 31 | JUN 30 | JUL 31 | AUG 31 | SEP 30 | OCT 31 | NOV 30 | DEC 31 | SUM 365 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1972 | 41.22 | 38.60 | 40.07 | 38.80 | 33.31 | 80.10 | 81.49 | 64.37 | 44.29 | 46.70 | 53.19 | 59.50 | 621.65 |
| 1973 | 63.14 | 59.45 | 63.72 | 55.21 | 49.83 | 54.23 | 55.07 | 54.45 | 48.72 | 52.69 | 52.15 | 43.81 | 652.44 |
| 1974 | 53.72 | 48.01 | 53.33 | 48.39 | 48.68 | 48.31 | 57.20 | 69.96 | 51.92 | 61.30 | 65.82 | 67.02 | 673.67 |
| 1975 | 64.83 | 63.48 | 65.20 | 65.46 | 47.44 | 35.48 | 21.67 | 18.96 | 38.30 | 44.03 | 50.47 | 51.78 | 567.11 |
| 1976 | 54.20 | 49.41 | 60.46 | 48.56 | 47.66 | 51.82 | 62.56 | 79.44 | 56.93 | 72.48 | 71.04 | 73.74 | 728.28 |
| 1977 | 65.74 | 41.93 | 36.76 | 46.08 | 39.96 | 43.44 | 65.71 | 53.80 | 41.20 | 58.05 | 67.23 | 75.81 | 635.71 |
| 1978 | 71.48 | 64.63 | 59.15 | 48.43 | 40.06 | 36.07 | 30.29 | 34.22 | 23.37 | 39.94 | 46.81 | 70.89 | 565.34 |
| 1979 | 74.08 | 63.37 | 45.98 | 38.27 | 40.75 | 48.74 | 50.82 | 39.23 | 47.27 | 47.68 | 61.45 | 47.02 | 604.66 |
| 1980 | 61.38 | 44.02 | 37.70 | 26.36 | 17.31 | 13.25 | 13.25 | 31.51 | 43.37 | 59.11 | 49.92 | 39.53 | 436.71 |
| 1981 | 28.65 | 45.81 | 66.84 | 59.95 | 30.79 | 22.63 | 38.04 | 35.82 | 54.46 | 66.07 | 69.85 | 67.35 | 586.26 |
| 1982 | 73.85 | 59.82 | 46.92 | 51.18 | 30.03 | 20.04 | 18.53 | 40.85 | 48.84 | 58.39 | 65.47 | 66.94 | 580.85 |
| 1983 | 40.25 | 24.70 | 22.99 | 27.57 | 53.15 | 35.48 | 82.29 | 52.95 | 66.08 | 59.71 | 49.37 | 63.19 | 577.72 |
| 1984 | 56.20 | 37.14 | 30.13 | 50.12 | 60.51 | 41.71 | 57.56 | 62.36 | 62.06 | 67.79 | 65.16 | 72.21 | 662.94 |
| 1985 | 46.61 | 42.17 | 64.08 | 63.22 | 40.87 | 57.81 | 55.39 | 49.23 | 65.71 | 68.06 | 69.34 | 75.54 | 698.02 |
| 1986 | 66.89 | 42.05 | 34.92 | 51.18 | 44.82 | 14.51 | 10.94 | 46.27 | 28.76 | 42.39 | 53.75 | 54.44 | 490.92 |
| 1987 | 61.60 | 67.23 | 77.22 | 74.84 | 53.44 | 60.25 | 55.48 | 42.93 | 55.53 | 62.07 | 61.10 | 76.78 | 748.47 |
| 1988 | 79.40 | 70.22 | 77.11 | 64.87 | 42.71 | 52.42 | 58.80 | 55.00 | 55.94 | 61.98 | 65.70 | 51.30 | 735.46 |
| 1989 | 60.88 | 60.66 | 58.42 | 39.02 | 28.65 | 34.24 | 51.84 | 53.25 | 40.18 | 42.89 | 33.48 | 47.61 | 551.12 |
| 1990 | 65.25 | 55.17 | 45.84 | 44.17 | 38.54 | 35.96 | 32.50 | 34.13 | 53.15 | 66.45 | 63.02 | 73.92 | 608.11 |
| 1991 | 51.85 | 26.57 | 55.26 | 42.28 | 32.86 | 25.39 | 18.06 | 23.30 | 34.56 | 71.09 | 67.49 | 73.66 | 522.38 |
| 1992 | 71.91 | 70.10 | 64.07 | 72.09 | 66.33 | 31.67 | 28.07 | 37.74 | 47.07 | 52.60 | 70.72 | 80.57 | 692.93 |
| 1993 | 81.94 | 71.83 | 78.82 | 62.93 | 24.47 | 13.83 | 17.91 | 37.61 | 45.40 | 50.46 | 73.16 | 81.61 | 639.98 |
| 1994 | 76.93 | 69.72 | 71.84 | 43.98 | 20.70 | 18.34 | 25.06 | 38.61 | 43.87 | 56.28 | 73.27 | 77.97 | 616.59 |
| 1995 | 72.94 | 46.48 | 39.46 | 29.01 | 17.36 | 18.77 | 31.35 | 18.93 | 26.74 | 43.78 | 50.98 | 69.46 | 465.26 |
| 1996 | 63.10 | 56.01 | 62.89 | 58.62 | 48.64 | 79.68 | 62.74 | 78.26 | 72.29 | 54.62 | 62.12 | 70.82 | 769.79 |
| 1997 | 65.46 | 51.08 | 64.17 | 57.37 | 43.79 | 27.15 | 25.57 | 27.90 | 39.37 | 47.04 | 76.23 | 82.68 | 607.83 |
| 1998 | 72.83 | 61.88 | 64.19 | 62.29 | 31.75 | 21.99 | 33.03 | 45.06 | 47.84 | 57.28 | 73.40 | 79.21 | 650.76 |
| 1999 | 65.66 | 69.88 | 61.84 | 61.51 | 59.77 | 34.09 | 31.69 | 30.96 | 53.97 | 56.43 | 40.83 | 66.30 | 632.93 |
| 2000 | 66.75 | 68.03 | 73.17 | 50.15 | 61.14 | 39.65 | 43.26 | 44.78 | 40.90 | 48.36 | 72.65 | 71.93 | 680.76 |
| 2001 | 67.18 | 61.30 | 61.38 | 60.51 | 38.86 | 24.16 | 28.46 | 31.25 | 33.04 | 62.77 | 62.31 | 81.33 | 612.55 |
| AVG | 62.86 | 54.36 | 56.13 | 51.41 | 41.14 | 37.37 | 41.49 | 44.44 | 47.04 | 55.95 | 61.25 | 67.13 | 620.57 |
| STD | 12.13 | 13.23 | 14.81 | 12.51 | 12.86 | 17.80 | 19.86 | 15.77 | 11.66 | 9.16 | 10.76 | 12.27 | 80.07 |
| MIN | 28.65 | 24.70 | 22.99 | 26.36 | 17.31 | 13.25 | 10.94 | 18.93 | 23.37 | 39.94 | 33.48 | 39.53 | 436.71 |
| MAX | 81.94 | 71.83 | 78.82 | 74.84 | 66.33 | 80.10 | 82.29 | 79.44 | 72.29 | 72.48 | 76.23 | 82.68 | 769.79 |



**TABLE 6-4**
**Annual Energy Production at Site 7b (GWh)**

| YEAR | JAN 31 | FEB 28 | MAR 31 | APR 30 | MAY 31 | JUN 30 | JUL 31 | AUG 31 | SEP 30 | OCT 31 | NOV 30 | DEC 31 | SUM 365 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1972 | 39.86 | 37.22 | 38.82 | 37.66 | 33.09 | 73.19 | 75.63 | 60.23 | 42.60 | 44.80 | 50.32 | 55.89 | 589.30 |
| 1973 | 58.98 | 55.31 | 59.47 | 52.08 | 47.86 | 51.89 | 52.55 | 51.74 | 46.52 | 50.07 | 49.41 | 42.17 | 618.07 |
| 1974 | 50.89 | 45.52 | 50.55 | 46.16 | 46.85 | 46.78 | 54.38 | 64.89 | 49.31 | 57.50 | 61.07 | 62.26 | 636.17 |
| 1975 | 60.42 | 58.68 | 60.73 | 60.80 | 45.75 | 35.41 | 22.28 | 19.29 | 37.28 | 42.44 | 47.95 | 49.21 | 540.24 |
| 1976 | 51.30 | 46.74 | 56.70 | 46.31 | 45.95 | 49.82 | 58.97 | 72.88 | 53.63 | 66.93 | 65.49 | 67.95 | 682.67 |
| 1977 | 61.18 | 40.16 | 35.83 | 44.12 | 39.13 | 42.48 | 61.61 | 51.18 | 39.87 | 54.71 | 62.23 | 69.71 | 602.20 |
| 1978 | 66.00 | 59.67 | 55.57 | 46.20 | 39.22 | 35.94 | 30.44 | 33.75 | 23.42 | 38.79 | 44.74 | 65.51 | 539.26 |
| 1979 | 68.23 | 58.59 | 44.07 | 37.18 | 39.84 | 47.15 | 48.86 | 38.31 | 45.24 | 45.67 | 57.41 | 45.01 | 575.54 |
| 1980 | 57.49 | 42.01 | 36.68 | 26.18 | 17.87 | 14.34 | 14.05 | 31.25 | 41.79 | 55.62 | 47.47 | 38.35 | 423.11 |
| 1981 | 28.31 | 43.59 | 62.10 | 56.16 | 30.76 | 23.46 | 37.55 | 35.22 | 51.50 | 61.53 | 64.48 | 62.53 | 557.20 |
| 1982 | 68.03 | 55.62 | 44.90 | 48.60 | 30.04 | 20.97 | 19.24 | 39.76 | 46.63 | 55.00 | 60.77 | 62.19 | 551.76 |
| 1983 | 38.99 | 24.46 | 22.92 | 27.32 | 50.76 | 35.41 | 75.63 | 53.31 | 61.37 | 56.13 | 46.99 | 59.04 | 552.33 |
| 1984 | 53.02 | 35.91 | 29.70 | 47.63 | 57.04 | 41.27 | 54.49 | 58.41 | 58.02 | 63.00 | 60.53 | 66.64 | 625.67 |
| 1985 | 44.63 | 40.37 | 59.78 | 58.90 | 39.72 | 54.69 | 52.63 | 47.03 | 61.17 | 63.21 | 64.04 | 69.47 | 655.63 |
| 1986 | 62.15 | 40.26 | 34.14 | 48.58 | 43.35 | 15.09 | 11.76 | 44.55 | 28.46 | 41.03 | 50.82 | 51.53 | 471.71 |
| 1987 | 57.68 | 61.90 | 70.88 | 68.73 | 51.05 | 56.91 | 52.92 | 42.27 | 52.49 | 58.17 | 57.12 | 70.53 | 700.65 |
| 1988 | 72.69 | 64.41 | 70.79 | 60.35 | 41.72 | 50.19 | 55.53 | 52.10 | 52.70 | 58.04 | 60.96 | 48.80 | 688.28 |
| 1989 | 57.06 | 56.32 | 54.94 | 37.84 | 28.94 | 34.01 | 49.62 | 50.76 | 38.96 | 41.44 | 32.78 | 45.55 | 528.23 |
| 1990 | 60.77 | 51.69 | 43.94 | 42.41 | 38.08 | 36.47 | 32.42 | 33.51 | 50.28 | 61.79 | 58.71 | 68.09 | 578.18 |
| 1991 | 49.25 | 26.22 | 52.22 | 40.72 | 32.65 | 25.81 | 18.47 | 23.28 | 33.81 | 65.72 | 62.45 | 67.87 | 498.47 |
| 1992 | 66.37 | 64.31 | 59.79 | 66.47 | 61.92 | 31.73 | 27.99 | 36.76 | 44.96 | 49.99 | 65.22 | 73.65 | 649.17 |
| 1993 | 74.77 | 65.74 | 72.21 | 58.64 | 24.67 | 14.76 | 18.96 | 37.33 | 43.72 | 48.13 | 67.30 | 74.51 | 600.73 |
| 1994 | 70.64 | 64.00 | 66.32 | 42.36 | 21.27 | 19.18 | 25.61 | 37.74 | 42.21 | 53.16 | 67.38 | 71.52 | 581.41 |
| 1995 | 67.25 | 44.18 | 38.28 | 28.63 | 17.84 | 19.44 | 31.74 | 19.37 | 26.65 | 42.19 | 48.40 | 64.30 | 448.26 |
| 1996 | 58.96 | 52.42 | 58.78 | 55.04 | 46.85 | 73.19 | 56.90 | 74.39 | 70.74 | 51.78 | 57.99 | 65.46 | 722.50 |
| 1997 | 60.96 | 48.18 | 59.86 | 53.97 | 42.86 | 27.81 | 26.02 | 27.86 | 38.40 | 45.28 | 69.90 | 75.38 | 576.48 |
| 1998 | 67.16 | 57.35 | 59.90 | 58.21 | 31.96 | 22.38 | 32.61 | 43.33 | 45.65 | 54.00 | 67.49 | 72.54 | 612.56 |
| 1999 | 61.11 | 64.14 | 57.88 | 57.50 | 56.31 | 34.03 | 31.49 | 30.57 | 50.99 | 53.24 | 39.40 | 61.65 | 598.31 |
| 2000 | 62.01 | 62.57 | 67.44 | 47.66 | 57.36 | 39.10 | 42.36 | 43.24 | 39.73 | 46.27 | 66.88 | 66.40 | 641.02 |
| 2001 | 62.39 | 56.86 | 57.49 | 56.59 | 37.99 | 26.07 | 29.00 | 31.03 | 32.45 | 58.71 | 58.12 | 74.28 | 580.97 |
| AVG | 58.62 | 50.81 | 52.76 | 48.63 | 39.96 | 36.63 | 40.06 | 42.84 | 45.02 | 52.81 | 57.13 | 62.27 | 587.54 |
| STD | 10.50 | 11.49 | 12.97 | 10.97 | 11.56 | 15.85 | 17.72 | 14.20 | 10.60 | 7.91 | 9.26 | 10.49 | 71.23 |
| MIN | 28.31 | 24.46 | 22.92 | 26.18 | 17.84 | 14.34 | 11.76 | 19.29 | 23.42 | 38.79 | 32.78 | 38.35 | 423.11 |
| MAX | 74.77 | 65.74 | 72.21 | 68.73 | 61.92 | 73.19 | 75.63 | 74.39 | 70.74 | 66.93 | 69.90 | 75.38 | 722.50 |

**TABLE 6-5**
**Annual Energy Production at Site 7c (GWh)**

| YEAR | JAN 31 | FEB 28 | MAR 31 | APR 30 | MAY 31 | JUN 30 | JUL 31 | AUG 31 | SEP 30 | OCT 31 | NOV 30 | DEC 31 | SUM 365 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1972 | 37.37 | 34.96 | 36.34 | 35.32 | 31.13 | 69.08 | 71.39 | 57.58 | 40.33 | 42.39 | 47.82 | 53.21 | 556.91 |
| 1973 | 56.18 | 52.71 | 56.65 | 49.61 | 45.68 | 50.05 | 50.42 | 49.35 | 44.16 | 47.57 | 46.93 | 39.69 | 588.99 |
| 1974 | 48.30 | 43.17 | 47.96 | 43.75 | 44.69 | 45.02 | 52.22 | 62.04 | 46.92 | 54.83 | 58.24 | 59.35 | 606.49 |
| 1975 | 57.56 | 55.93 | 57.86 | 58.01 | 43.62 | 33.83 | 21.00 | 17.88 | 35.01 | 40.04 | 45.48 | 46.65 | 512.88 |
| 1976 | 48.70 | 44.38 | 53.98 | 43.90 | 43.81 | 48.01 | 56.61 | 69.13 | 51.16 | 63.77 | 62.32 | 64.63 | 650.39 |
| 1977 | 58.30 | 37.91 | 33.39 | 41.75 | 37.05 | 40.84 | 59.15 | 48.79 | 37.59 | 52.14 | 59.37 | 66.20 | 572.47 |
| 1978 | 62.87 | 56.83 | 52.89 | 43.79 | 37.13 | 34.35 | 28.73 | 31.60 | 21.64 | 36.40 | 42.32 | 62.43 | 510.98 |
| 1979 | 64.87 | 55.85 | 41.59 | 34.84 | 37.75 | 45.39 | 46.79 | 36.07 | 42.91 | 43.24 | 54.70 | 42.52 | 546.52 |
| 1980 | 54.74 | 39.72 | 34.22 | 24.18 | 16.74 | 13.93 | 13.39 | 29.18 | 39.51 | 53.02 | 45.01 | 35.88 | 399.54 |
| 1981 | 26.12 | 41.27 | 59.19 | 53.54 | 28.87 | 22.39 | 35.63 | 33.03 | 49.09 | 58.71 | 61.41 | 59.62 | 528.87 |
| 1982 | 64.69 | 53.01 | 42.41 | 46.16 | 28.19 | 20.06 | 18.17 | 37.51 | 44.27 | 52.42 | 57.96 | 59.29 | 524.12 |
| 1983 | 36.50 | 22.52 | 21.01 | 25.27 | 48.53 | 33.83 | 71.39 | 50.96 | 58.61 | 53.51 | 44.54 | 56.24 | 522.90 |
| 1984 | 50.40 | 33.66 | 27.44 | 45.16 | 54.58 | 39.94 | 52.13 | 55.70 | 55.40 | 60.16 | 57.73 | 63.46 | 595.76 |
| 1985 | 42.15 | 38.11 | 56.94 | 56.15 | 37.40 | 52.46 | 50.31 | 44.57 | 58.53 | 60.35 | 61.00 | 65.99 | 623.96 |
| 1986 | 59.24 | 38.01 | 31.73 | 46.10 | 41.17 | 14.16 | 11.32 | 42.27 | 26.38 | 38.67 | 48.34 | 48.95 | 446.34 |
| 1987 | 54.93 | 58.83 | 67.23 | 65.23 | 48.85 | 54.72 | 50.82 | 40.67 | 50.13 | 55.48 | 54.44 | 66.94 | 668.28 |
| 1988 | 68.83 | 61.07 | 67.15 | 57.61 | 39.77 | 48.22 | 53.10 | 49.59 | 50.19 | 55.31 | 58.14 | 46.24 | 655.22 |
| 1989 | 54.32 | 53.68 | 52.28 | 35.49 | 27.32 | 32.20 | 47.41 | 48.43 | 36.68 | 39.04 | 30.50 | 43.06 | 500.41 |
| 1990 | 57.91 | 49.21 | 41.46 | 40.07 | 36.23 | 35.49 | 30.56 | 31.21 | 47.79 | 58.90 | 55.94 | 64.74 | 549.53 |
| 1991 | 46.66 | 24.20 | 49.61 | 38.34 | 30.69 | 24.35 | 17.17 | 21.40 | 31.53 | 62.65 | 59.56 | 64.56 | 470.70 |
| 1992 | 63.20 | 60.98 | 56.98 | 63.27 | 59.26 | 30.07 | 26.02 | 34.34 | 42.54 | 47.48 | 62.06 | 69.67 | 615.87 |
| 1993 | 70.63 | 62.24 | 68.40 | 55.89 | 22.96 | 14.17 | 18.20 | 35.57 | 41.56 | 45.65 | 63.93 | 70.43 | 569.63 |
| 1994 | 67.03 | 60.72 | 63.16 | 40.13 | 20.00 | 18.26 | 24.19 | 35.50 | 39.91 | 50.61 | 64.01 | 67.81 | 551.33 |
| 1995 | 63.99 | 41.85 | 35.80 | 26.48 | 16.62 | 18.36 | 30.27 | 18.06 | 24.72 | 39.76 | 45.93 | 61.34 | 423.18 |
| 1996 | 56.17 | 49.91 | 55.99 | 52.46 | 44.72 | 69.08 | 38.83 | 68.08 | 67.53 | 49.28 | 55.29 | 62.39 | 669.73 |
| 1997 | 58.09 | 45.82 | 57.02 | 51.44 | 41.10 | 26.57 | 24.51 | 25.92 | 36.28 | 43.04 | 66.26 | 71.18 | 547.24 |
| 1998 | 63.90 | 54.68 | 57.08 | 55.57 | 30.33 | 20.93 | 30.45 | 40.92 | 43.22 | 51.41 | 64.09 | 68.70 | 581.29 |
| 1999 | 58.23 | 60.83 | 55.12 | 54.84 | 53.80 | 32.38 | 29.49 | 28.37 | 48.48 | 50.63 | 36.99 | 58.74 | 567.92 |
| 2000 | 59.09 | 59.43 | 64.15 | 45.17 | 54.69 | 37.42 | 40.57 | 40.99 | 37.57 | 43.84 | 63.57 | 63.24 | 609.73 |
| 2001 | 59.48 | 54.21 | 54.74 | 53.90 | 35.76 | 25.92 | 27.59 | 28.99 | 30.24 | 55.95 | 55.37 | 70.22 | 552.37 |
| AVG | 55.68 | 48.19 | 49.99 | 46.11 | 37.95 | 35.05 | 37.59 | 40.46 | 42.66 | 50.21 | 54.31 | 59.11 | 557.32 |
| STD | 10.13 | 11.09 | 12.60 | 10.70 | 11.21 | 15.11 | 16.69 | 13.55 | 10.36 | 7.71 | 8.94 | 10.01 | 67.79 |
| MIN | 26.12 | 22.52 | 21.01 | 24.18 | 16.62 | 13.93 | 11.32 | 17.88 | 21.64 | 36.40 | 30.50 | 35.88 | 399.54 |
| MAX | 70.63 | 62.24 | 68.40 | 65.23 | 59.26 | 69.08 | 71.39 | 69.13 | 67.53 | 63.77 | 66.26 | 71.18 | 669.73 |



**TABLE 6-6**
**Annual Energy Production at Site 7d (GWh)**

| YEAR | JAN 31 | FEB 28 | MAR 31 | APR 30 | MAY 31 | JUN 30 | JUL 31 | AUG 31 | SEP 30 | OCT 31 | NOV 30 | DEC 31 | SUM 365 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1972 | 31.94 | 29.85 | 31.03 | 30.90 | 31.08 | 64.30 | 66.44 | 52.16 | 36.12 | 37.31 | 41.35 | 45.87 | 498.35 |
| 1973 | 48.40 | 45.44 | 48.80 | 43.23 | 43.22 | 51.10 | 49.24 | 45.02 | 39.41 | 41.79 | 40.57 | 34.09 | 530.31 |
| 1974 | 41.42 | 36.98 | 41.10 | 38.13 | 42.39 | 47.03 | 50.74 | 56.07 | 41.80 | 48.13 | 50.61 | 51.37 | 545.77 |
| 1975 | 49.64 | 48.36 | 49.89 | 50.70 | 41.48 | 38.11 | 25.09 | 18.57 | 31.62 | 35.32 | 39.31 | 40.11 | 468.19 |
| 1976 | 41.78 | 38.03 | 46.41 | 38.26 | 41.64 | 49.45 | 54.43 | 62.54 | 45.47 | 56.14 | 54.33 | 56.18 | 584.66 |
| 1977 | 50.30 | 32.39 | 28.50 | 36.40 | 36.05 | 43.66 | 56.57 | 44.55 | 33.83 | 45.76 | 51.62 | 57.65 | 517.27 |
| 1978 | 54.44 | 49.18 | 45.45 | 38.17 | 36.11 | 38.52 | 31.44 | 30.02 | 20.31 | 32.21 | 36.56 | 54.16 | 466.56 |
| 1979 | 56.30 | 48.28 | 35.56 | 30.49 | 36.62 | 47.33 | 46.24 | 33.80 | 38.33 | 38.04 | 47.43 | 36.52 | 494.93 |
| 1980 | 47.11 | 33.97 | 29.22 | 21.41 | 19.18 | 22.09 | 18.91 | 27.98 | 35.44 | 46.54 | 38.89 | 30.81 | 371.53 |
| 1981 | 22.32 | 35.32 | 51.08 | 46.70 | 29.20 | 28.87 | 37.12 | 31.23 | 43.66 | 51.59 | 53.49 | 51.61 | 482.19 |
| 1982 | 56.13 | 45.71 | 36.27 | 40.23 | 28.62 | 27.00 | 22.79 | 35.03 | 39.51 | 46.01 | 50.35 | 51.31 | 478.96 |
| 1983 | 31.20 | 19.21 | 17.99 | 22.33 | 45.62 | 38.11 | 66.44 | 47.10 | 52.05 | 46.97 | 38.48 | 48.58 | 474.07 |
| 1984 | 43.14 | 28.68 | 23.38 | 38.87 | 50.25 | 46.27 | 48.00 | 49.00 | 49.36 | 53.15 | 50.19 | 55.13 | 535.42 |
| 1985 | 36.07 | 32.52 | 48.98 | 48.75 | 33.51 | 49.70 | 46.88 | 39.22 | 53.51 | 53.28 | 53.00 | 57.47 | 552.89 |
| 1986 | 51.20 | 32.46 | 27.00 | 39.85 | 38.63 | 16.33 | 17.55 | 38.88 | 23.72 | 34.76 | 42.06 | 42.24 | 404.69 |
| 1987 | 47.35 | 51.07 | 58.44 | 57.36 | 46.05 | 53.31 | 49.77 | 44.62 | 45.33 | 48.93 | 47.30 | 58.33 | 607.85 |
| 1988 | 60.20 | 53.18 | 58.40 | 50.85 | 40.10 | 47.57 | 48.74 | 43.87 | 43.71 | 48.18 | 50.52 | 39.85 | 585.17 |
| 1989 | 46.72 | 46.27 | 44.85 | 31.05 | 30.33 | 33.87 | 45.03 | 44.85 | 32.88 | 34.55 | 26.34 | 37.07 | 453.82 |
| 1990 | 49.96 | 42.24 | 35.37 | 34.83 | 38.07 | 45.83 | 32.21 | 27.77 | 41.42 | 51.07 | 48.31 | 56.16 | 503.24 |
| 1991 | 39.89 | 20.61 | 42.48 | 33.05 | 30.44 | 27.35 | 18.49 | 18.99 | 27.77 | 54.78 | 51.67 | 56.05 | 421.57 |
| 1992 | 54.70 | 53.06 | 49.19 | 56.04 | 53.93 | 33.11 | 24.83 | 29.83 | 36.83 | 41.64 | 53.99 | 61.11 | 548.26 |
| 1993 | 61.98 | 54.37 | 59.65 | 48.49 | 22.88 | 21.35 | 26.52 | 39.13 | 38.77 | 40.12 | 55.85 | 62.00 | 531.12 |
| 1994 | 58.37 | 52.83 | 54.80 | 36.04 | 22.47 | 23.62 | 28.72 | 33.32 | 35.54 | 44.22 | 55.84 | 59.34 | 505.12 |
| 1995 | 55.47 | 35.81 | 30.58 | 22.93 | 17.62 | 22.32 | 35.91 | 20.15 | 23.26 | 34.85 | 39.79 | 53.32 | 392.02 |
| 1996 | 48.51 | 43.00 | 48.30 | 45.67 | 42.77 | 62.31 | 45.51 | 59.33 | 56.39 | 43.58 | 48.26 | 54.25 | 597.90 |
| 1997 | 50.27 | 39.39 | 49.12 | 44.76 | 42.44 | 32.68 | 27.73 | 25.13 | 34.85 | 40.08 | 58.51 | 62.69 | 507.65 |
| 1998 | 55.40 | 47.29 | 49.45 | 49.45 | 33.99 | 22.62 | 28.52 | 35.94 | 37.47 | 44.70 | 55.83 | 60.14 | 520.80 |
| 1999 | 50.25 | 52.95 | 47.46 | 48.15 | 48.34 | 35.75 | 29.01 | 25.37 | 41.94 | 43.60 | 31.64 | 50.64 | 505.09 |
| 2000 | 50.88 | 51.52 | 55.53 | 38.82 | 48.07 | 40.60 | 42.95 | 37.85 | 35.02 | 38.54 | 55.59 | 54.89 | 550.27 |
| 2001 | 51.47 | 46.88 | 47.10 | 46.54 | 33.50 | 44.49 | 32.97 | 27.79 | 27.04 | 48.71 | 47.84 | 61.67 | 515.98 |
| AVG | 48.09 | 41.56 | 43.05 | 40.28 | 36.82 | 38.49 | 38.49 | 37.50 | 38.08 | 44.15 | 47.18 | 51.35 | 505.06 |
| STD | 9.01 | 9.83 | 11.08 | 9.40 | 9.18 | 12.46 | 13.75 | 11.63 | 8.72 | 6.61 | 7.95 | 9.00 | 58.13 |
| MIN | 22.32 | 19.21 | 17.99 | 21.41 | 17.62 | 16.33 | 17.55 | 18.57 | 20.31 | 32.21 | 26.34 | 30.81 | 371.53 |
| MAX | 61.98 | 54.37 | 59.65 | 57.36 | 53.93 | 64.30 | 66.44 | 62.54 | 56.39 | 56.14 | 58.51 | 62.69 | 607.85 |

Peace Cascade

**TABLE 6-7**
**Annual Energy Production at Site 7e (GWh)**

| YEAR | JAN 31 | FEB 28 | MAR 31 | APR 30 | MAY 31 | JUN 30 | JUL 31 | AUG 31 | SEP 30 | OCT 31 | NOV 30 | DEC 31 | SUM 365 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1972 | 42.89 | 40.09 | 41.66 | 41.56 | 42.20 | 88.92 | 91.88 | 71.35 | 48.77 | 50.32 | 55.91 | 62.17 | 677.71 |
| 1973 | 65.73 | 61.82 | 66.30 | 58.59 | 58.87 | 70.51 | 67.49 | 61.22 | 53.33 | 56.53 | 54.82 | 45.82 | 721.04 |
| 1974 | 55.92 | 49.90 | 55.48 | 51.48 | 57.70 | 64.72 | 69.63 | 77.04 | 56.65 | 65.45 | 69.03 | 69.98 | 742.98 |
| 1975 | 67.49 | 66.02 | 67.85 | 69.19 | 56.44 | 52.25 | 34.27 | 25.15 | 42.63 | 47.58 | 53.07 | 54.11 | 636.06 |
| 1976 | 56.42 | 51.37 | 62.92 | 51.66 | 56.67 | 68.15 | 74.96 | 86.72 | 61.81 | 77.00 | 74.46 | 76.99 | 799.12 |
| 1977 | 68.44 | 43.55 | 38.23 | 49.08 | 48.93 | 59.97 | 78.08 | 60.56 | 45.62 | 62.10 | 70.49 | 79.16 | 704.19 |
| 1978 | 74.42 | 67.22 | 61.56 | 51.52 | 49.02 | 52.82 | 42.84 | 40.56 | 27.36 | 43.35 | 49.26 | 74.02 | 633.95 |
| 1979 | 77.14 | 65.91 | 47.80 | 41.00 | 49.71 | 65.13 | 63.25 | 45.69 | 51.83 | 51.33 | 64.49 | 49.15 | 672.45 |
| 1980 | 63.91 | 45.72 | 39.20 | 28.75 | 26.16 | 30.54 | 25.98 | 37.81 | 47.83 | 63.19 | 52.49 | 41.37 | 502.94 |
| 1981 | 29.90 | 47.59 | 69.56 | 63.49 | 39.65 | 39.68 | 50.57 | 42.20 | 59.27 | 70.38 | 73.23 | 70.32 | 655.82 |
| 1982 | 76.90 | 62.21 | 48.78 | 54.38 | 38.87 | 37.15 | 31.18 | 47.35 | 53.46 | 62.45 | 68.66 | 69.90 | 651.28 |
| 1983 | 41.88 | 25.72 | 24.08 | 29.99 | 62.23 | 52.25 | 91.88 | 62.88 | 71.22 | 63.80 | 51.92 | 66.00 | 643.86 |
| 1984 | 58.31 | 38.49 | 31.32 | 52.44 | 68.71 | 63.97 | 65.50 | 66.69 | 67.36 | 72.67 | 68.43 | 75.45 | 729.35 |
| 1985 | 48.52 | 43.72 | 66.56 | 66.38 | 45.21 | 68.18 | 63.93 | 52.95 | 73.50 | 72.83 | 72.50 | 78.89 | 753.17 |
| 1986 | 69.73 | 43.65 | 36.20 | 53.83 | 52.40 | 22.32 | 24.18 | 52.65 | 31.89 | 46.86 | 56.93 | 57.09 | 547.73 |
| 1987 | 64.25 | 70.00 | 80.32 | 79.00 | 62.87 | 73.57 | 68.27 | 61.36 | 61.71 | 66.60 | 64.32 | 80.17 | 832.44 |
| 1988 | 82.95 | 73.14 | 80.26 | 69.46 | 54.68 | 65.30 | 66.52 | 59.46 | 59.24 | 65.48 | 68.89 | 53.75 | 799.13 |
| 1989 | 63.36 | 63.00 | 60.71 | 41.76 | 41.39 | 46.13 | 61.40 | 61.04 | 44.33 | 46.54 | 35.36 | 49.91 | 614.93 |
| 1990 | 67.96 | 57.27 | 47.54 | 46.90 | 51.96 | 63.66 | 43.81 | 37.35 | 56.01 | 69.56 | 65.71 | 76.95 | 684.69 |
| 1991 | 53.78 | 27.60 | 57.38 | 44.44 | 41.30 | 37.35 | 25.09 | 25.48 | 37.33 | 74.97 | 70.55 | 76.79 | 572.07 |
| 1992 | 74.79 | 72.96 | 66.88 | 77.10 | 73.97 | 45.20 | 33.51 | 40.07 | 49.63 | 56.32 | 73.96 | 84.33 | 748.72 |
| 1993 | 85.65 | 74.91 | 82.12 | 65.98 | 30.99 | 29.39 | 36.53 | 53.52 | 52.60 | 54.21 | 76.72 | 85.70 | 728.32 |
| 1994 | 80.22 | 72.62 | 74.95 | 48.70 | 30.69 | 32.45 | 39.25 | 45.03 | 47.95 | 59.90 | 76.70 | 81.68 | 690.14 |
| 1995 | 75.92 | 48.28 | 41.04 | 30.75 | 23.99 | 30.55 | 49.23 | 27.39 | 31.35 | 46.90 | 53.75 | 72.80 | 531.96 |
| 1996 | 65.90 | 58.37 | 65.61 | 62.04 | 58.29 | 86.91 | 69.52 | 85.03 | 77.62 | 59.06 | 65.69 | 74.16 | 828.19 |
| 1997 | 68.41 | 53.27 | 66.76 | 60.77 | 58.15 | 44.91 | 37.84 | 33.95 | 47.19 | 54.37 | 80.74 | 86.75 | 693.10 |
| 1998 | 75.83 | 64.48 | 67.24 | 67.49 | 46.47 | 30.76 | 38.48 | 48.41 | 50.52 | 60.55 | 76.67 | 82.87 | 709.78 |
| 1999 | 68.36 | 72.80 | 64.40 | 65.57 | 65.89 | 48.88 | 39.28 | 34.11 | 56.73 | 58.97 | 42.49 | 68.92 | 686.40 |
| 2000 | 69.26 | 70.66 | 76.00 | 52.37 | 65.37 | 55.65 | 58.83 | 51.22 | 47.39 | 52.03 | 76.35 | 75.09 | 750.22 |
| 2001 | 70.12 | 63.88 | 63.90 | 63.20 | 45.28 | 62.23 | 45.19 | 37.58 | 36.38 | 66.22 | 65.04 | 85.17 | 704.20 |
| AVG | 65.48 | 56.54 | 58.42 | 54.63 | 50.14 | 52.98 | 52.95 | 51.06 | 51.62 | 59.92 | 64.29 | 70.18 | 688.20 |
| STD | 12.68 | 13.81 | 15.44 | 13.10 | 12.59 | 17.35 | 19.21 | 16.38 | 12.12 | 9.28 | 11.24 | 12.83 | 81.55 |
| MIN | 29.90 | 25.72 | 24.08 | 28.75 | 23.99 | 22.32 | 24.18 | 25.15 | 27.36 | 43.35 | 35.36 | 41.37 | 502.94 |
| MAX | 85.65 | 74.91 | 82.12 | 79.00 | 73.97 | 88.92 | 91.88 | 86.72 | 77.62 | 77.00 | 80.74 | 86.75 | 832.44 |

Peace Cascade

**TABLE 6-8**
**Annual Energy Production at Site 7f (GWh)**

| YEAR | JAN 31 | FEB 28 | MAR 31 | APR 30 | MAY 31 | JUN 30 | JUL 31 | AUG 31 | SEP 30 | OCT 31 | NOV 30 | DEC 31 | SUM 365 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1972 | 41.96 | 39.01 | 40.93 | 40.84 | 42.58 | 82.76 | 85.52 | 67.74 | 47.07 | 48.55 | 53.55 | 59.25 | 649.76 |
| 1973 | 62.41 | 58.54 | 62.92 | 56.06 | 57.43 | 68.01 | 64.82 | 58.72 | 51.27 | 54.25 | 52.56 | 44.41 | 691.39 |
| 1974 | 53.54 | 47.79 | 53.14 | 49.59 | 56.38 | 62.93 | 66.70 | 72.75 | 54.29 | 62.30 | 65.30 | 66.22 | 710.93 |
| 1975 | 63.98 | 62.26 | 64.30 | 65.52 | 55.24 | 51.79 | 35.45 | 26.48 | 41.70 | 46.02 | 50.95 | 51.92 | 615.63 |
| 1976 | 54.00 | 49.13 | 59.89 | 49.75 | 55.45 | 65.94 | 71.38 | 81.01 | 58.94 | 72.51 | 70.08 | 72.40 | 760.49 |
| 1977 | 64.82 | 41.94 | 37.99 | 47.38 | 48.38 | 58.72 | 74.11 | 58.12 | 44.16 | 59.29 | 66.59 | 74.29 | 675.80 |
| 1978 | 70.11 | 63.32 | 58.66 | 49.63 | 48.47 | 52.31 | 42.80 | 40.37 | 28.25 | 42.49 | 47.45 | 69.79 | 613.66 |
| 1979 | 72.51 | 62.16 | 46.07 | 40.37 | 49.11 | 63.30 | 61.05 | 44.63 | 49.89 | 49.48 | 61.27 | 47.35 | 647.18 |
| 1980 | 60.73 | 43.91 | 38.77 | 29.35 | 27.54 | 32.72 | 27.90 | 37.99 | 46.51 | 60.59 | 50.54 | 40.80 | 497.35 |
| 1981 | 30.59 | 45.72 | 65.84 | 60.54 | 41.66 | 41.01 | 49.03 | 41.44 | 56.48 | 66.52 | 68.93 | 66.49 | 634.24 |
| 1982 | 72.27 | 58.87 | 46.93 | 52.07 | 39.25 | 38.57 | 33.36 | 46.58 | 51.50 | 59.65 | 65.18 | 66.25 | 630.48 |
| 1983 | 41.16 | 26.36 | 25.03 | 30.74 | 60.27 | 51.54 | 85.52 | 62.31 | 67.24 | 60.79 | 49.87 | 62.66 | 623.50 |
| 1984 | 55.71 | 37.69 | 31.82 | 50.34 | 65.92 | 62.81 | 62.97 | 63.39 | 63.94 | 68.97 | 64.88 | 71.09 | 699.53 |
| 1985 | 46.76 | 42.12 | 63.15 | 62.99 | 44.84 | 65.69 | 61.13 | 50.87 | 69.27 | 68.91 | 68.32 | 74.04 | 718.10 |
| 1986 | 65.97 | 42.04 | 36.21 | 51.60 | 51.06 | 25.26 | 25.95 | 50.82 | 32.28 | 45.40 | 54.47 | 54.67 | 535.73 |
| 1987 | 61.10 | 65.77 | 75.25 | 74.18 | 61.37 | 70.56 | 65.53 | 60.59 | 59.07 | 63.27 | 61.15 | 75.23 | 793.08 |
| 1988 | 77.55 | 68.47 | 75.20 | 65.77 | 53.70 | 63.43 | 63.48 | 56.85 | 56.50 | 62.21 | 65.08 | 51.53 | 759.78 |
| 1989 | 60.25 | 59.57 | 57.85 | 40.86 | 41.89 | 45.67 | 59.25 | 58.63 | 43.29 | 45.12 | 35.51 | 48.18 | 596.07 |
| 1990 | 64.47 | 54.49 | 45.86 | 45.45 | 51.44 | 63.45 | 43.33 | 37.31 | 53.54 | 65.79 | 62.24 | 72.32 | 659.69 |
| 1991 | 51.57 | 28.11 | 54.89 | 43.17 | 41.84 | 38.58 | 26.58 | 26.42 | 37.07 | 70.67 | 66.64 | 72.25 | 557.78 |
| 1992 | 70.46 | 68.35 | 63.67 | 72.74 | 70.55 | 44.80 | 34.15 | 39.61 | 47.64 | 54.07 | 69.62 | 78.72 | 714.39 |
| 1993 | 79.81 | 69.99 | 76.79 | 62.50 | 32.46 | 30.68 | 37.50 | 52.19 | 50.88 | 52.13 | 72.01 | 79.88 | 696.82 |
| 1994 | 75.19 | 68.05 | 70.60 | 47.41 | 33.29 | 34.71 | 39.61 | 43.91 | 46.21 | 57.23 | 72.03 | 76.48 | 664.71 |
| 1995 | 71.43 | 46.30 | 40.39 | 31.26 | 26.80 | 32.50 | 49.17 | 28.48 | 31.84 | 45.30 | 51.49 | 68.69 | 523.65 |
| 1996 | 62.55 | 55.46 | 62.29 | 59.41 | 57.09 | 79.30 | 63.40 | 83.04 | 79.34 | 56.62 | 62.30 | 69.89 | 790.68 |
| 1997 | 64.78 | 50.85 | 63.32 | 58.43 | 58.27 | 45.83 | 38.80 | 34.49 | 45.58 | 52.57 | 75.76 | 80.80 | 669.47 |
| 1998 | 71.36 | 60.91 | 63.77 | 64.00 | 46.66 | 32.18 | 38.45 | 46.67 | 48.48 | 57.71 | 71.92 | 77.48 | 679.61 |
| 1999 | 64.74 | 68.19 | 61.21 | 62.29 | 63.45 | 48.53 | 39.53 | 34.47 | 54.18 | 56.27 | 41.37 | 65.20 | 659.42 |
| 2000 | 65.50 | 66.32 | 71.48 | 50.22 | 62.19 | 54.51 | 57.24 | 49.57 | 46.38 | 50.27 | 71.83 | 70.78 | 716.28 |
| 2001 | 66.32 | 60.37 | 60.75 | 60.04 | 44.43 | 61.35 | 45.55 | 38.14 | 36.33 | 62.88 | 61.69 | 79.45 | 677.31 |
| AVG | 62.12 | 53.74 | 55.83 | 52.48 | 49.63 | 52.31 | 51.64 | 49.79 | 49.97 | 57.26 | 61.02 | 66.28 | 662.08 |
| STD | 11.27 | 12.32 | 13.77 | 11.72 | 11.14 | 15.17 | 16.86 | 14.92 | 11.32 | 8.36 | 10.03 | 11.41 | 72.88 |
| MIN | 30.59 | 26.36 | 25.03 | 29.35 | 26.80 | 25.26 | 25.95 | 26.42 | 28.25 | 42.49 | 35.51 | 40.80 | 497.35 |
| MAX | 79.81 | 69.99 | 76.79 | 74.18 | 70.55 | 82.76 | 85.52 | 83.04 | 79.34 | 72.51 | 75.76 | 80.80 | 793.08 |



**TABLE 6-9**
**Annual Energy Production at Site 7g (GWh)**

**Peace Cascade Energy - Ice Effects**

| Site | Ice Stage-up Duration | Tailwater Stage-up | | Return Period | Energy Lost, GWh |
|---|---|---|---|---|---|
| 7a | 0 | 0 | 0.00 | n/a | 0 |
| 7b | 0 | 0 | 0.00 | n/a | 0 |
| 7c | 0 | 0 | 0.00 | n/a | 0 |
| 7d | 5 | 1 | 0.07 | 15.00 | 1.41 |
| 7e | 20 | 2 | 0.13 | 7.50 | 11.35 |
| 7f | 40 | 2 | 0.13 | 7.50 | 22.48 |
| 7g | 60 | 4 | 0.20 | 5.00 | 65.61 |

Source: Preliminary ice stage-up for Peace River Cascade Option, Martin Jasek,

**Estimated Energy Lost due to Ice Stage-up**

| Return Period, Years | Probability | Energy Lost, GWh | Average Annual Energy of the Cascade, GWh | Estimated Annual Energy with Ice, GWh |
|---|---|---|---|---|
| 5 | 0.20 | 65.61 | 4034.5 | 3968.89 |
| 7.5 | 0.13 | 99.44 | 4034.5 | 3935.06 |
| 15 | 0.067 | 100.85 | 4034.5 | 3933.65 |



**TABLE 6-10**
**Summary of Energy Lost Due to Ice Stage-up**

**Table 7.1.**

**Generating Units Proposed for 7.5 m Head, 2000 $m^3/s$ Total Powerplant Capacity**

| Supplier | Type | Number of Units | Flow/unit $m^3/s$ | Runner diameter, m | Total installed capacity, MW | Wire to wire supply cost, $M |
|---|---|---|---|---|---|---|
| VA Tech | 34 MW Bulb | 4 | 500 | 7.80 | 136 | 90 |
| VA Tech | 5.2 MW Ecobulb | 25 | 80 | 3.65 | 130 | 85 |
| Voith Siemens | 5 MW Pit | 25 | 80 | 3.50 | 125 | 58 |
| Voith Siemens | 12 MW S | 11 | 182 | 6.80 | 132 | 64 |
| Voith Siemens | 17 MW Siphon | 7 | 283 | 7.80 | 119 | 111 |
| Voith Siemens | 8 MW S | 16 | 125 | 4.60 | 130 | 74 |

**Table 8.1**

**Elevations Relative to River Bed Level**

| DESCRIPTION | ELEVATION RELATIVE TO RIVER BED |
|---|---|
| **RESERVOIR ELEVATIONS** | |
| Crest of Earth Embankments | 16.1 m |
| Crest of Concrete Components | 14.6 m |
| Maximum Flood Level in Reservoir | 13.6 m |
| Full Supply Level | 11.6 m |
| **TAILWATER ELEVATIONS** | |
| Maximum Ice Jam Level | 9.1 m |
| Maximum Flood Level | 7.6 m |
| Normal Tailwater | 4.1 m |
| Unit Centreline | 0.5 m |
| River Bed | 0.0 m |
| Bedrock surface | Varies from 0.0 m to –8.0 m |

**Table 8.2**

**Cascade Barrages**

| Site | Max. Flood (m) | Flood Tailwater Level (m) | Head on Barrage (m) | Froude No. | Number of Bays | Bay Width (m) | Gate Height (m) |
|---|---|---|---|---|---|---|---|
| 7a | 461.0 | 459.1 | 1.9 | 0.7 | 14 | 13.0 | 11.5 |
| 7b | 455.1 | 450.4 | 4.7 | 1.1 | 10 | 13.0 | 13.7 |
| 7c | 447.2 | 443.4 | 3.8 | 0.9 | 10 | 13.0 | 13.5 |
| 7d | 439.2 | 437.2 | 2.0 | 0.7 | 14 | 13.0 | 11.4 |
| 7e | 432.0 | 429.0 | 3.0 | 1.0 | 17 | 13.0 | 10.3 |
| 7f | 426.0 | 421.4 | 4.6 | 1.3 | 14 | 13.0 | 11.0 |
| 7g | 418.0 | 414.0 | 4.0 | 1.2 | 18 | 13.0 | 10.0 |

**Table 10.1**

**Transmission Line Costs**

(Note: Costs do not include right-of-way acquisition. These are estimated to be $2 million to $5 million.)

| Option | Description | Cost ($M) |
|---|---|---|
| 1A | Single circuit 138 kV main line with bundled 795 kcmil ACSR conductors | 12.8 |
| 1B | Double circuit 138 kV main line with bundles 795 kcmil ACSR conductors | 13.1 |
| 2A | Single circuit 230 kV main line with bundled 795 kcmil ACSR conductors | 12.4 |
| 2B | Double circuit 230 kV main line with bundled 795 kcmil ACSR conductors | 13.6 |
| 3A | Single circuit 138 kV main line with bundled 1033 kcmil ACSR conductors | 12.9 |
| 3B | Double circuit 138 kV main line with bundled 1033 kcmil ACSR conductors | 17.0 |
| 4A | Single circuit 230 kV main line with bundled 1033 kcmil ACSR conductors | 14.3 |
| 4B | Double circuit 230 kV main line with bundled 1033 kcmil ACSR conductors | 16.0 |

**PEACE CASCADE HYDROELECTRIC PROJECT**
**TABLE 12.1 -SUMMARY LEVEL COST ESTIMATE**
**SUMMARIZED BY SITE**

## Site 7a

| Description | Cost |
|---|---|
| Access Roads and Bridges | 1,191,595 |
| River Diversion Works | 8,041,037 |
| Excavation and Foundation Preparation | 34,694,855 |
| Grouting and Drainage | 270,233 |
| Intake (16 numbers) | 29,646,784 |
| Powerhouse Unit Bays Civil/M & E (16 units) | 191,640,528 |
| Powerhouse Service Bay | 3,505,448 |
| Tailrace(16 numbers) | 3,555,056 |
| Barrage Bays Civil/M & E(14 bays) | 44,610,552 |
| Transition Blocks (2 numbers) | 6,088,834 |
| Fish Way (1 number) | 1,173,316 |
| Navigation Lock | 5,940,488 |
| Anchor System | 4,054,016 |
| Switchyard | 3,648,863 |
| Transmission Line | 1,322,950 |
| Earthfill Dam | 2,780,414 |
| **Subtotal** | **342,164,969** |
| Engineering Fees @ 6% | 20,529,898 |
| Project Management Fees @ 6% | 20,529,898 |
| **Subtotal** | 383,224,765 |
| Contingency say 30% | 114,967,430 |
| **TOTAL COST** | **498,192,195** |

### Site 7b

| Description | Cost |
|---|---|
| Access Roads and Bridges | 145,626 |
| River Diversion Works | 5,083,926 |
| Excavation and Foundation Preparation | 17,435,508 |
| Grouting and Drainage | 215,371 |
| Intake (16 numbers) | 29,646,784 |
| Powerhouse Unit Bays Civil/M & E (16 units) | 191,640,528 |
| Powerhouse Service Bay | 3,505,448 |
| Tailrace (16 numbers) | 3,555,056 |
| Barrage Bays Civil/M & E (10 bays) | 31,864,680 |
| Transition Blocks (3 numbers) | 9,263,463 |
| Fish Ways (2 numbers) | 2,346,632 |
| Navigation Lock | 5,940,488 |
| Anchor System | 4,606,837 |
| Switchyard | 3,648,863 |
| Transmission Line | 2,443,516 |
| **Subtotal** | **311,342,726** |
| Engineering Fees @ 6% | 18,680,564 |
| Project Management Fees @ 6% | 18,680,564 |
| **Subtotal** | 348,703,853 |
| Contingency say 30% | 104,611,156 |
| **TOTAL COST** | **453,315,009** |

### Site 7c

| Description | Cost |
|---|---|
| Access Roads and Bridges | 291,248 |
| River Diversion Works | 6,079,679 |
| Excavation and Foundation Preparation | 16,485,443 |
| Grouting and Drainage | 249,140 |
| Intake (16 numbers) | 29,646,784 |
| Powerhouse Unit Bays Civil/M & E (16 units) | 191,640,528 |
| Powerhouse Service Bay | 3,505,448 |
| Tailrace (16 numbers) | 3,555,056 |
| Barrage Bays Civil/M & E (10 bays) | 31,864,680 |
| Transition Blocks (2 numbers) | 6,088,834 |
| Fish Ways (2 numbers) | 2,346,632 |
| Navigation Lock | 5,940,488 |
| Anchor System | 15,847,518 |
| Switchyard | 3,648,863 |
| Transmission Line | 1,715,209 |
| Concrete Gravity Dam | 8,510,469 |
| **Subtotal** | **327,416,019** |
| Engineering Fees @ 6% | 19,644,961 |
| Project Management Fees @ 6% | 19,644,961 |
| **Subtotal** | 366,705,941 |
| Contingency say 30% | 110,011,782 |
| **TOTAL COST** | **476,717,724** |

**Site 7d**

| Description | Cost |
|---|---|
| Access Roads and Bridges | 291,248 |
| River Diversion Works | 6,807,395 |
| Excavation and Foundation Preparation | 26,561,821 |
| Grouting and Drainage | 350,550 |
| Intake (16 numbers) | 29,646,784 |
| Powerhouse Unit Bays Civil/M & E (16 units) | 191,640,528 |
| Powerhouse Service Bay | 3,505,448 |
| Tailrace (16 numbers) | 3,555,056 |
| Barrage Bays Civil/M & E (14 bays) | 44,610,552 |
| Transition Blocks (2 numbers) | 8,462,126 |
| Fish Ways (2 numbers) | 2,346,632 |
| Navigation Lock | 5,940,488 |
| Anchor Systems | 17,690,252 |
| Switchyard | 3,648,863 |
| Transmission Line | 1,516,390 |
| Concrete Gravity Dam | 8,510,469 |
| **Subtotal** | **355,084,602** |
| Engineering Fees @ 6% | 21,305,076 |
| Project Management Fees @ 6% | 21,305,076 |
| **Subtotal** | 397,694,754 |
| Contingency say 30% | 119,308,426 |
| **TOTAL COST** | **517,003,181** |

**Site 7e**

| Description | Cost |
|---|---|
| Access Roads and Bridges | 485,416 |
| River Diversion Works | 6,759,691 |
| Excavation and Foundation Preparation | 13,639,172 |
| Grouting and Drainage | 291,574 |
| Intake (17 numbers) | 31,499,708 |
| Powerhouse Unit Bays Civil/M & E (17 units) | 203,618,061 |
| Powerhouse Service Bay | 3,505,448 |
| Tailrace (17 numbers) | 3,777,247 |
| Barrage Bays Civil/M & E (17 bays) | 54,169,956 |
| Transition Blocks (2 numbers) | 7,896,064 |
| Fish Ways (2 numbers) | 2,346,632 |
| Navigation Lock | 5,940,488 |
| Anchor Systems | 19,594,411 |
| Switchyard | 3,648,863 |
| Transmission Line | 3,135,172 |
| Concrete Gravity Dam | 8,510,469 |
| **Subtotal** | **368,818,372** |
| Engineering Fees @ 6% | 22,129,102 |
| Project Management Fees @ 6% | 22,129,102 |
| **Subtotal** | 413,076,577 |
| Contingency say 30% | 123,922,973 |
| **TOTAL COST** | **536,999,550** |

### Site 7f

| Description | Cost |
|---|---|
| Access Roads and Bridges | 4,557,607 |
| River Diversion Works | 7,943,809 |
| Excavation and Foundation Preparation | 26,321,601 |
| Grouting and Drainage | 330,451 |
| Intake (17 numbers) | 31,499,708 |
| Powerhouse Unit Bays Civil/M & E (17 units) | 203,618,061 |
| Powerhouse Service Bay | 3,505,448 |
| Tailrace (17 numbers) | 3,777,247 |
| Barrage Bays Civil/M & E (14 bays) | 44,610,552 |
| Transition Blocks (4 numbers) | 16,924,252 |
| Fish Ways (2 numbers) | 2,346,632 |
| Navigation Lock | 5,940,488 |
| Anchor Systems | 17,505,979 |
| Switchyard | 3,648,863 |
| Transmission Line | 2,323,400 |
| Earthfill Dam | 2,780,414 |
| **Subtotal** | **377,634,512** |
| Engineering Fees @ 6% | 22,658,071 |
| Project Management Fees @ 6% | 22,658,071 |
| **Subtotal** | 422,950,653 |
| Contingency say 30% | 126,885,196 |
| **TOTAL COST** | **549,835,849** |

### Site 7g

| Description | Cost |
|---|---|
| Access Roads and Bridges | 971,489 |
| River Diversion Works | 6,736,593 |
| Excavation and Foundation Preparation | 19,798,691 |
| Grouting and Drainage | 318,632 |
| Intake (17 numbers) | 31,499,708 |
| Powerhouse Unit Bays Civil/M & E (17 units) | 203,618,061 |
| Powerhouse Service Bay | 3,505,448 |
| Tailrace (17 numbers) | 3,777,247 |
| Barrage Bays Civil/M & E (18bays) | 57,356,424 |
| Transition Blocks (2 numbers) | 7,896,064 |
| Fish Ways (2 numbers) | 2,346,632 |
| Navigation Lock | 5,940,488 |
| Anchor Systems | 18,980,166 |
| Switchyard | 3,648,863 |
| Transmission Line | 2,108,107 |
| Concrete Gravity Dam | 8,510,469 |
| **Subtotal** | **377,013,082** |
| Engineering Fees @ 6% | 22,620,785 |
| Project Management Fees @ 6% | 22,620,785 |
| **Subtotal** | 422,254,652 |
| Contingency say 30% | 126,676,396 |
| **TOTAL COST** | **548,931,047** |

**Table 14.1.**

**Ranking of Biophysical Factors, Site C versus Cascade Development**

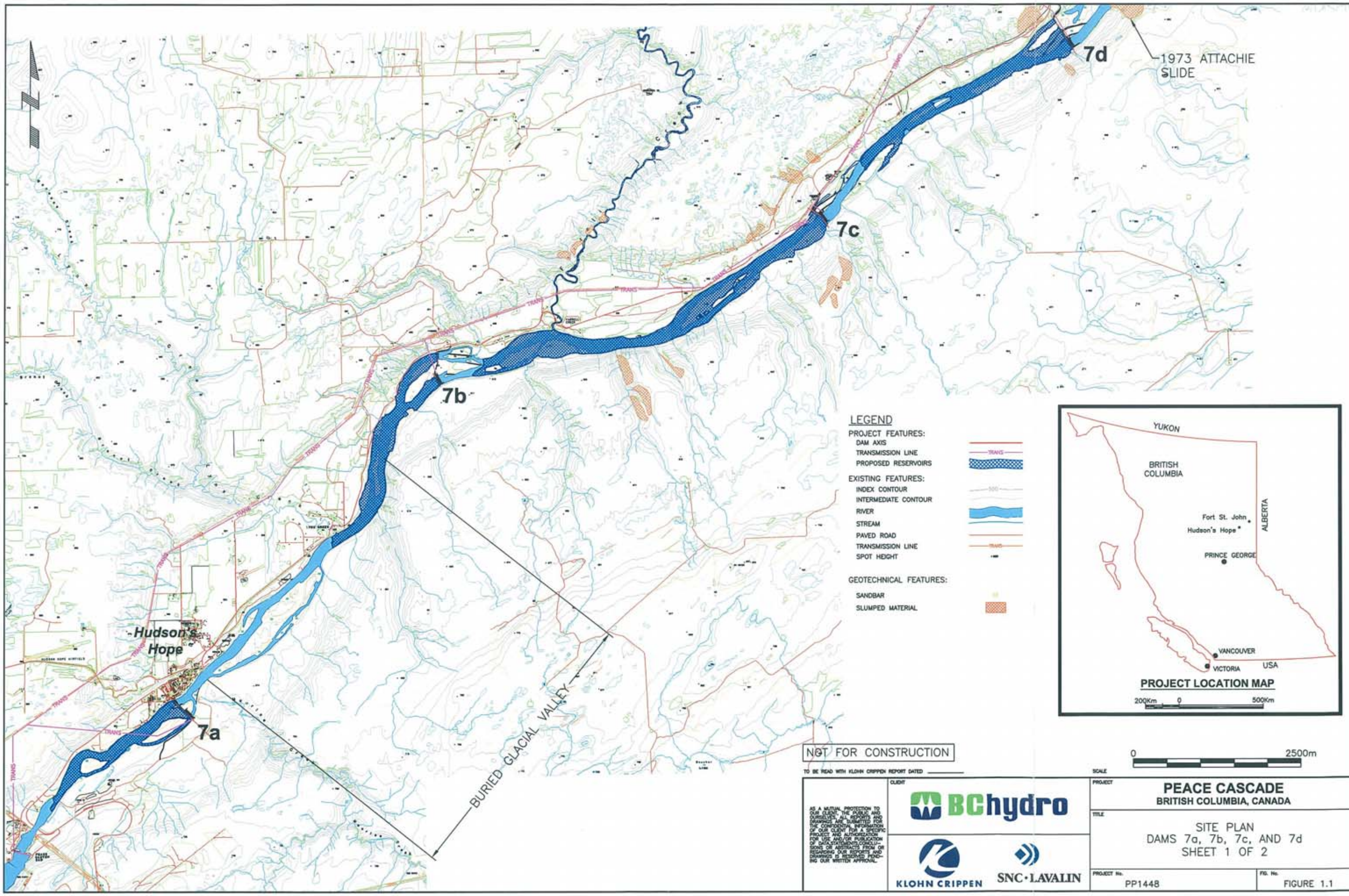
| | Site C Development | | Cascade Development 8 Plants @ 84 MW | |
|---|---|---|---|---|
| **Category** | **Factor** | **Comment** | **Factor** | **Comment** |
| Land Area | 5 | Impacts ~3800ha of forest land, 200ha of active agricultural land | 3.5 | Minor flooding of valley bottom habitats; increased impacts due to need for multiple developments |
| Navigation | 4 | High dam is impediment to navigation | 3.6 | Multiple low-head dams could have navigation locks but still impede river travel |
| Visual | 3 | Visual impacts of large reservoir; displacement of highway away from river | 2.1 | Many reservoirs and facilities to mar the viewscape but many of the vegetated terraces will remain unflooded |
| Water Quality and Quantity | 1 | Not a large issue; some sediment problems due to slope instability | 0.3 | No real water quality issues; *sediment downstream of Halfway River |
| Fish | 5 | Reservoir will result in large shift in species composition and fish abundance | 0.5 | Fish ways will mitigate fish movement; turbine design is fish friendly; habitat is enhanced in some cases due to moderate increases in water levels |
| Wildlife | 4 | Loss of high value bottom land habitats; significant displacement of species | 1.2 | Much of valley bottom habitat will not be flooded; some species, amphibians and shorebirds, displaced |
| Climate | 2 | Large reservoir will have local air temperature effects – increased fog | 0.2 | No significant impact on climate |
| Terrain Stability | 2 | High water may destabilize valley slopes | 1.4 | Multiple access points will traverse sensitive valley slopes |
| **TOTAL SCORE** | **26** | | **12.8** | |

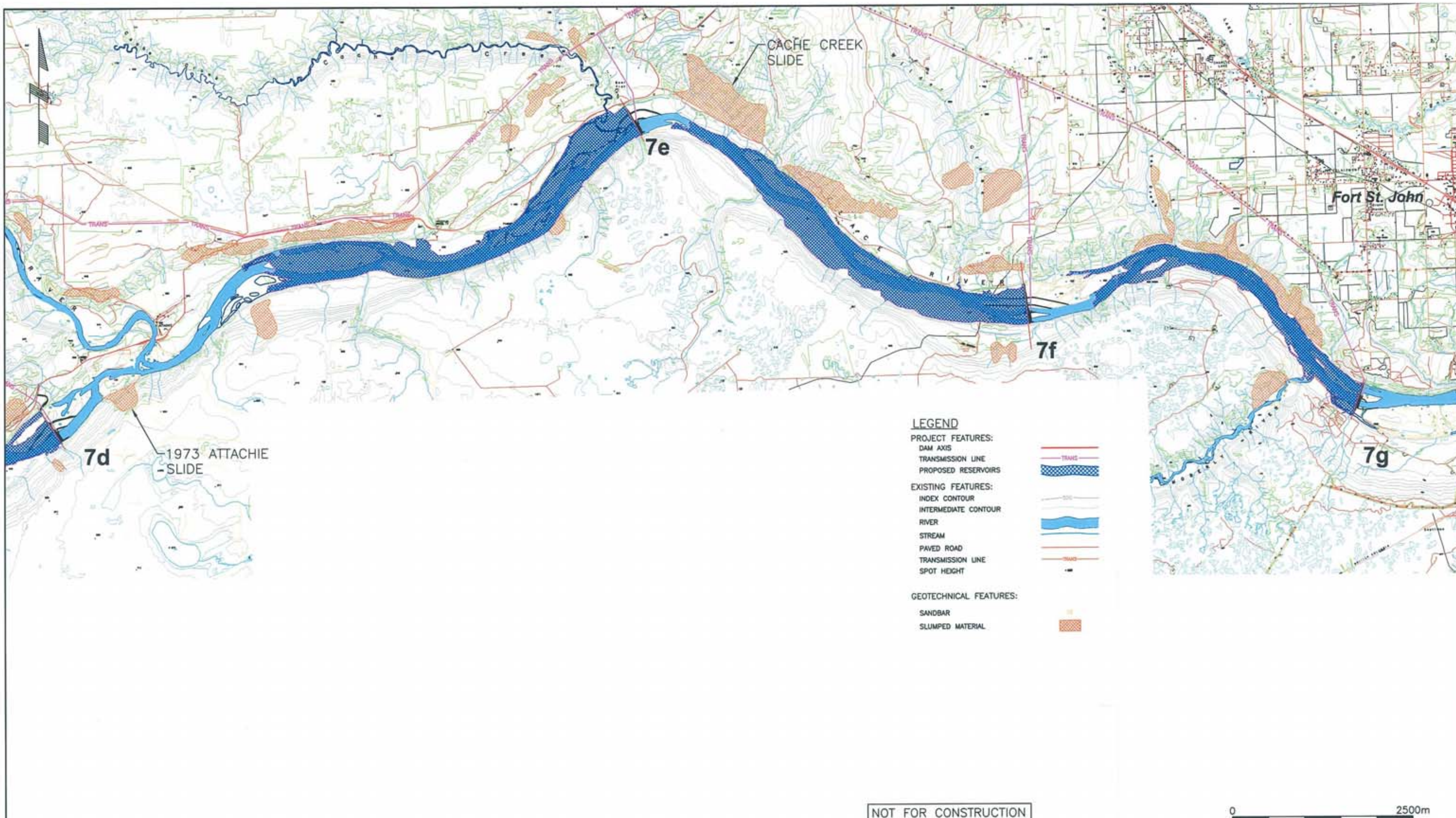
Table excerpted from BC Hydro Environmental Resources ranking table of Site C, two-dam development and eight-dam cascade development, 2001. Factors shown for Site C Development indicate relative weights for categories. For a given category, lower value of Factor indicates less negative impact.

*Comment added for this report, not in original table by BC Hydro.

# FIGURES

# FIGURES


7a
7b
7c
7d
1973 ATTACHIE SLIDE
Hudson's Hope
BURIED GLACIAL VALLEY
LEGEND
PROJECT FEATURES:
DAM AXIS
TRANSMISSION LINE
PROPOSED RESERVOIRS
EXISTING FEATURES:
INDEX CONTOUR
INTERMEDIATE CONTOUR
RIVER
STREAM
PAVED ROAD
TRANSMISSION LINE
SPOT HEIGHT
GEOTECHNICAL FEATURES:
SANDBAR
SLUMPED MATERIAL
YUKON
BRITISH COLUMBIA
ALBERTA
Fort St. John
Hudson's Hope
PRINCE GEORGE
VANCOUVER
VICTORIA
USA
PROJECT LOCATION MAP
200Km 0 500Km
0 2500m
NOT FOR CONSTRUCTION
BChydro
KLOHN CRIPPEN
SNC·LAVALIN
PEACE CASCADE
BRITISH COLUMBIA, CANADA
SITE PLAN
DAMS 7a, 7b, 7c, AND 7d
SHEET 1 OF 2
PP1448
FIGURE 1.1




NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN REPORT DATED ________

SCALE

CLIENT: BC hydro

KLOHN CRIPPEN

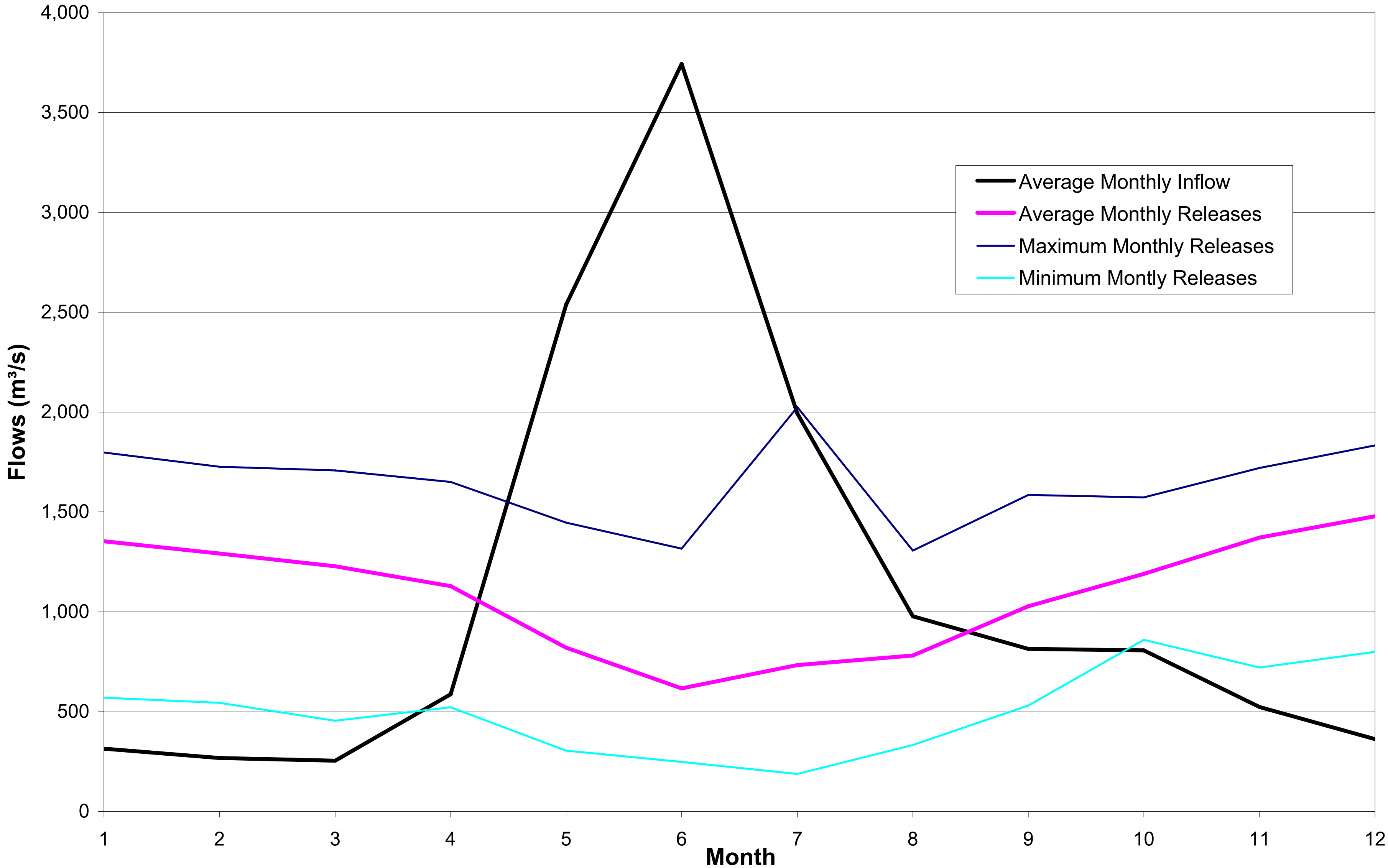
SNC·LAVALIN

PROJECT: **PEACE CASCADE**
**BRITISH COLUMBIA, CANADA**

TITLE: SITE PLAN
DAMS 7d, 7e, 7f, AND 7g
SHEET 2 OF 2

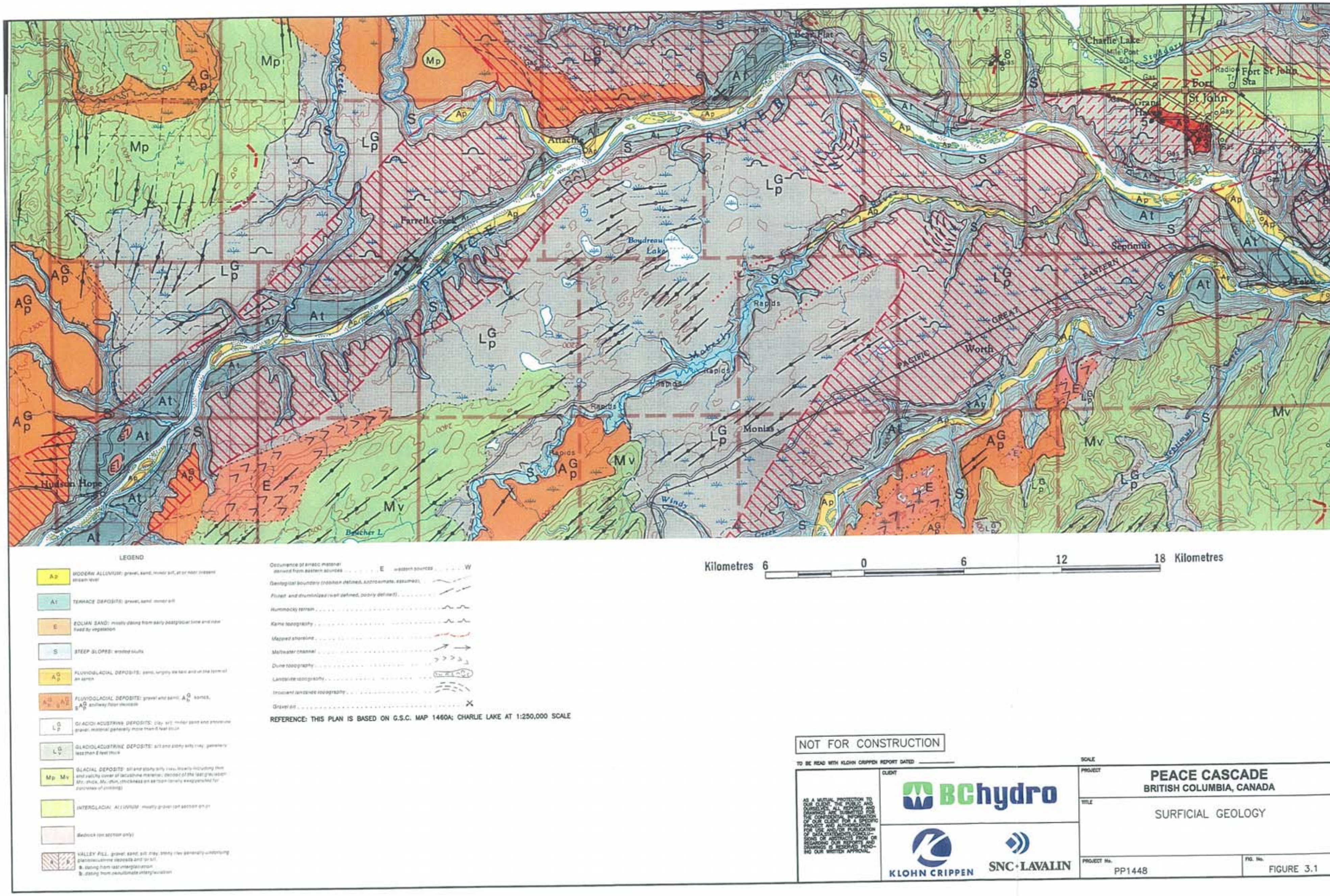
PROJECT No. PP1448

FIG. No. FIGURE 1.2




Note, in 1996 spill event (to lower the Williston Reservoir) is not concerned as a normal hydrologic event, therefore not considered in the above data sets.

**FIGURE 2.1**
**Williston Reservoir**
**Average Monthly Inflows and Releases**




REFERENCE: THIS PLAN IS BASED ON G.S.C. MAP 1460A; CHARLIE LAKE AT 1:250,000 SCALE

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN REPORT DATED ____

| CLIENT | PROJECT |
|---|---|
| BChydro | PEACE CASCADE<br>BRITISH COLUMBIA, CANADA |
| KLOHN CRIPPEN / SNC·LAVALIN | TITLE: SURFICIAL GEOLOGY |
| | PROJECT No. PP1448 — FIG. No. FIGURE 3.1 |

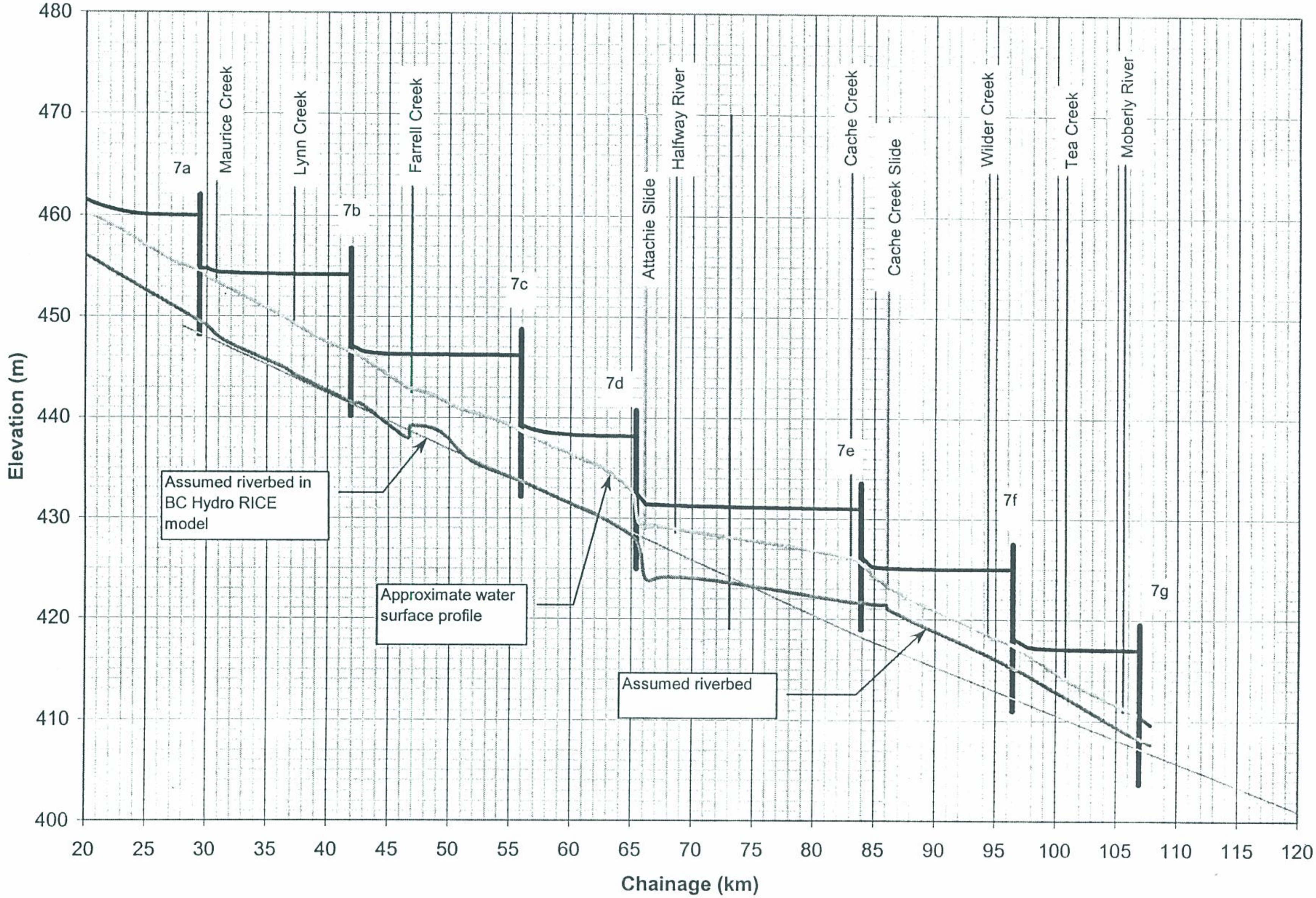



**FIGURE 5-1**
**Existing Water Level and Projected Water Levels with the Peace Cascade Dams**

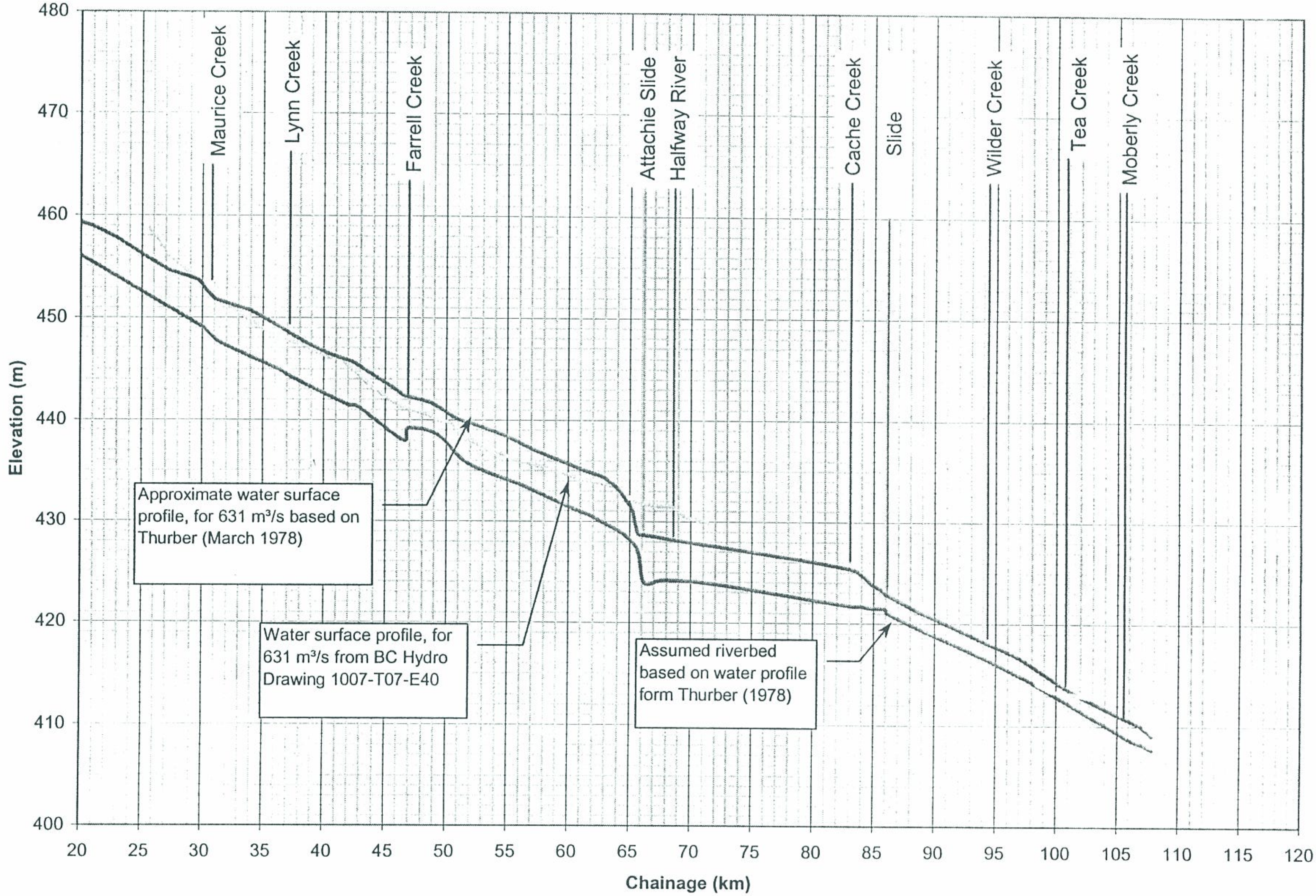



**FIGURE 5-2**
**Water Surface Profiles**
**Comparison between the Thruber (1978) and BC Hydro (1996-97)**

**FIGURE 6.1**
**Peace Canyon Dam, Hourly Releases, January 1999**

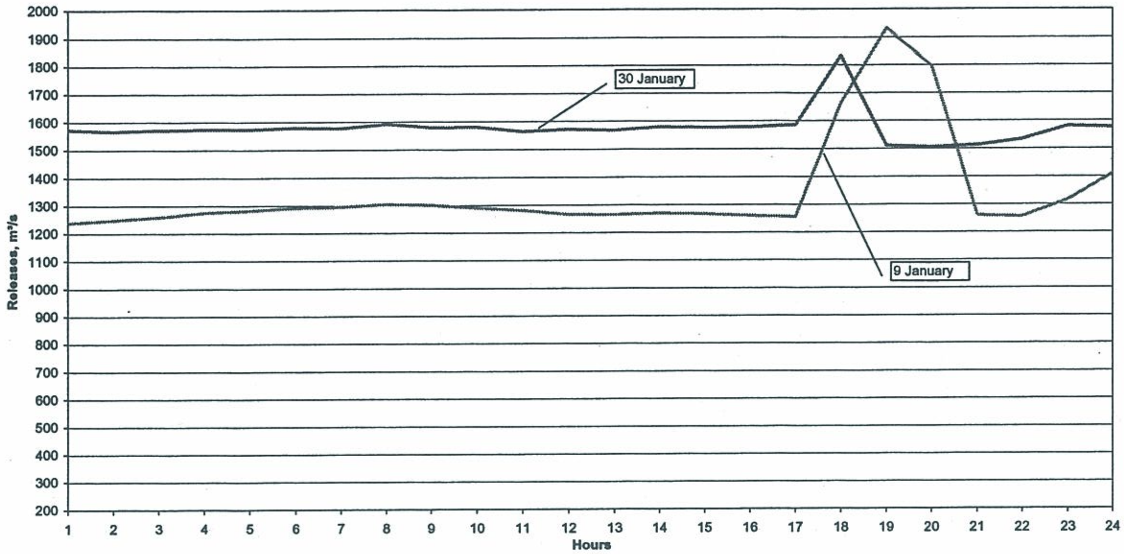
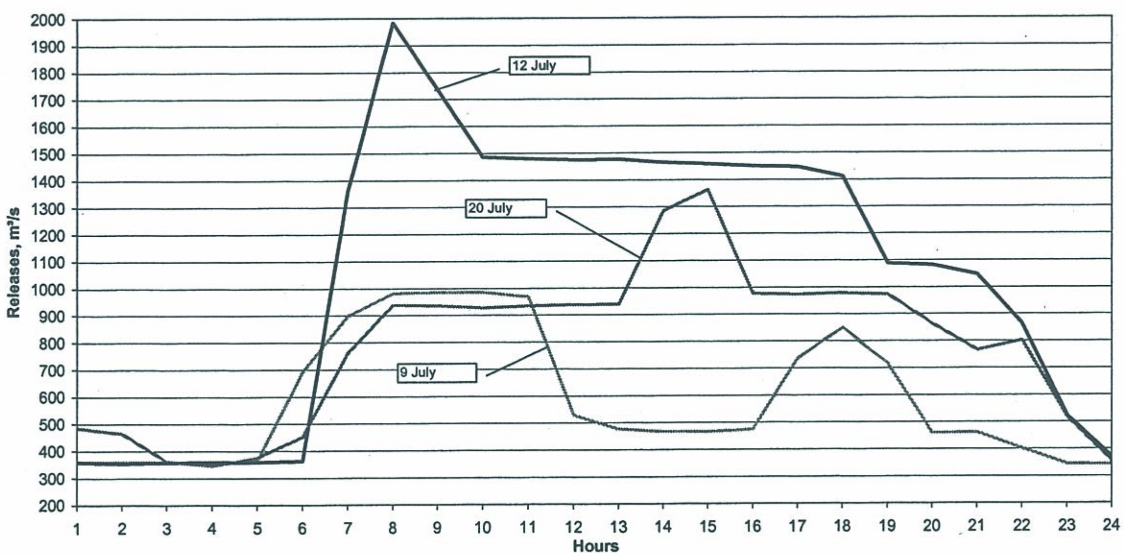
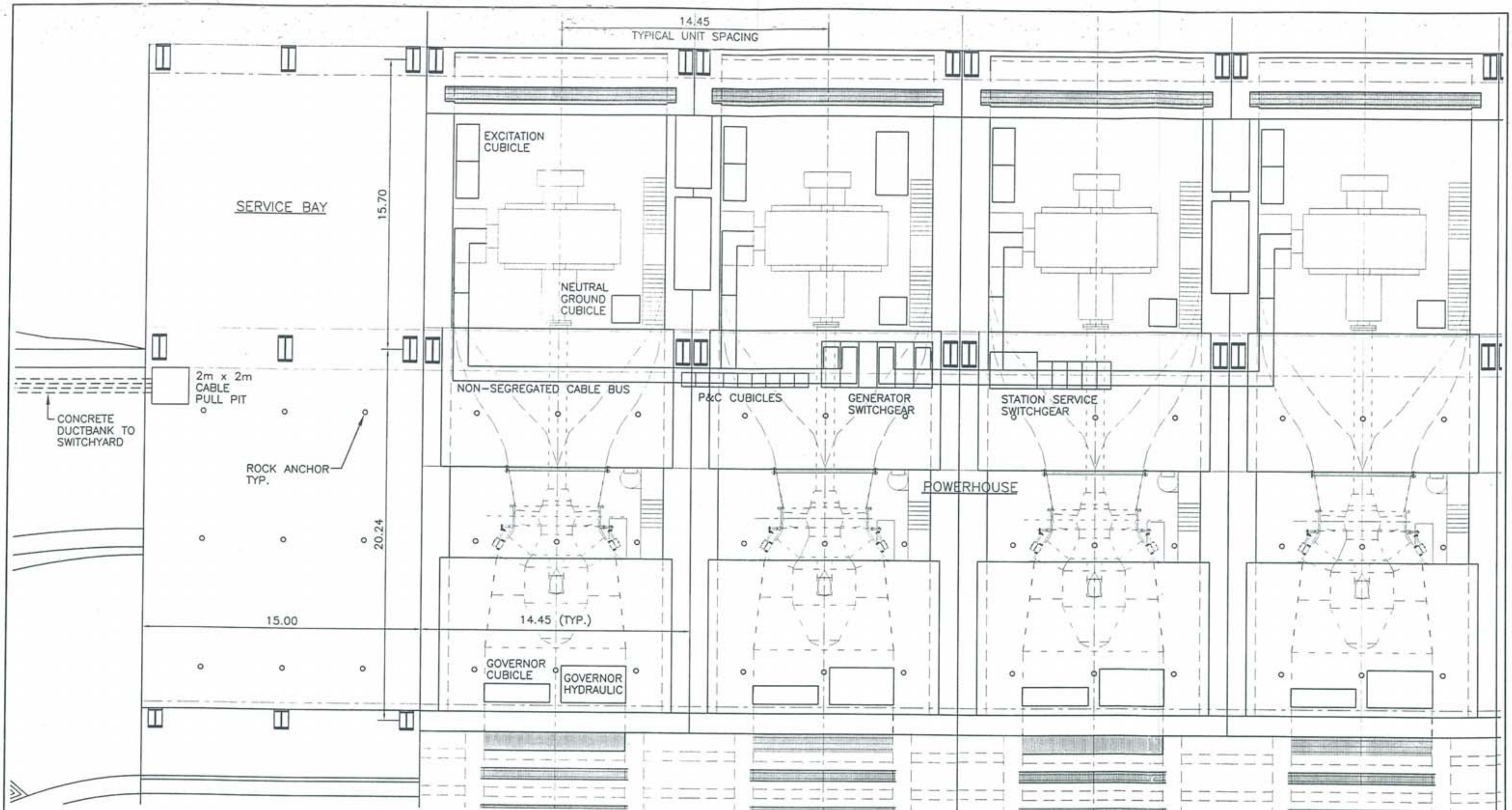



**FIGURE 6.2**
**Peace Canyon Dam, Hourly Releases, July 1999**



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TO BE READ WITH KLOHN CRIPPEN REPORT DATED ________

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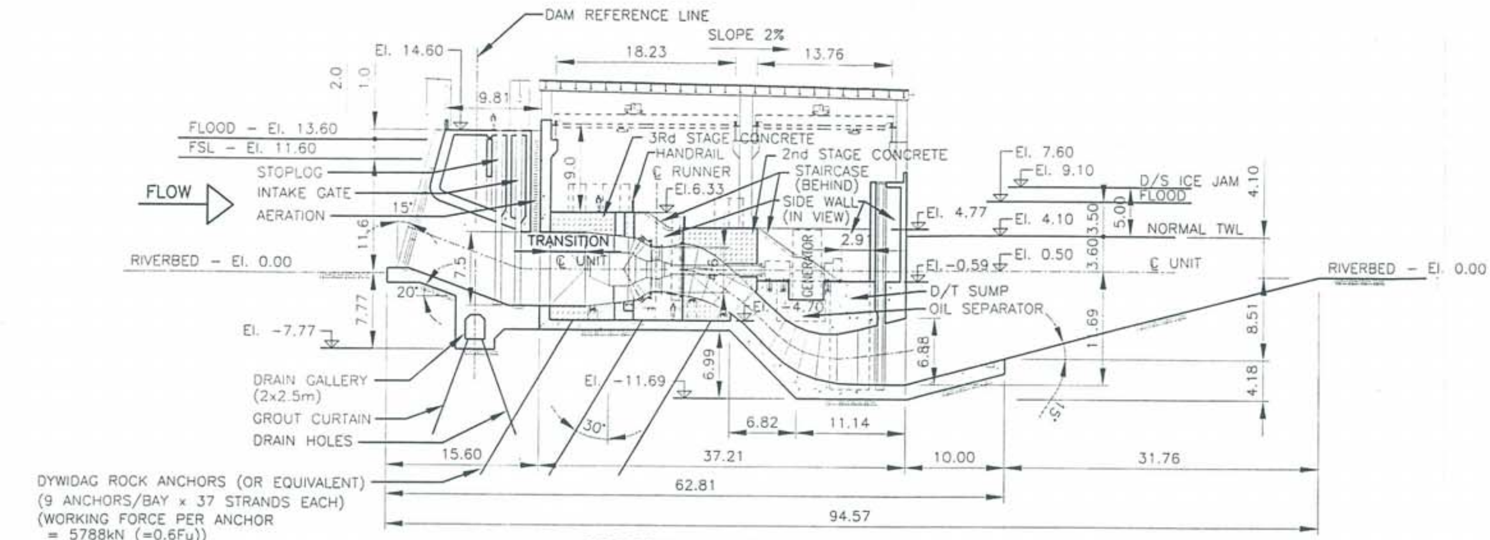
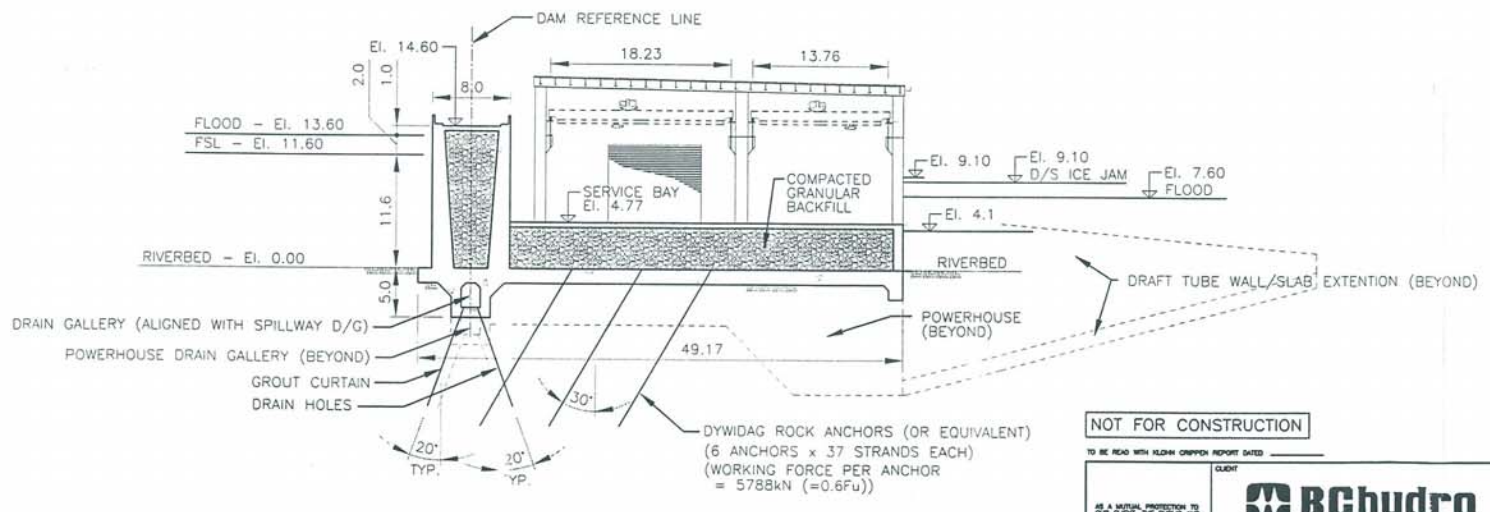
| | | PROJECT No. PP1448 | FIG. No. FIGURE 8.1 |




SECTION - POWERHOUSE




SECTION - SERVICE BAY

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN REPORT DATED

SCALE 5 0 5 10 15 20 25m

CLIENT: BChydro

KLOHN CRIPPEN

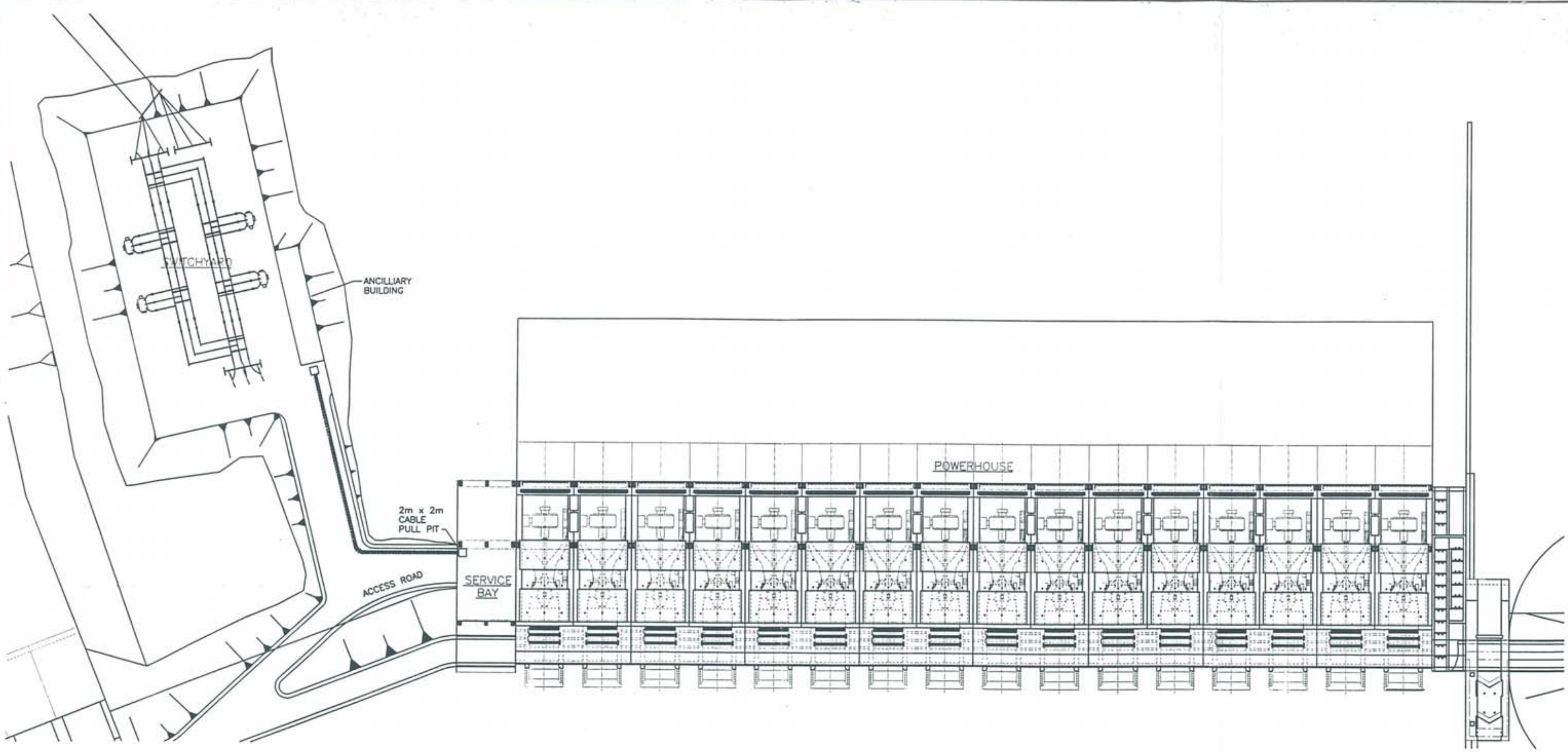
SNC·LAVALIN

PROJECT: PEACE CASCADE
BRITISH COLUMBIA, CANADA

TITLE: TYPICAL POWERHOUSE AND SERVICE BAY SECTIONS

PROJECT No. PP1448

FIG. No. FIGURE 8.2




NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN REPORT DATED ________

SCALE 10 0 10 20 30 40 50m

CLIENT: BChydro

KLOHN CRIPPEN

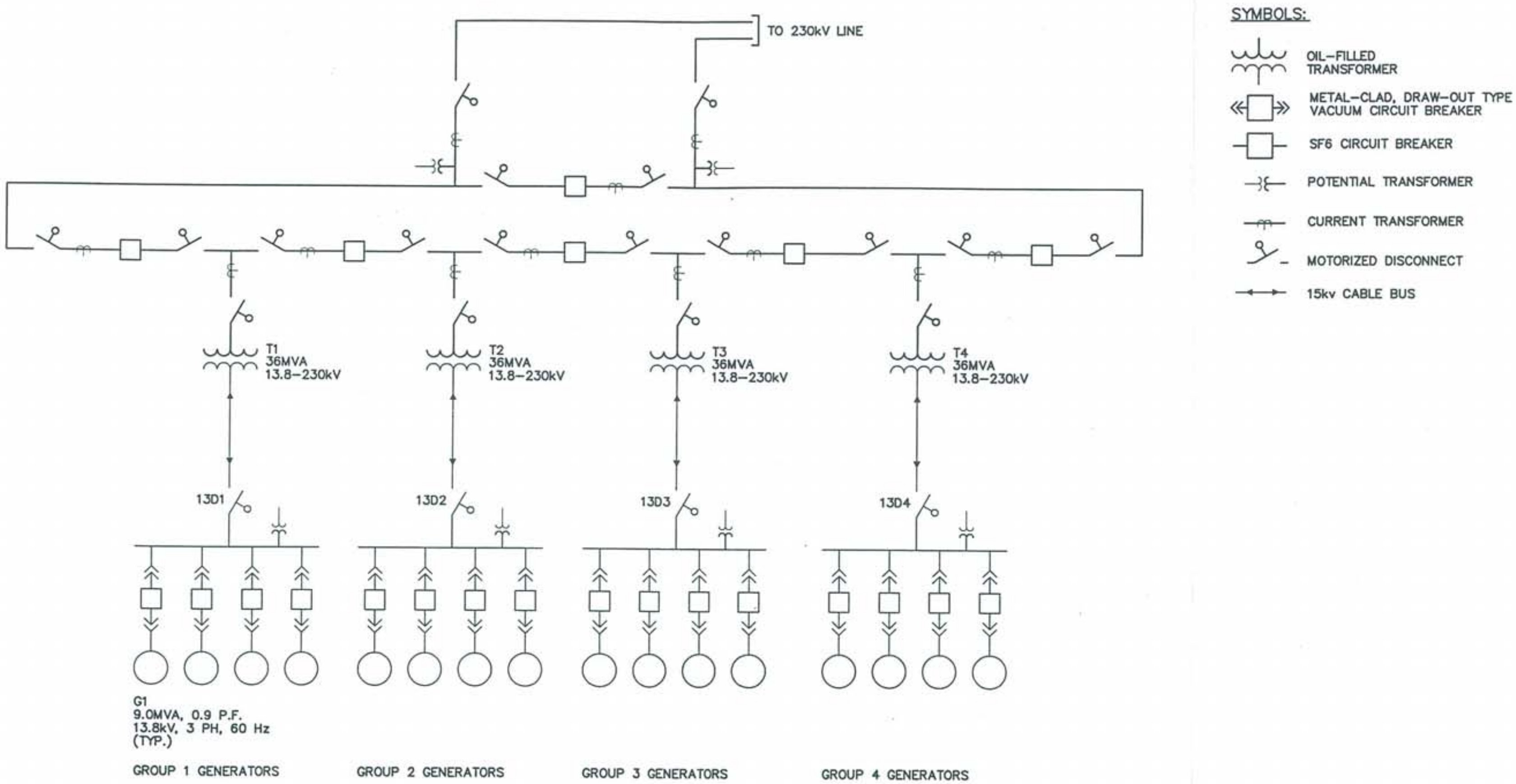
SNC·LAVALIN

PROJECT: PEACE CASCADE
BRITISH COLUMBIA, CANADA

TITLE: TYPICAL POWERHOUSE, SERVICE BAY & SWITCHYARD PLAN

PROJECT No. PP1448

FIG. No. FIGURE 8.3

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CLIENT: BChydro

KLOHN CRIPPEN | SNC·LAVALIN

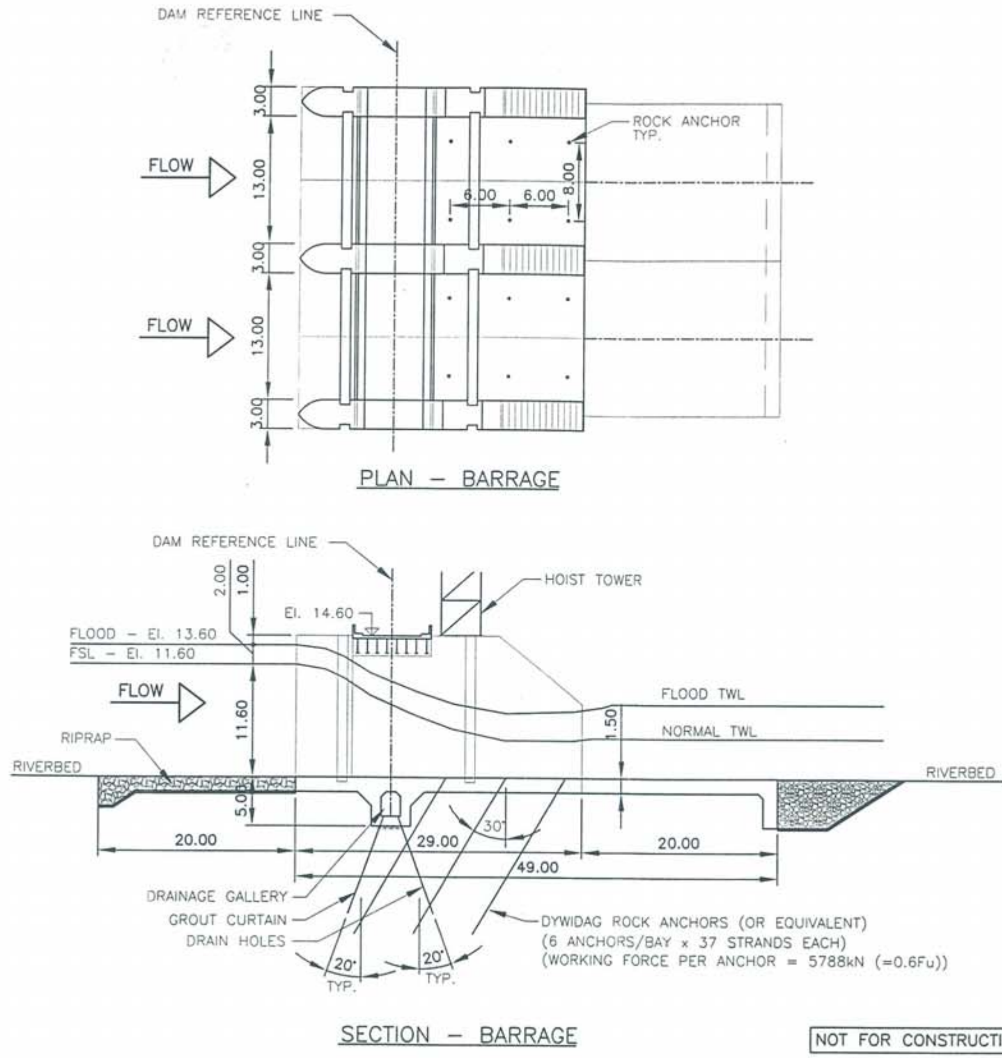
SCALE

PROJECT: PEACE CASCADE
BRITISH COLUMBIA, CANADA

TITLE: 16 x 8MW CONFIGURATION
MAIN SINGLE LINE DIAGRAM

PROJECT No. PP1448

FIG. No. FIGURE 8.4




NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN REPORT DATED ________

SCALE 5 0 5 10 15 20 25m

CLIENT: BChydro

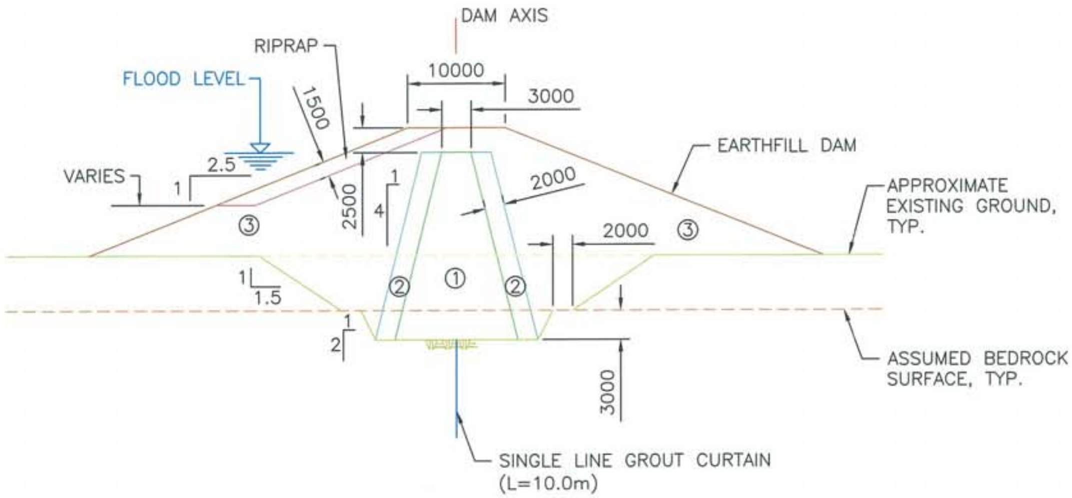
KLOHN CRIPPEN | SNC·LAVALIN

PROJECT: PEACE CASCADE
BRITISH COLUMBIA, CANADA

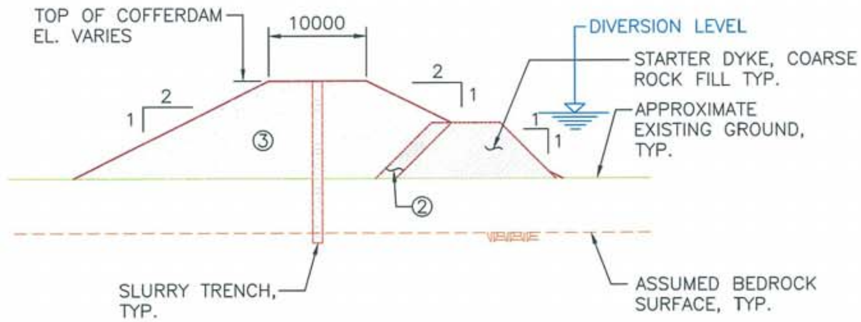
TITLE: TYPICAL BARRAGE PLAN AND SECTION

PROJECT No. PP1448

FIG. No. FIGURE 8.5




TYPICAL SECTION THROUGH EARTHFILL DAM




TYPICAL SECTION THROUGH COFFERDAM

LEGEND:

① CORE MATERIAL
② FILTER MATERIAL
③ SHELL MATERIAL

0 — 25m

SCALE

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN REPORT DATED

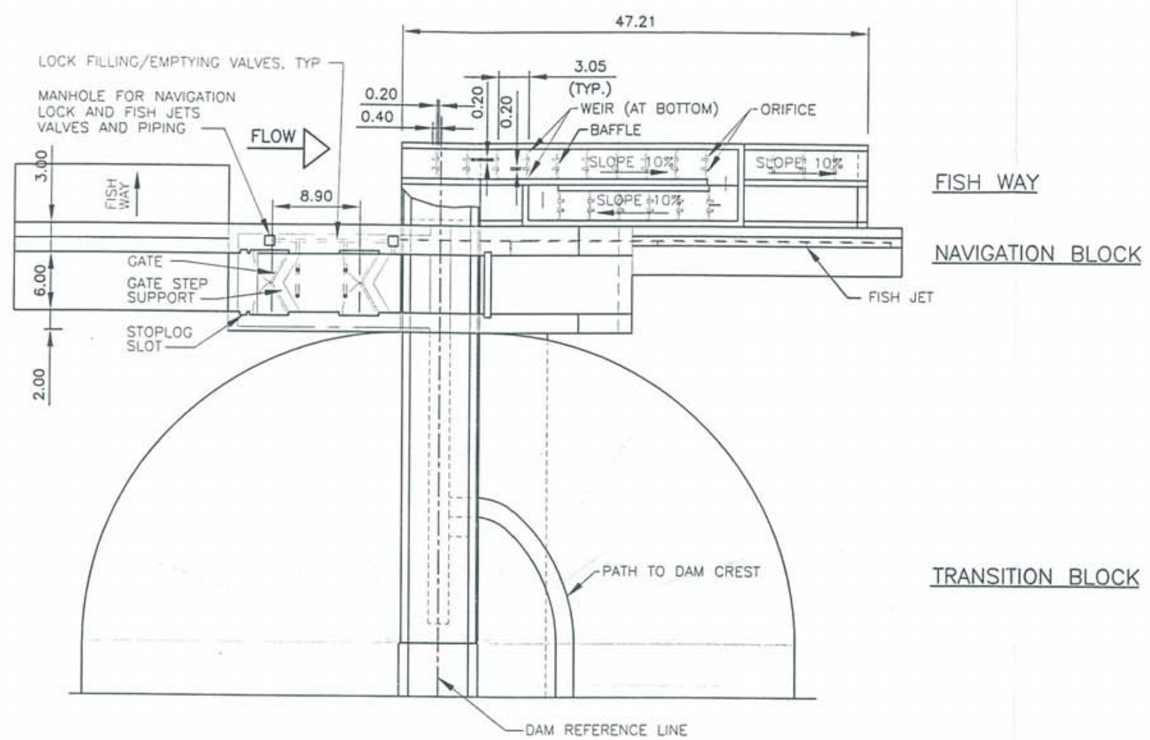
CLIENT: BC hydro

KLOHN CRIPPEN — SNC·LAVALIN

PROJECT: **PEACE CASCADE**
BRITISH COLUMBIA, CANADA

TITLE: TYPICAL EARTHFILL DAM AND COFFERDAM SECTION AND ELEVATION

| PROJECT No. | FIG. No. |
|---|---|
| PP1448 | FIGURE 8.6 |




NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN REPORT DATED

SCALE
5 0 5 10 15 20 25m

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CLIENT: BChydro

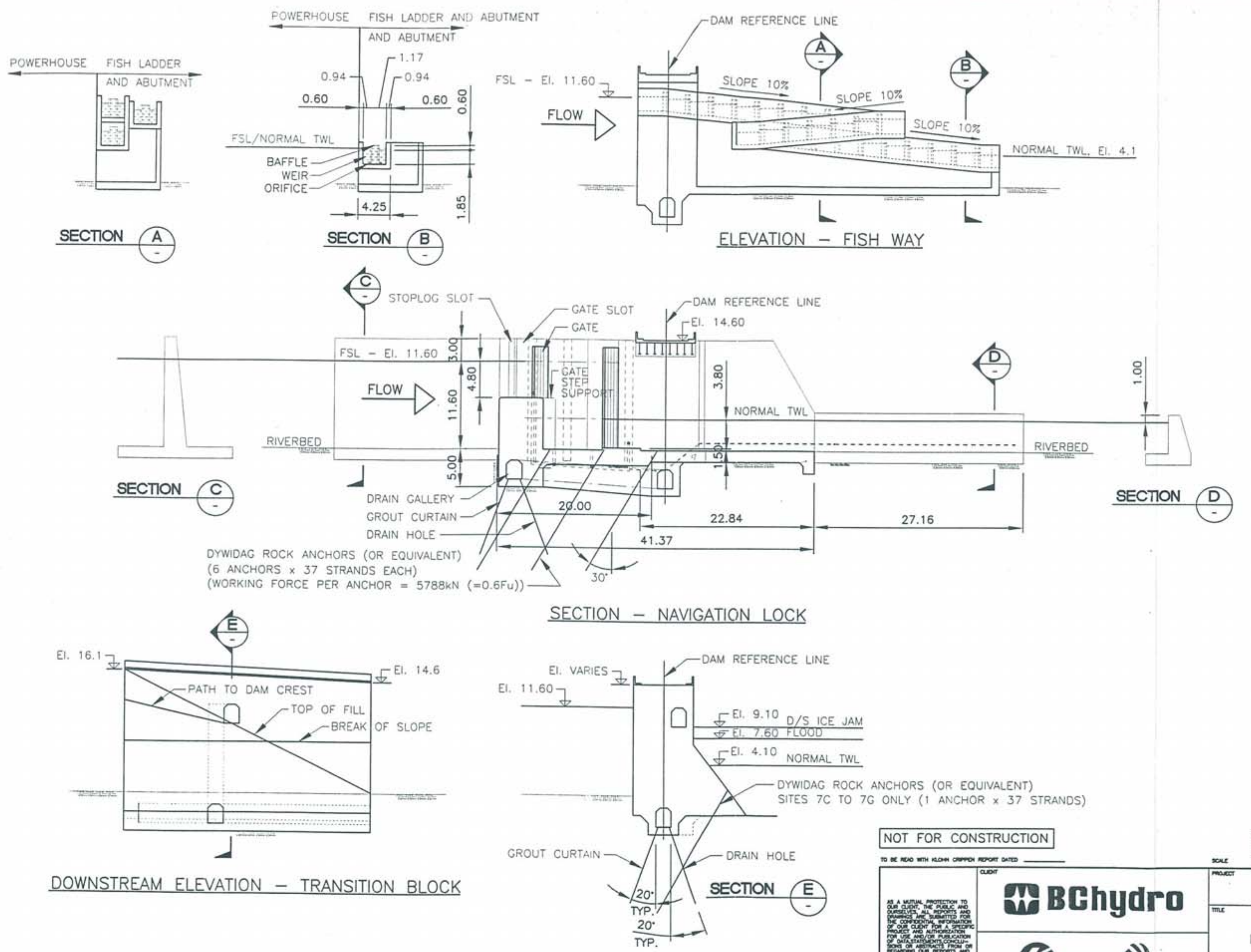
KLOHN CRIPPEN | SNC·LAVALIN

PROJECT: PEACE CASCADE
BRITISH COLUMBIA, CANADA

TITLE: TYPICAL NAVIGATION LOCK, FISH WAY AND TRANSITION BLOCK PLAN

PROJECT No. PP1448

FIG. No. FIGURE 8.7




NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN REPORT DATED

CLIENT: BChydro

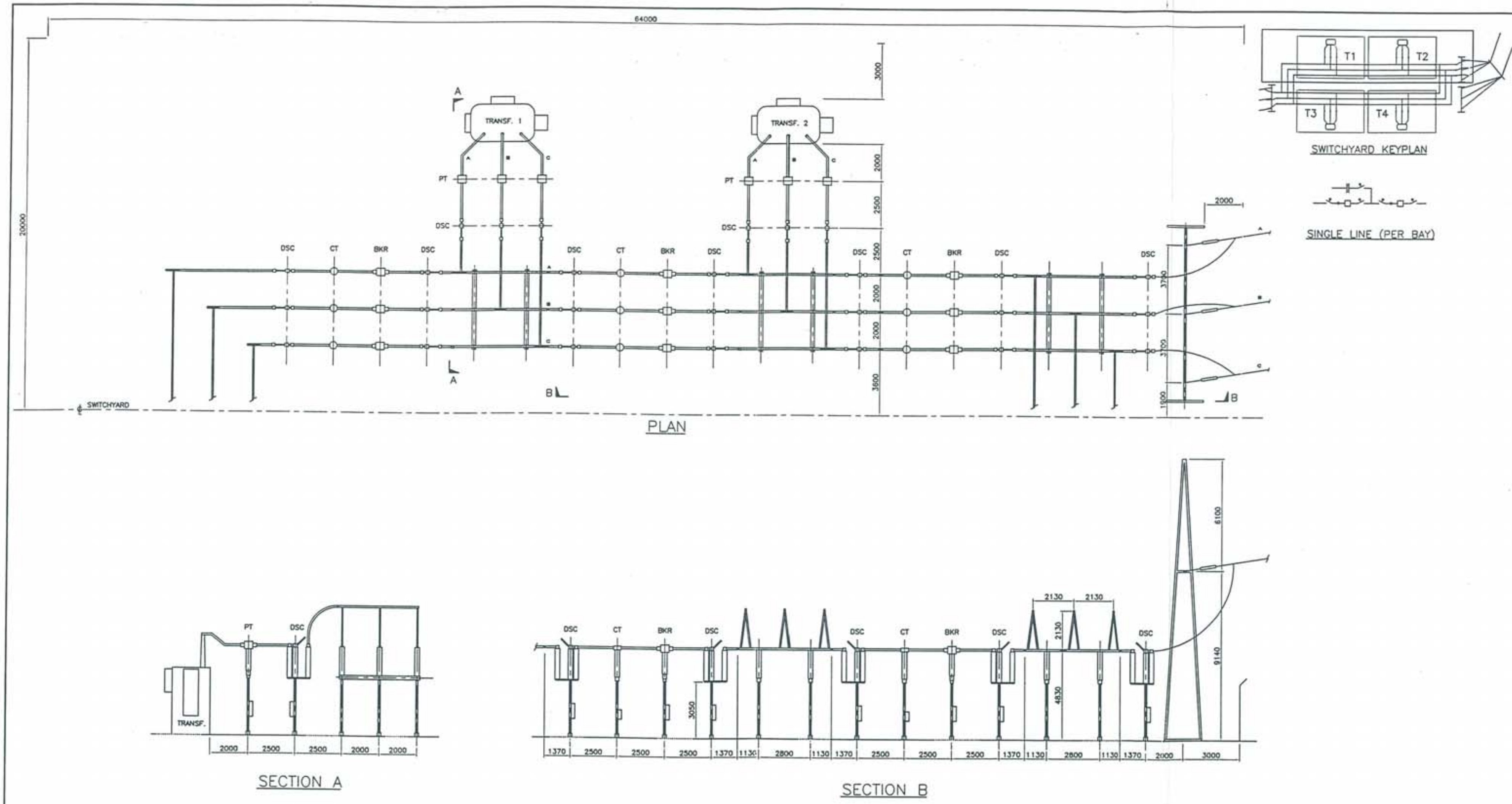
KLOHN CRIPPEN — SNC·LAVALIN

PROJECT: **PEACE CASCADE**
BRITISH COLUMBIA, CANADA

TITLE: TYPICAL NAVIGATION LOCK, FISH WAY AND TRANSITION BLOCK SECTIONS

PROJECT No. PP1448

FIG. No. FIGURE 8.8




NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN REPORT DATED ________

SCALE
2 0 2 4 6 8 10m

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CLIENT
BC hydro

KLOHN CRIPPEN

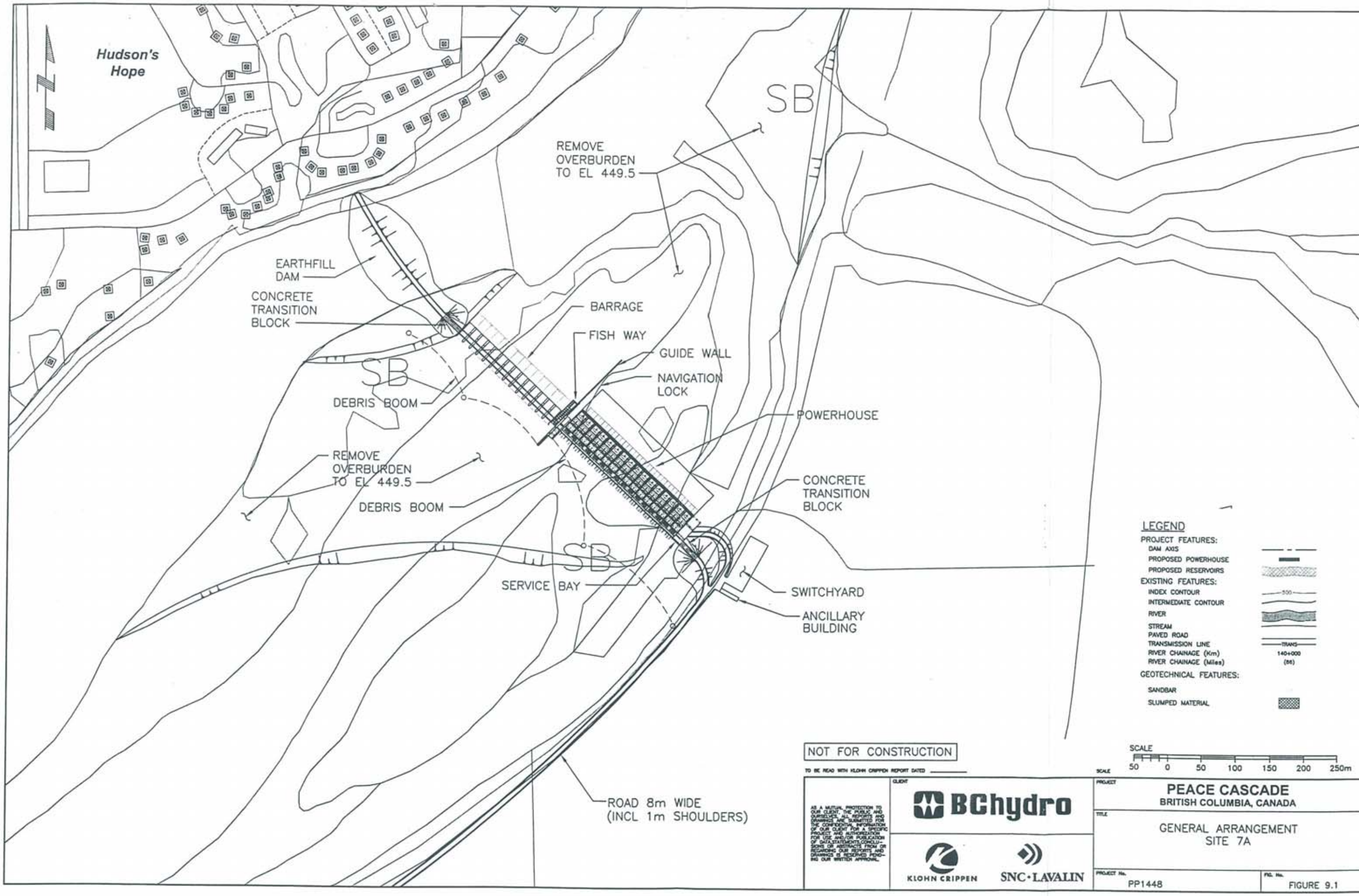
SNC·LAVALIN

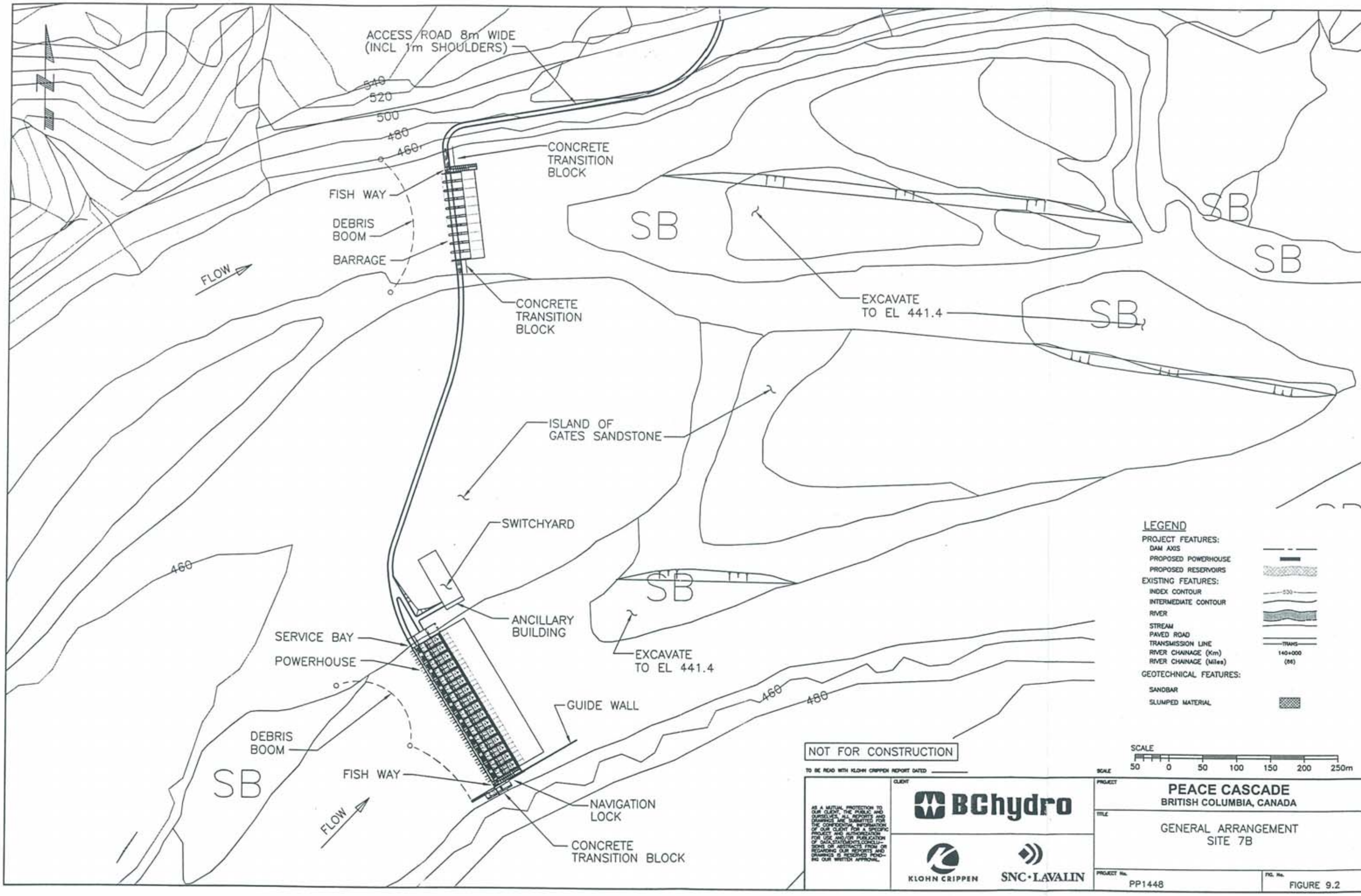
PROJECT
PEACE CASCADE
BRITISH COLUMBIA, CANADA

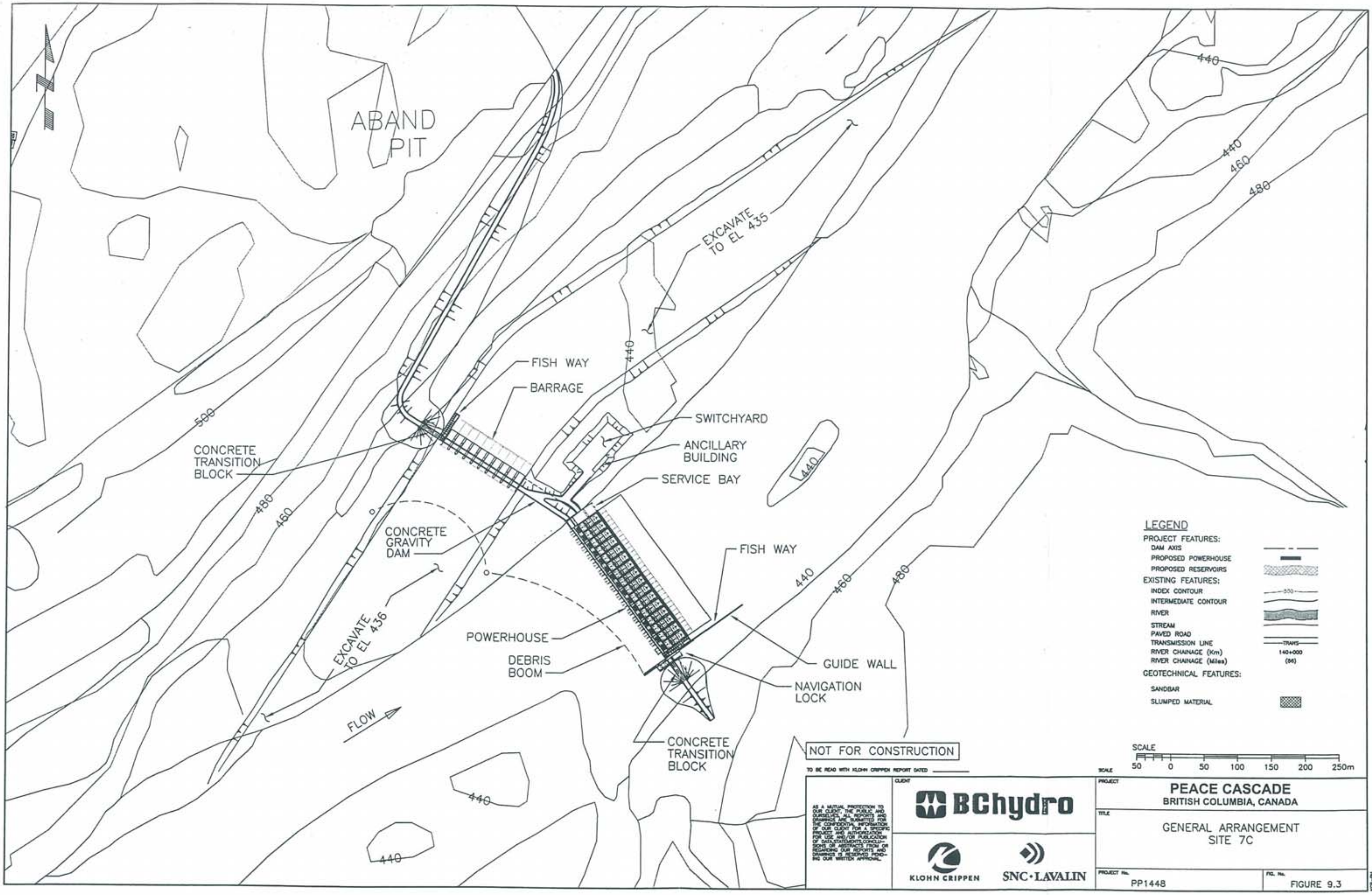
TITLE
TYPICAL SWITCHYARD
PLAN AND SECTION

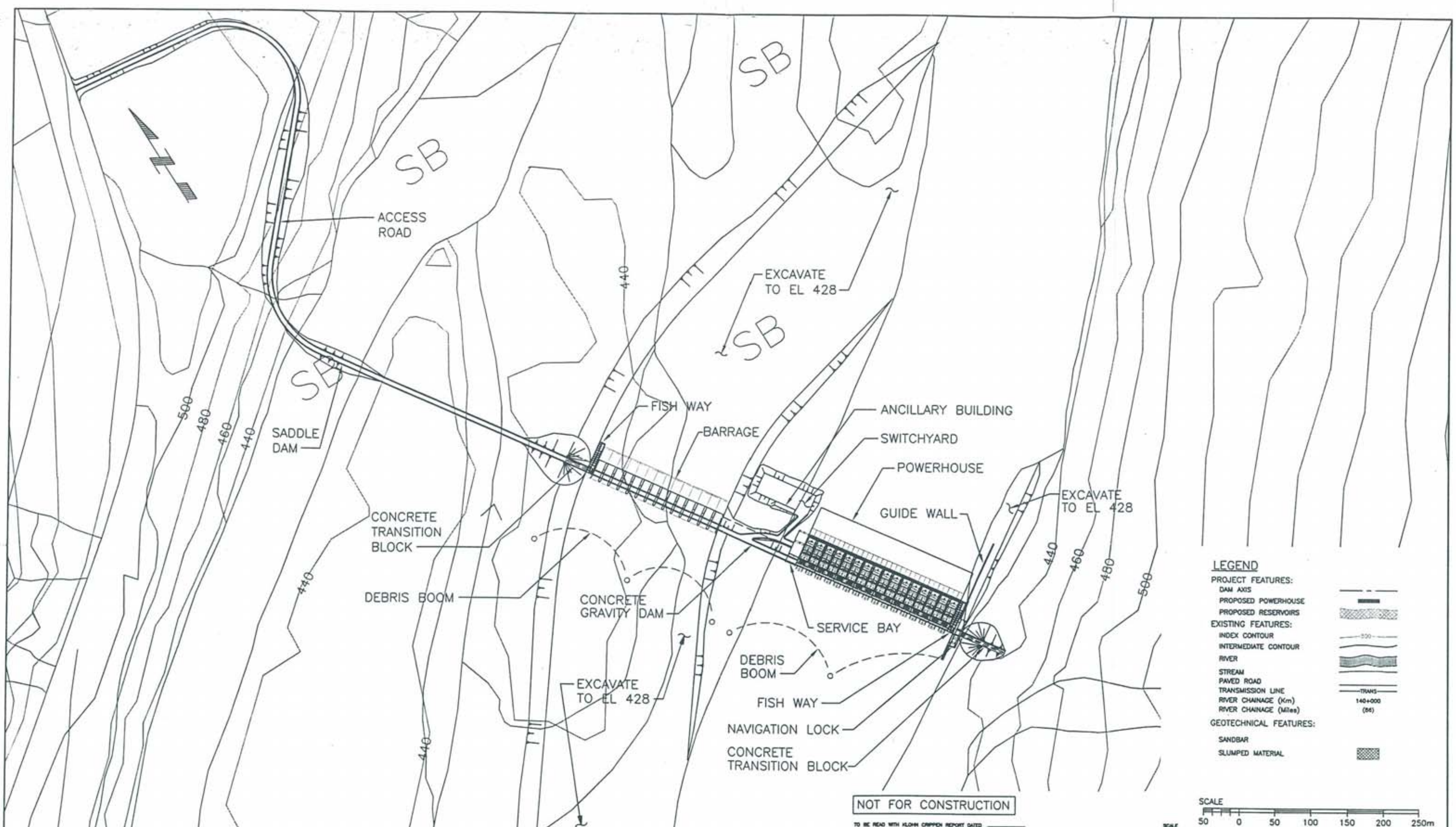
PROJECT No. PP1448

FIG. No. FIGURE 8.9


Hudson's Hope
SB
REMOVE OVERBURDEN TO EL 449.5
EARTHFILL DAM
CONCRETE TRANSITION BLOCK
BARRAGE
FISH WAY
GUIDE WALL
NAVIGATION LOCK
POWERHOUSE
SB
DEBRIS BOOM
REMOVE OVERBURDEN TO EL 449.5
DEBRIS BOOM
CONCRETE TRANSITION BLOCK
SB
SERVICE BAY
SWITCHYARD
ANCILLARY BUILDING
ROAD 8m WIDE (INCL 1m SHOULDERS)
LEGEND
PROJECT FEATURES:
DAM AXIS
PROPOSED POWERHOUSE
PROPOSED RESERVOIRS
EXISTING FEATURES:
INDEX CONTOUR
INTERMEDIATE CONTOUR
RIVER
STREAM
PAVED ROAD
TRANSMISSION LINE
RIVER CHAINAGE (Km)
RIVER CHAINAGE (Miles)
GEOTECHNICAL FEATURES:
SANDBAR
SLUMPED MATERIAL
NOT FOR CONSTRUCTION
SCALE
50 0 50 100 150 200 250m
BChydro
KLOHN CRIPPEN
SNC·LAVALIN
PEACE CASCADE
BRITISH COLUMBIA, CANADA
GENERAL ARRANGEMENT
SITE 7A
PP1448
FIGURE 9.1


ACCESS ROAD 8m WIDE
(INCL 1m SHOULDERS)
540
520
500
480
460
CONCRETE TRANSITION BLOCK
FISH WAY
DEBRIS BOOM
BARRAGE
FLOW
CONCRETE TRANSITION BLOCK
SB
EXCAVATE TO EL 441.4
ISLAND OF GATES SANDSTONE
SWITCHYARD
ANCILLARY BUILDING
EXCAVATE TO EL 441.4
SERVICE BAY
POWERHOUSE
GUIDE WALL
DEBRIS BOOM
FISH WAY
NAVIGATION LOCK
CONCRETE TRANSITION BLOCK
FLOW
460
480
LEGEND
PROJECT FEATURES:
DAM AXIS
PROPOSED POWERHOUSE
PROPOSED RESERVOIRS
EXISTING FEATURES:
INDEX CONTOUR
INTERMEDIATE CONTOUR
RIVER
STREAM
PAVED ROAD
TRANSMISSION LINE
RIVER CHAINAGE (Km)
RIVER CHAINAGE (Miles)
GEOTECHNICAL FEATURES:
SANDBAR
SLUMPED MATERIAL
TRANS
140+000
(86)
SCALE
50 0 50 100 150 200 250m
NOT FOR CONSTRUCTION
TO BE READ WITH KLOHN CRIPPEN REPORT DATED
BChydro
KLOHN CRIPPEN
SNC·LAVALIN
PEACE CASCADE
BRITISH COLUMBIA, CANADA
GENERAL ARRANGEMENT
SITE 7B
PROJECT No.
PP1448
FIG. No.
FIGURE 9.2


ABAND PIT
FISH WAY
BARRAGE
SWITCHYARD
ANCILLARY BUILDING
SERVICE BAY
CONCRETE TRANSITION BLOCK
CONCRETE GRAVITY DAM
EXCAVATE TO EL 435
EXCAVATE TO EL 436
FISH WAY
POWERHOUSE
DEBRIS BOOM
GUIDE WALL
NAVIGATION LOCK
CONCRETE TRANSITION BLOCK
FLOW
440
460
480
500
LEGEND
PROJECT FEATURES:
DAM AXIS
PROPOSED POWERHOUSE
PROPOSED RESERVOIRS
EXISTING FEATURES:
INDEX CONTOUR
INTERMEDIATE CONTOUR
RIVER
STREAM
PAVED ROAD
TRANSMISSION LINE
RIVER CHAINAGE (Km)
RIVER CHAINAGE (Miles)
GEOTECHNICAL FEATURES:
SANDBAR
SLUMPED MATERIAL
TRANS
140+000
(86)
SCALE
50 0 50 100 150 200 250m
NOT FOR CONSTRUCTION
TO BE READ WITH KLOHN CRIPPEN REPORT DATED
BChydro
KLOHN CRIPPEN
SNC·LAVALIN
PEACE CASCADE
BRITISH COLUMBIA, CANADA
GENERAL ARRANGEMENT
SITE 7C
PP1448
FIGURE 9.3

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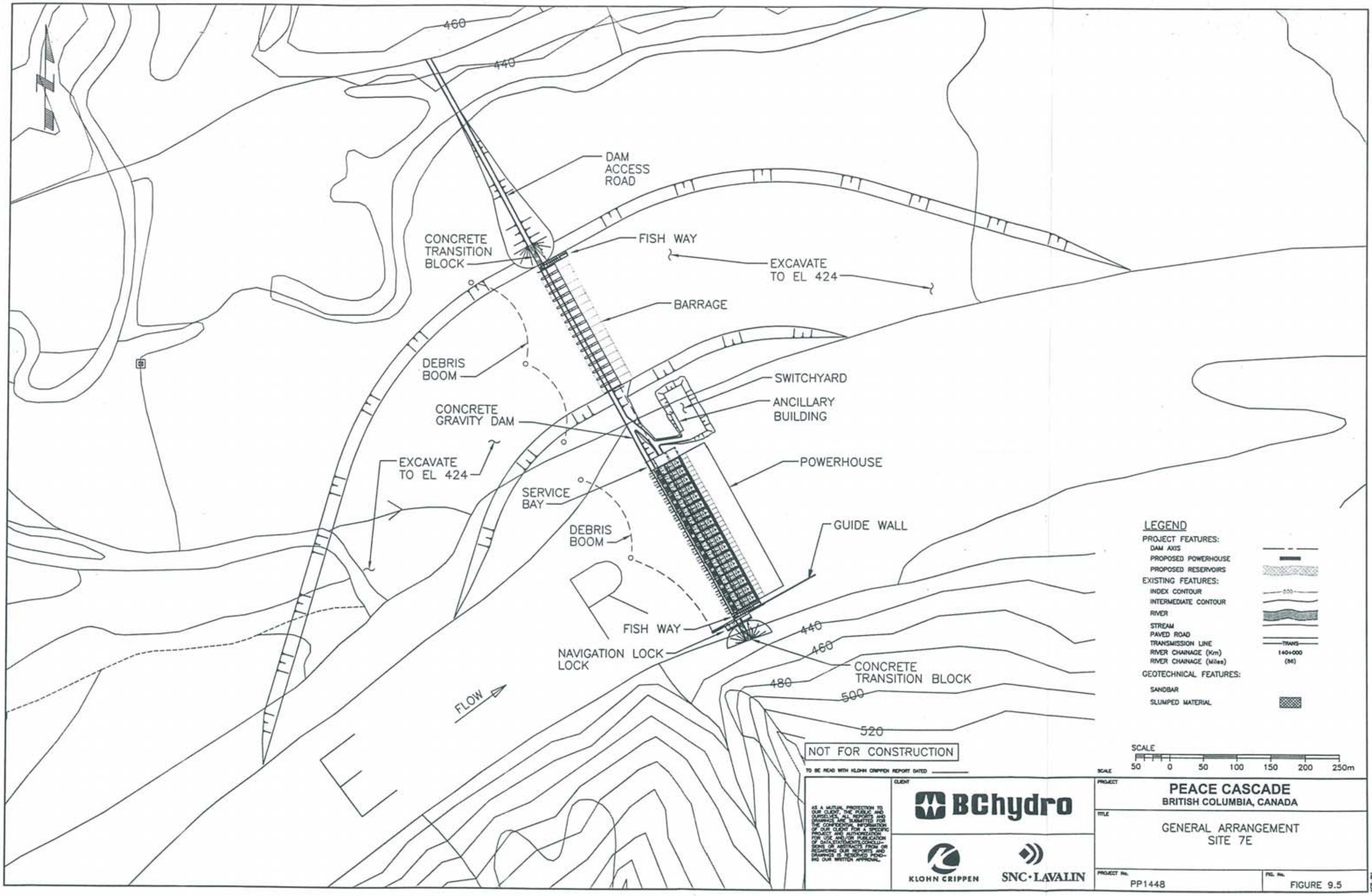
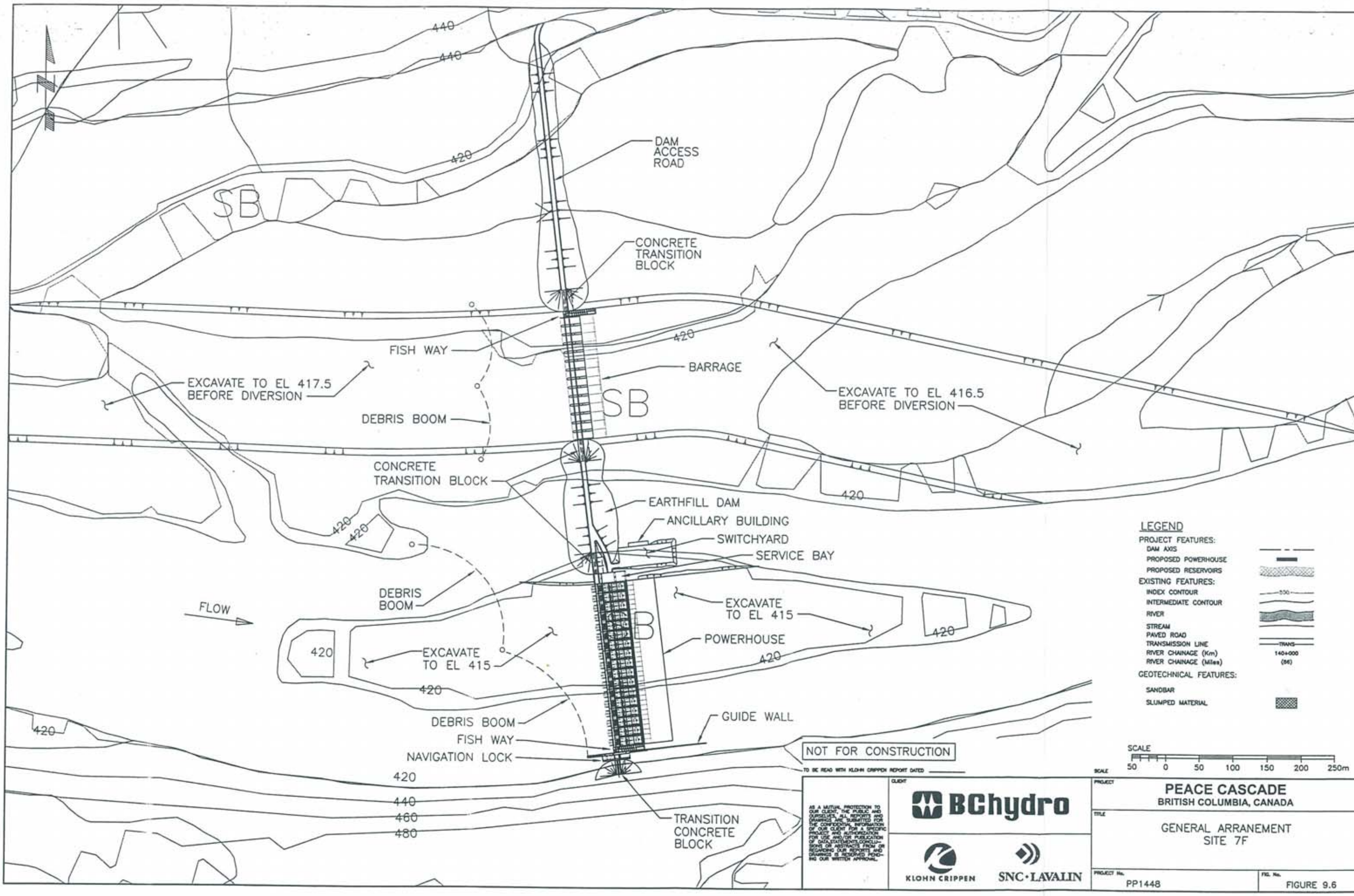
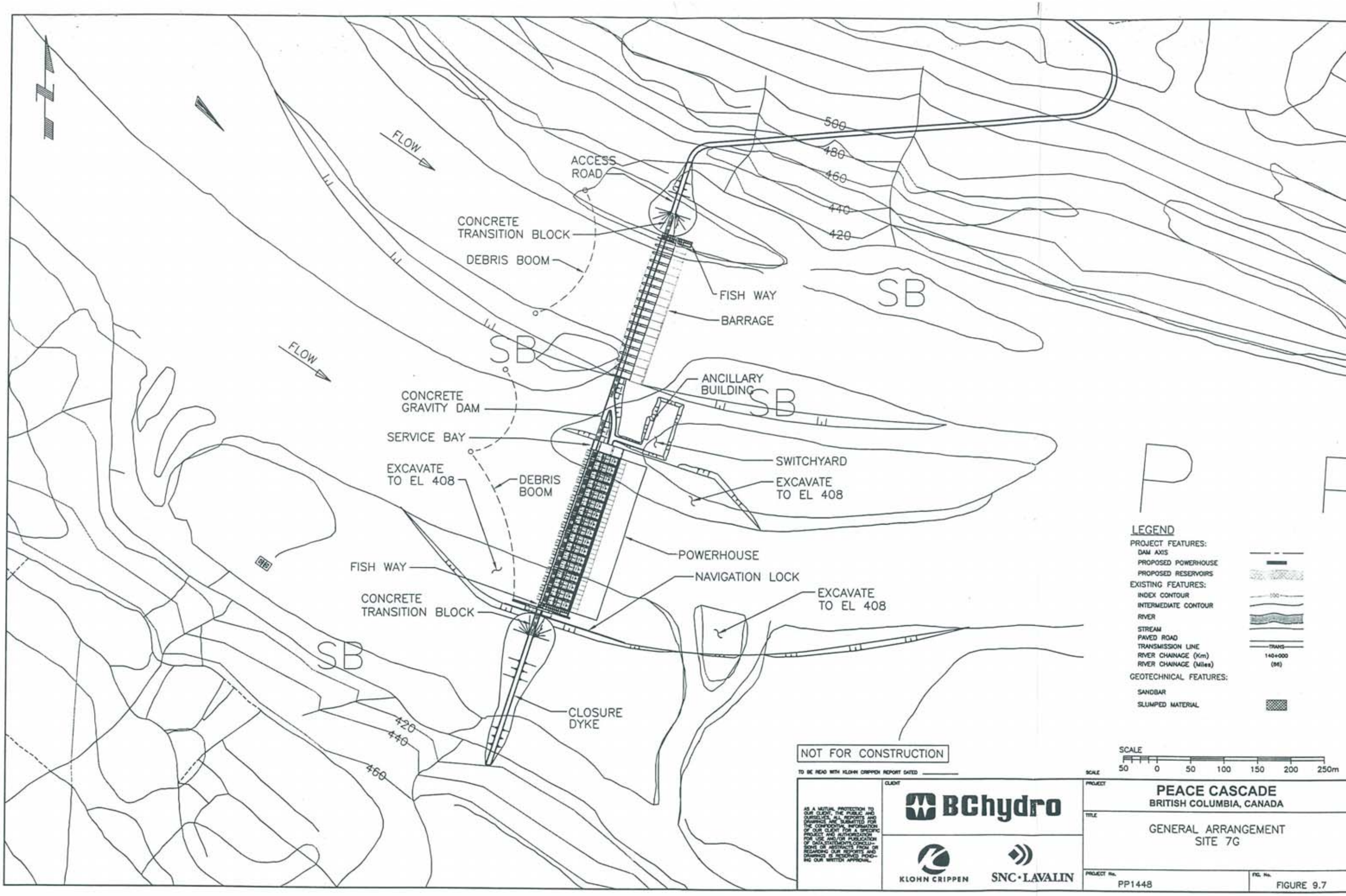
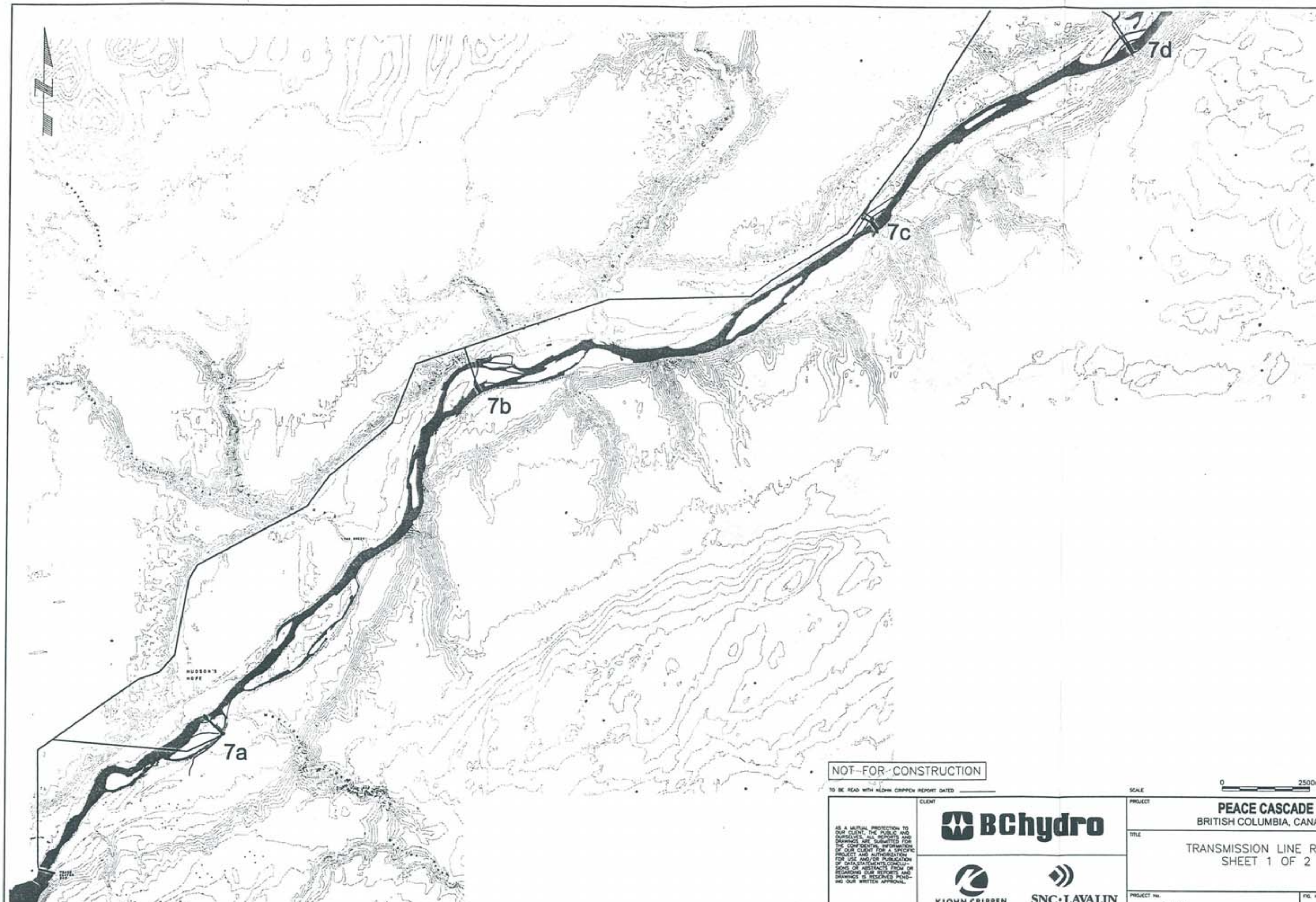
| | |
|---|---|
| CLIENT | BChydro / KLOHN CRIPPEN / SNC·LAVALIN |
| PROJECT | PEACE CASCADE<br>BRITISH COLUMBIA, CANADA |
| TITLE | GENERAL ARRANGEMENT<br>SITE 7D |
| PROJECT No. | PP1448 |
| FIG. No. | FIGURE 9.4 |


460
440
DAM ACCESS ROAD
CONCRETE TRANSITION BLOCK
FISH WAY
EXCAVATE TO EL 424
BARRAGE
DEBRIS BOOM
SWITCHYARD
ANCILLARY BUILDING
CONCRETE GRAVITY DAM
EXCAVATE TO EL 424
POWERHOUSE
SERVICE BAY
DEBRIS BOOM
GUIDE WALL
FISH WAY
NAVIGATION LOCK LOCK
440
460
CONCRETE TRANSITION BLOCK
480
500
520
FLOW
NOT FOR CONSTRUCTION
LEGEND
PROJECT FEATURES:
DAM AXIS
PROPOSED POWERHOUSE
PROPOSED RESERVOIRS
EXISTING FEATURES:
INDEX CONTOUR
INTERMEDIATE CONTOUR
RIVER
STREAM
PAVED ROAD
TRANSMISSION LINE
RIVER CHAINAGE (Km)
RIVER CHAINAGE (Miles)
GEOTECHNICAL FEATURES:
SANDBAR
SLUMPED MATERIAL
SCALE
50 0 50 100 150 200 250m
BChydro
KLOHN CRIPPEN
SNC·LAVALIN
PEACE CASCADE
BRITISH COLUMBIA, CANADA
GENERAL ARRANGEMENT
SITE 7E
PP1448
FIGURE 9.5



DAM ACCESS ROAD
CONCRETE TRANSITION BLOCK
FISH WAY
BARRAGE
EXCAVATE TO EL 417.5 BEFORE DIVERSION
EXCAVATE TO EL 416.5 BEFORE DIVERSION
DEBRIS BOOM
CONCRETE TRANSITION BLOCK
EARTHFILL DAM
ANCILLARY BUILDING
SWITCHYARD
SERVICE BAY
DEBRIS BOOM
FLOW
EXCAVATE TO EL 415
POWERHOUSE
EXCAVATE TO EL 415
DEBRIS BOOM
FISH WAY
NAVIGATION LOCK
GUIDE WALL
TRANSITION CONCRETE BLOCK
SB
SB
440
440
420
420
420
420
460
480
NOT FOR CONSTRUCTION
TO BE READ WITH KLOHN CRIPPEN REPORT DATED
LEGEND
PROJECT FEATURES:
DAM AXIS
PROPOSED POWERHOUSE
PROPOSED RESERVOIRS
EXISTING FEATURES:
INDEX CONTOUR
INTERMEDIATE CONTOUR
RIVER
STREAM
PAVED ROAD
TRANSMISSION LINE
RIVER CHAINAGE (Km)
RIVER CHAINAGE (Miles)
GEOTECHNICAL FEATURES:
SANDBAR
SLUMPED MATERIAL
SCALE
50 0 50 100 150 200 250m
BChydro
KLOHN CRIPPEN
SNC·LAVALIN
PEACE CASCADE
BRITISH COLUMBIA, CANADA
GENERAL ARRANEMENT
SITE 7F
PP1448
FIGURE 9.6


FLOW
FLOW
ACCESS ROAD
500
480
460
440
420
CONCRETE TRANSITION BLOCK
DEBRIS BOOM
FISH WAY
BARRAGE
SB
SB
SB
SB
ANCILLARY BUILDING
CONCRETE GRAVITY DAM
SERVICE BAY
SWITCHYARD
EXCAVATE TO EL 408
EXCAVATE TO EL 408
DEBRIS BOOM
POWERHOUSE
FISH WAY
NAVIGATION LOCK
EXCAVATE TO EL 408
CONCRETE TRANSITION BLOCK
CLOSURE DYKE
420
440
460
LEGEND
PROJECT FEATURES:
DAM AXIS
PROPOSED POWERHOUSE
PROPOSED RESERVOIRS
EXISTING FEATURES:
INDEX CONTOUR
INTERMEDIATE CONTOUR
RIVER
STREAM
PAVED ROAD
TRANSMISSION LINE
RIVER CHAINAGE (Km)
RIVER CHAINAGE (Miles)
GEOTECHNICAL FEATURES:
SANDBAR
SLUMPED MATERIAL
SCALE
50 0 50 100 150 200 250m
NOT FOR CONSTRUCTION
TO BE READ WITH KLOHN CRIPPEN REPORT DATED
BChydro
KLOHN CRIPPEN
SNC·LAVALIN
PEACE CASCADE
BRITISH COLUMBIA, CANADA
GENERAL ARRANGEMENT
SITE 7G
PP1448
FIGURE 9.7

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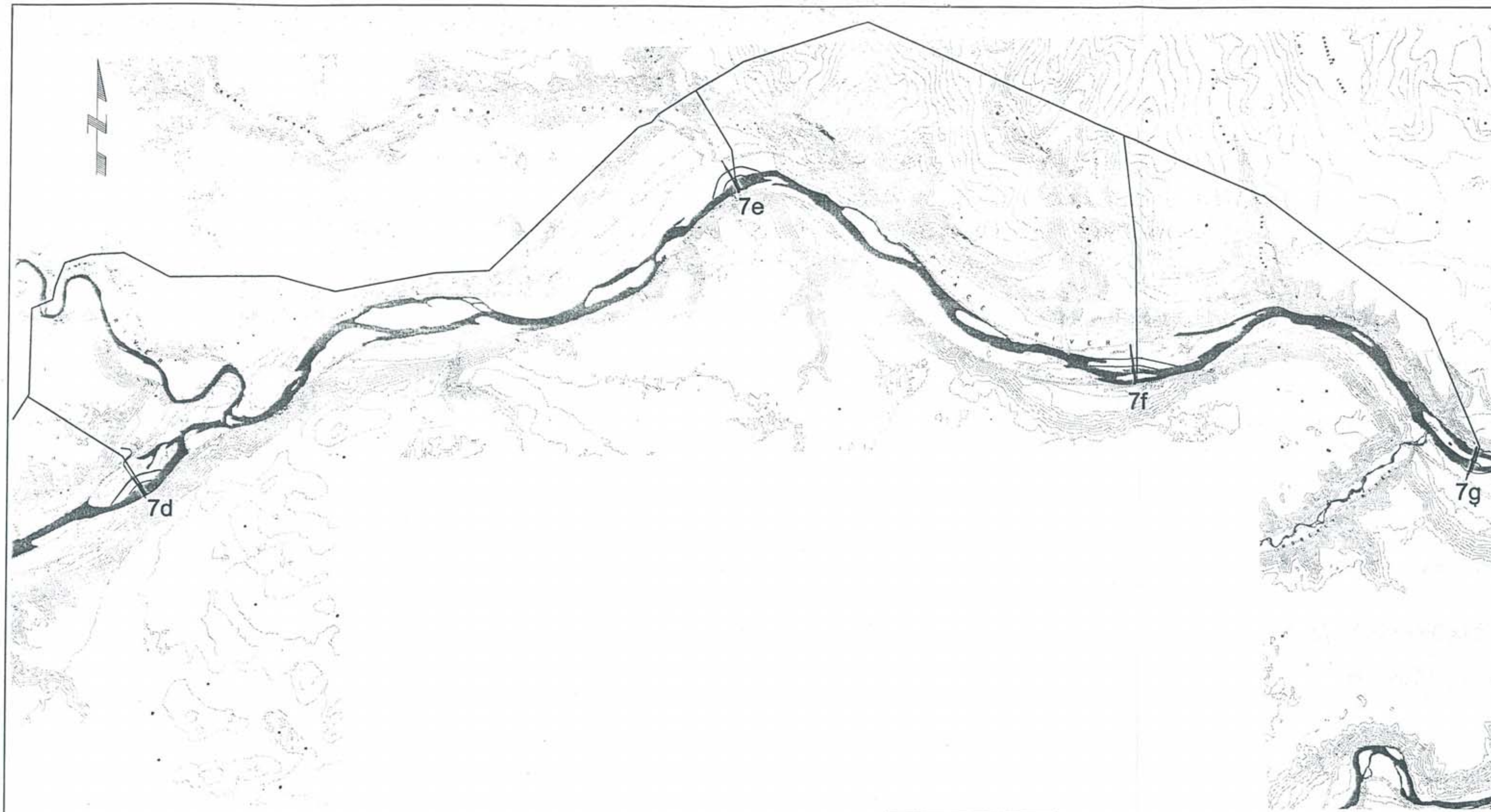
| | |
|---|---|
| CLIENT: BC hydro | PROJECT: PEACE CASCADE, BRITISH COLUMBIA, CANADA |
| KLOHN CRIPPEN / SNC·LAVALIN | TITLE: TRANSMISSION LINE ROUTE SHEET 1 OF 2 |
| | PROJECT No. 1448 / FIG. No. FIGURE 10.1 |




NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN REPORT DATED ________



CLIENT: BChydro

KLOHN CRIPPEN — SNC·LAVALIN

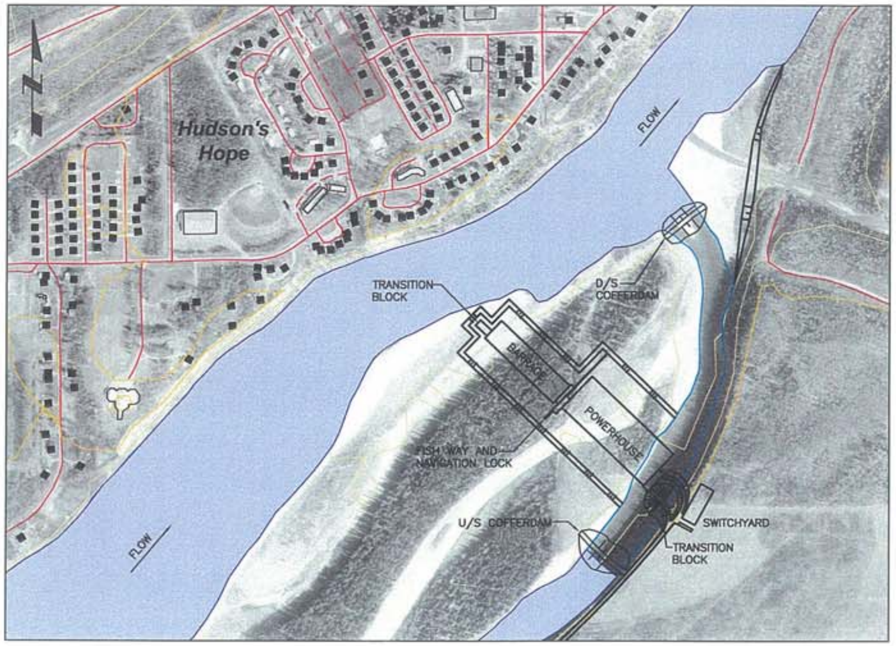
SCALE

PROJECT: **PEACE CASCADE**
BRITISH COLUMBIA, CANADA

TITLE: TRANSMISSION LINE ROUTE
SHEET 2 OF 2

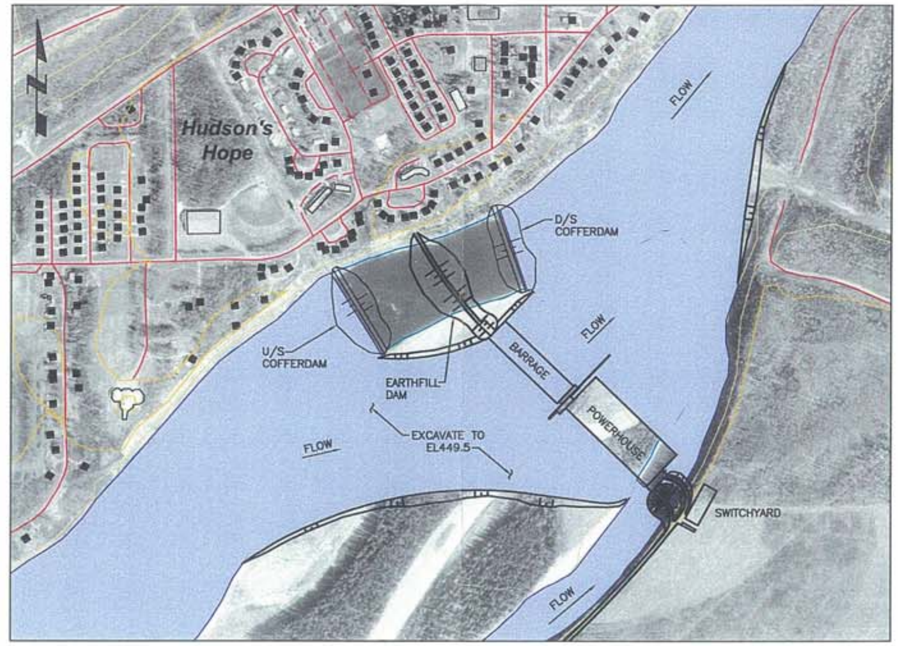
PROJECT No. 1448

FIG. No. FIGURE 10.2




## STAGE 1 – DIVERSION ALONG LEFT MAIN CHANNEL

Ⓐ CONSTRUCT RIGHT BANK ACCESS ROAD
Ⓑ CONSTRUCT STAGE 1 U/S AND D/S COFFERDAMS
Ⓒ DEWATER AREA BETWEEN COFFERDAMS
Ⓓ EXCAVATE AND CONSTRUCT POWERHOUSE, SERVICE BAY, NAVIGATION LOCK, FISH WAY, BARRAGE, SWITCHYARD AND TRANSITION BLOCKS




## STAGE 2 – DIVERSION THROUGH BARRAGE

Ⓐ OPEN BARRAGE GATES
Ⓑ EXCAVATE APPROACH AND EXIT CHANNELS
Ⓒ REMOVE U/S AND D/S STAGE 1 COFFERDAMS
Ⓓ ACHIEVE CLOSURE OF LEFT MAIN CHANNEL BY CONSTRUCTING THE U/S AND D/S STAGE 2 COFFERDAMS
Ⓔ DEWATER AREA BETWEEN COFFERDAMS
Ⓕ EXCAVATE FOUNDATION, CONSTRUCT EARTHFILL DAM
Ⓖ REMOVE THE U/S AND D/S STAGE 2 COFFERDAMS

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN REPORT DATED ______

SCALE 0 500m

CLIENT: BChydro

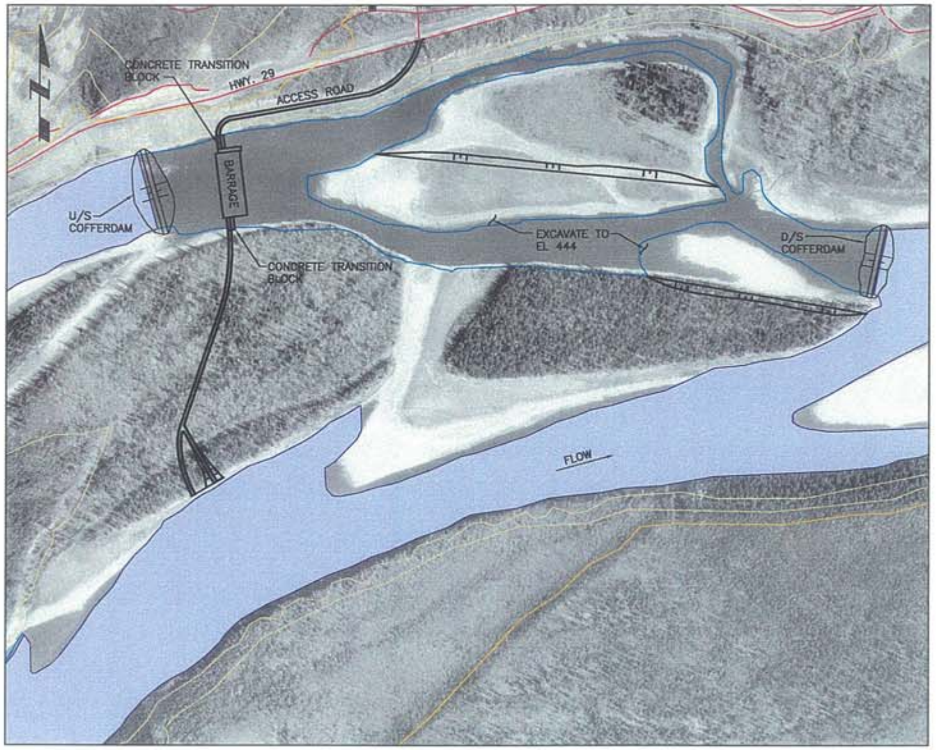
KLOHN CRIPPEN   SNC·LAVALIN

PROJECT: PEACE CASCADE
BRITISH COLUMBIA, CANADA

TITLE: CONSTRUCTION SEQUENCING
DAM 7a

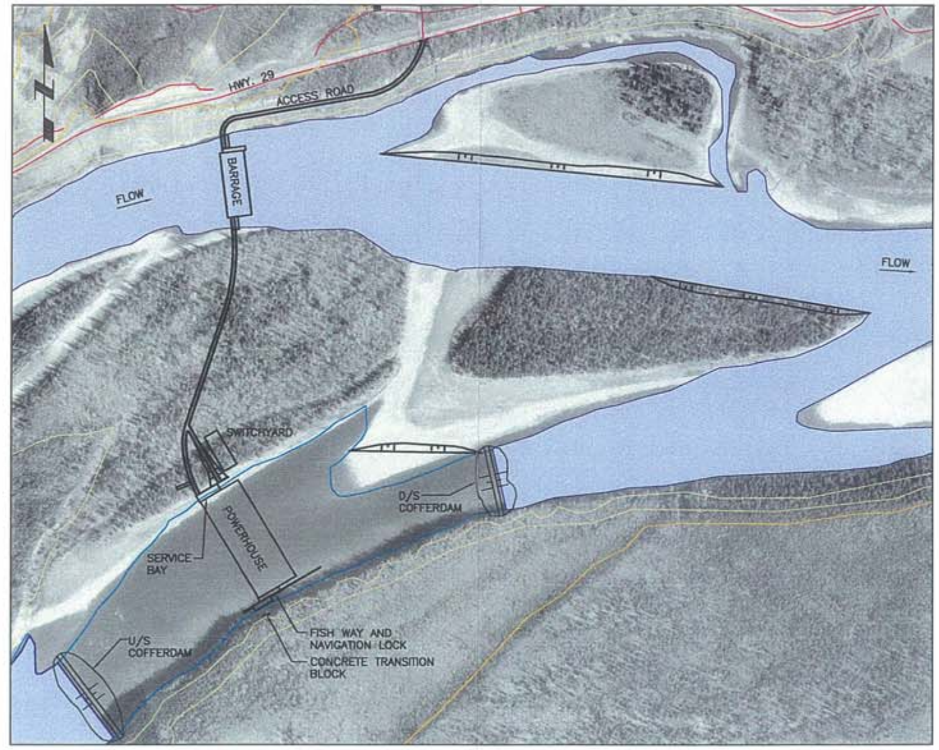
PROJECT No. PP1448

FIG. No. FIGURE 11.1




STAGE 1 – DIVERSION ALONG RIGHT MAIN CHANNEL

Ⓐ CONSTRUCT LEFT BANK ACCESS ROAD
Ⓑ CONSTRUCT STAGE 1 U/S AND D/S COFFERDAMS
Ⓒ DEWATER AREA BETWEEN COFFERDAMS
Ⓓ EXCAVATE AND CONSTRUCT BARRAGE AND CONCRETE TRANSITION BLOCKS
Ⓔ EXCAVATE EXIT CHANNEL
Ⓕ CONSTRUCT ACCESS TO POWERHOUSE LEFT ABUTMENT




STAGE 2 – DIVERSION THROUGH BARRAGE

Ⓐ OPEN BARRAGE GATES
Ⓑ REMOVE U/S AND D/S STAGE 1 COFFERDAMS
Ⓒ ACHIEVE CLOSURE OF RIGHT MAIN CHANNEL BY CONSTRUCTING THE U/S AND D/S STAGE 2 COFFERDAMS
Ⓓ DEWATER AREA BETWEEN COFFERDAMS
Ⓔ EXCAVATE FOUNDATION AND CONSTRUCT SERVICE BAY, POWERHOUSE, FISH WAY, NAVIGATION LOCK, CONCRETE TRANSITION BLOCK AND SWITCHYARD
Ⓕ REMOVE THE U/S AND D/S STAGE 2 COFFERDAMS

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN REPORT DATED ______

SCALE 0 — 500m

CLIENT: BC hydro

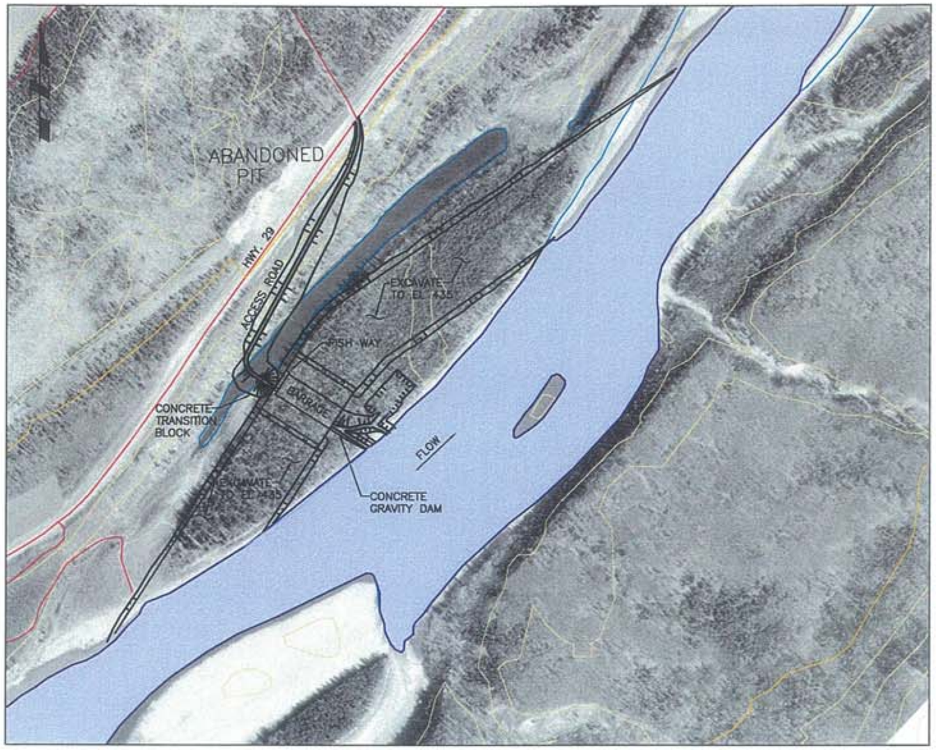
KLOHN CRIPPEN — SNC·LAVALIN

PROJECT: PEACE CASCADE, BRITISH COLUMBIA, CANADA

TITLE: CONSTRUCTION SEQUENCING DAM 7b

PROJECT No. PP1448

FIG. No. FIGURE 11.2



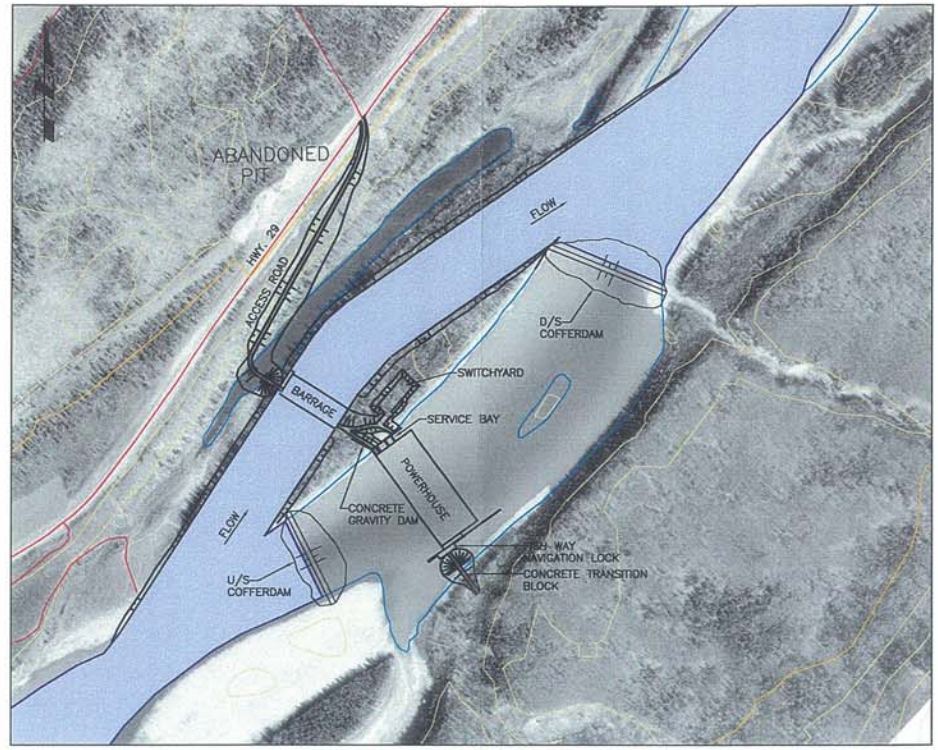

## STAGE 1 – CONSTRUCTION OF BARRAGE

(A) CONSTRUCT THE LEFT BANK ACCESS ROAD

(B) EXCAVATE AND CONSTRUCT BARRAGE, LEFT SIDE CONCRETE GRAVITY DAM, TRANSITION BLOCK AND FISH WAY

(C) CONSTRUCT ACCESS TO POWERHOUSE LEFT ABUTMENT

(D) EXCAVATE APPROACH AND EXIT CHANNELS




## STAGE 2 – DIVERSION THROUGH BARRAGE

(A) OPEN BARRAGE GATES

(B) CONSTRUCT U/S AND D/S COFFERDAMS

(C) DEWATER AREA BETWEEN COFFERDAMS

(D) EXCAVATE FOUNDATIONS AND CONSTRUCT SERVICE BAY, SWITCHYARD, POWERHOUSE, RIGHT SIDE GRAVITY DAM, FISH WAY, NAVIGATION LOCK AND CONCRETE TRANSITION BLOCK

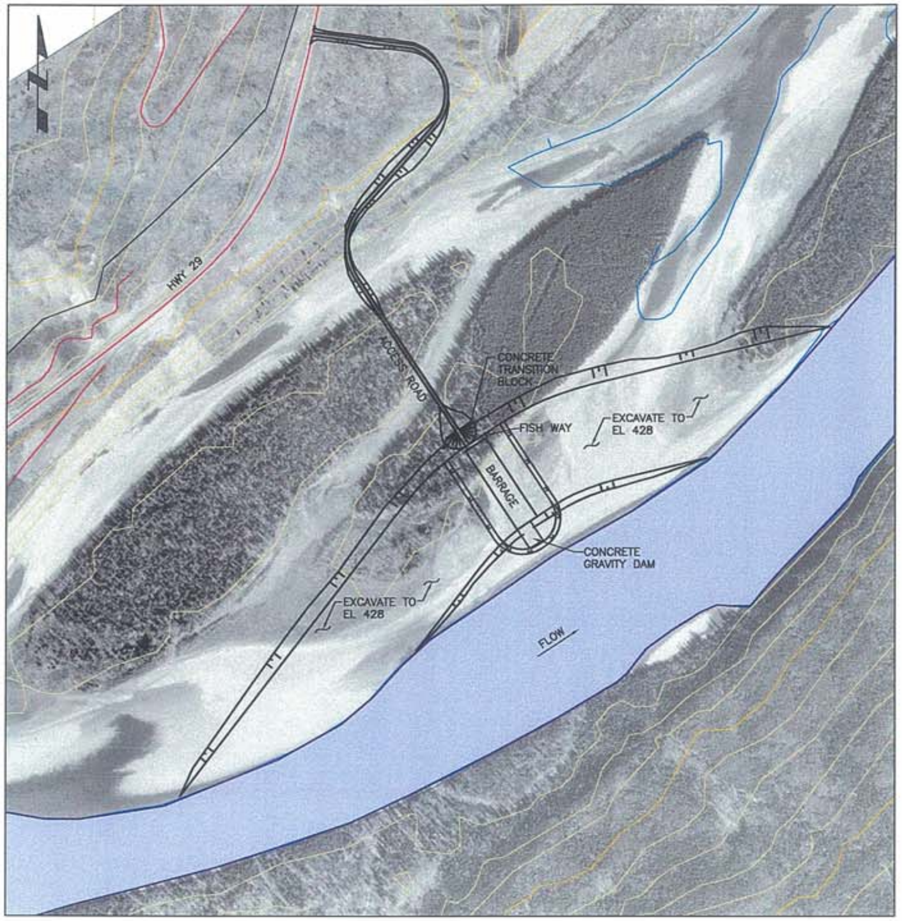
(E) REMOVE THE U/S AND D/S COFFERDAMS

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN REPORT DATED ______

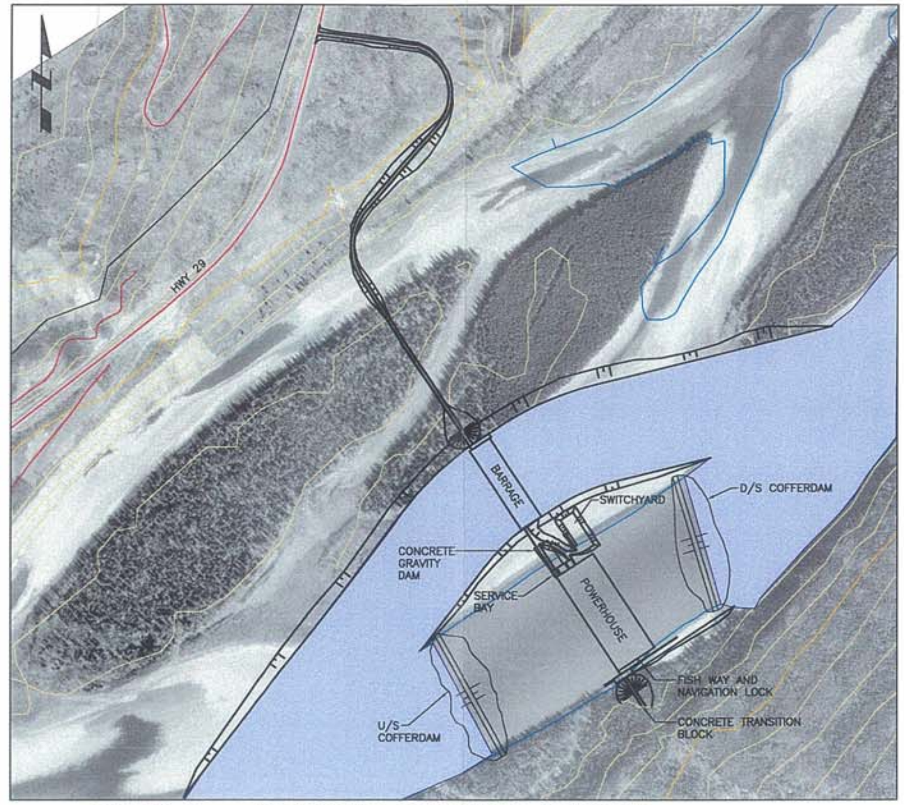
SCALE 0 — 500m

| | | |
|---|---|---|
| AS A MUTUAL PROTECTION TO OUR CLIENT, THE PUBLIC AND OURSELVES, ALL REPORTS AND DRAWINGS ARE SUBMITTED FOR THE CONFIDENTIAL INFORMATION OF OUR CLIENT FOR A SPECIFIC PROJECT AND AUTHORIZATION FOR USE AND/OR PUBLICATION OF DATA, STATEMENTS, CONCLUSIONS OR ABSTRACTS FROM OR REGARDING OUR REPORTS AND DRAWINGS IS RESERVED PENDING OUR WRITTEN APPROVAL. | CLIENT: BChydro<br>KLOHN CRIPPEN / SNC·LAVALIN | PROJECT: PEACE CASCADE<br>BRITISH COLUMBIA, CANADA<br>TITLE: CONSTRUCTION SEQUENCING DAM 7c<br>PROJECT No. PP1448<br>FIG. No. FIGURE 11.3 |




STAGE 1 – CONSTRUCTION OF BARRAGE, FISHWAY, NAVIGATION LOCK AND POWERHOUSE

(A) CONSTRUCT THE LEFT BANK ACCESS ROAD
(B) EXCAVATE AND CONSTRUCT BARRAGE, FISH WAY, TRANSITION BLOCK AND LEFT SIDE CONCRETE GRAVITY DAM
(C) EXCAVATE APPROACH AND EXIT CHANNELS




STAGE 2 – DIVERSION THROUGH BARRAGE

(A) OPEN BARRAGE GATES
(B) CONSTRUCT U/S AND D/S COFFERDAMS
(C) DEWATER AREA BETWEEN COFFERDAMS
(D) EXCAVATE FOUNDATION AND CONSTRUCT SWITCHYARD, POWERHOUSE, FISH WAY, CONCRETE TRANSITION AND RIGHT SIDE CONCRETE GRAVITY DAM AND NAVIGATION LOCK
(E) REMOVE THE U/S AND D/S COFFERDAMS

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN REPORT DATED ______

SCALE 0 — 500m

CLIENT: BChydro

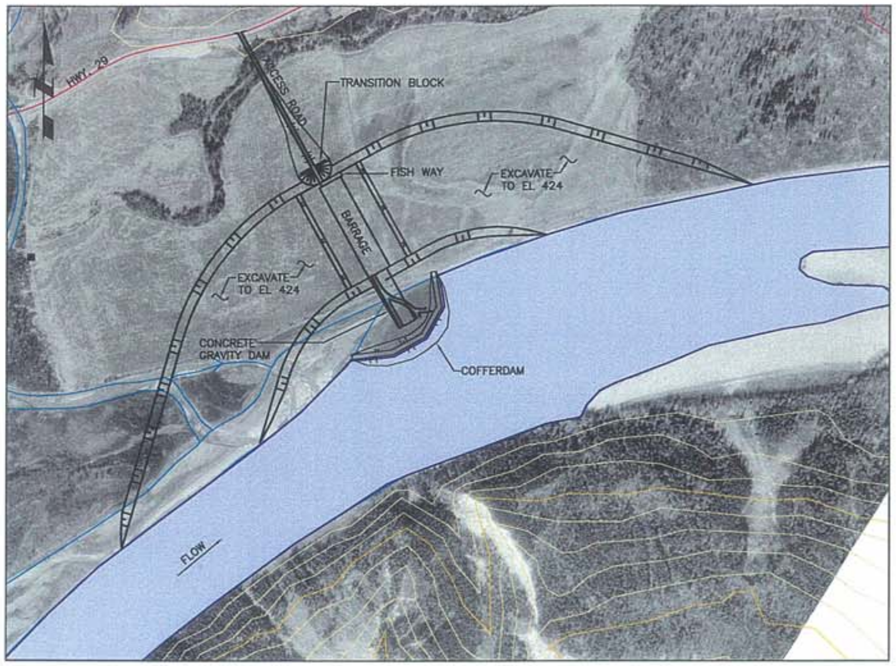
KLOHN CRIPPEN — SNC·LAVALIN

PROJECT: PEACE CASCADE
BRITISH COLUMBIA, CANADA

TITLE: CONSTRUCTION SEQUENCING
DAM 7d

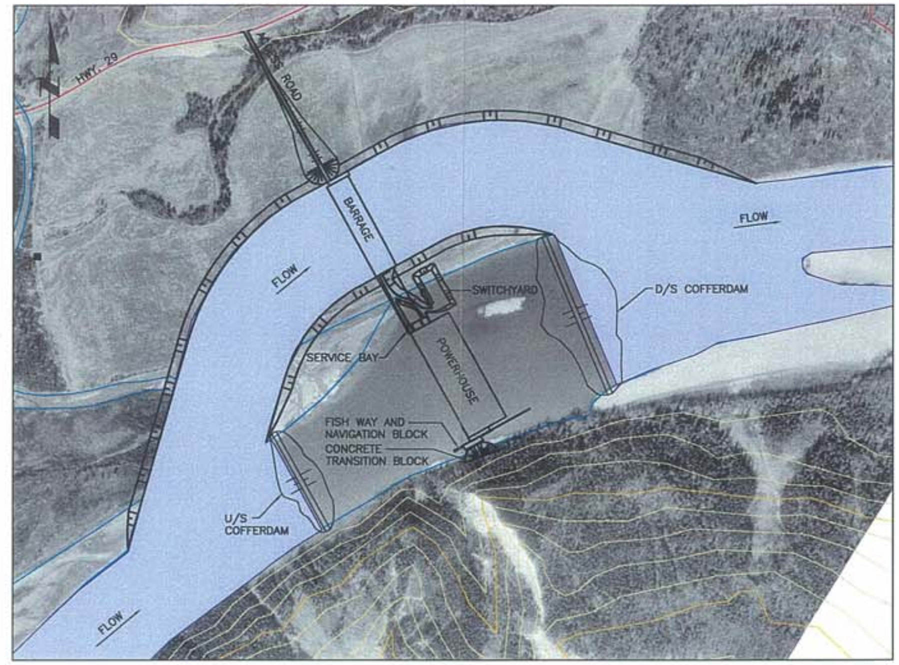
PROJECT No. PP1448

FIG. No. FIGURE 11.4




STAGE 1 – CONSTRUCTION OF BARRAGE

Ⓐ CONSTRUCT THE LEFT BANK ACCESS ROAD
Ⓑ CONSTRUCT STAGE 1 COFFERDAM
Ⓒ EXCAVATE AND CONSTRUCT BARRAGE, TRANSITION BLOCK, FISH WAY AND CONCRETE GRAVITY DAM
Ⓓ CONSTRUCT ACCESS TO POWERHOUSE LEFT ABUTMENT
Ⓔ EXCAVATE APPROACH AND EXIT CHANNELS




STAGE 2 – DIVERSION THROUGH BARRAGE

Ⓐ OPEN BARRAGE GATES
Ⓑ CONSTRUCT U/S AND D/S STAGE 2 COFFERDAMS
Ⓒ DEWATER AREA BETWEEN COFFERDAMS
Ⓓ EXCAVATE FOUNDATIONS AND STAGE 1 COFFERDAM AND CONSTRUCT SWITCHYARD, SERVICE BAY, POWERHOUSE, FISHWAY, NAVIGATION LOCK AND CONCRETE TRANSITION BLOCK
Ⓔ REMOVE THE U/S AND D/S COFFERDAMS

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN REPORT DATED

SCALE 0 — 500m

CLIENT: BChydro

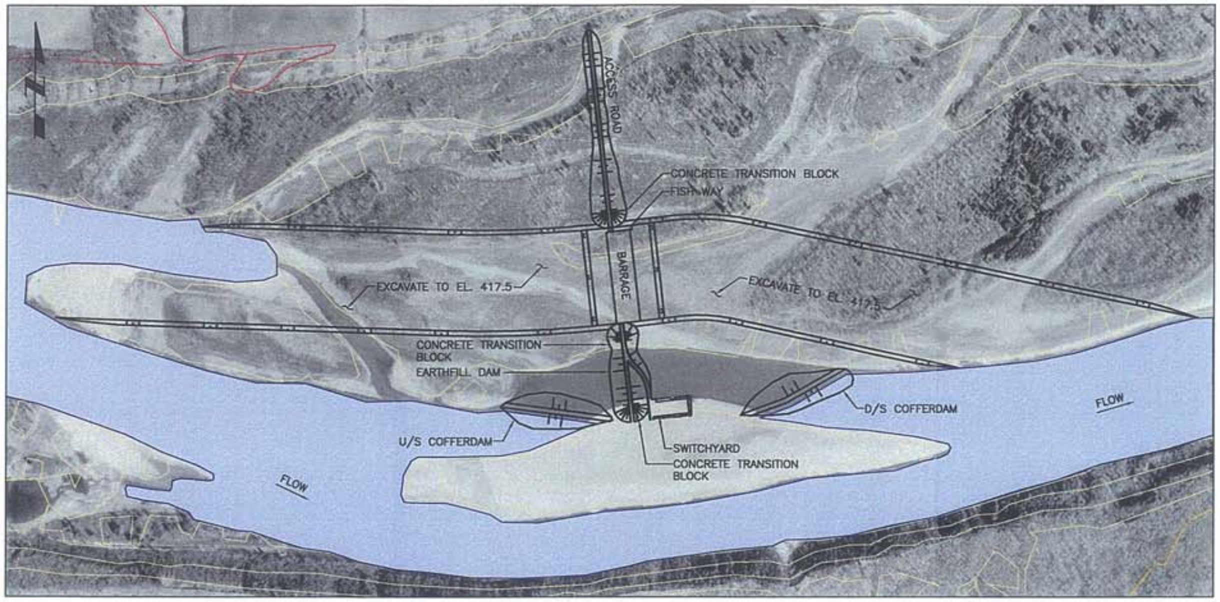
KLOHN CRIPPEN    SNC·LAVALIN

PROJECT: PEACE CASCADE
BRITISH COLUMBIA, CANADA

TITLE: CONSTRUCTION SEQUENCING
DAM 7e

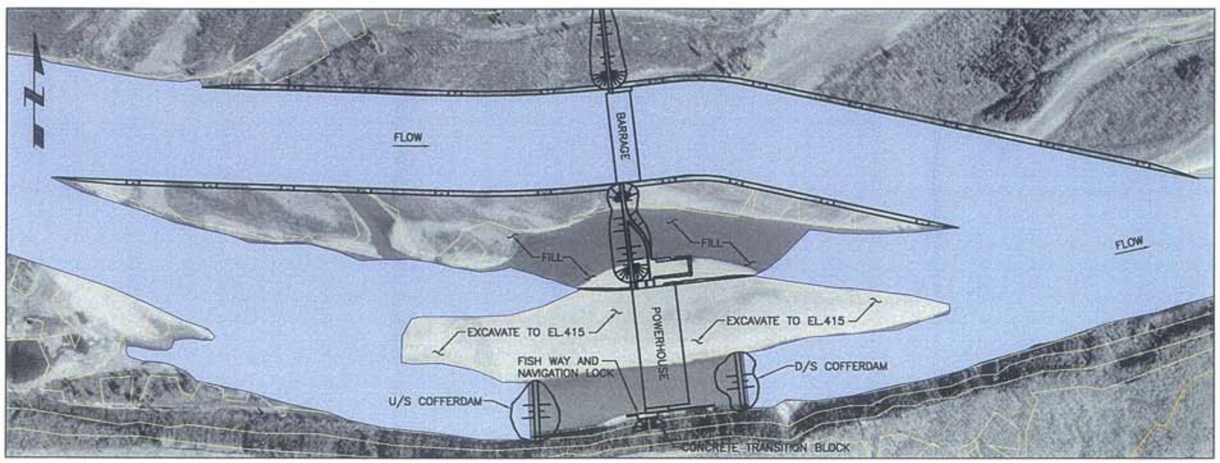
PROJECT No. PP1448

FIG. No. FIGURE 11.5




## STAGE 1 – CONSTRUCTION OF BARRAGE

- (A) CONSTRUCT THE LEFT BANK ACCESS ROAD
- (B) CONSTRUCT THE STAGE 1 U/S AND D/S COFFERDAMS
- (C) DEWATER AREA BETWEEN COFFERDAMS
- (D) EXCAVATE FOUNDATION AND CONSTRUCT BARRAGE, FISHWAY, AND TRANSITION BLOCKS.
- (E) EXCAVATE FOUNDATION, CONSTRUCT EARTHFILL DAM, SWITCHYARD, AND CONCRETE TRANSITION BLOCK.
- (F) EXCAVATE APPROACH AND EXIT CHANNELS. EXCAVATED MATERIAL TO BE PLACED AND COMPACTED BETWEEN THE COFFERDAMS




## STAGE 2 – DIVERSION THROUGH BARRAGE

- (A) OPEN BARRAGE GATES
- (B) ACHIEVE CLOSURE OF RIGHT MAIN CHANNEL BY CONSTRUCTING THE STAGE 2 U/S AND D/S COFFERDAMS
- (C) EXCAVATE AND CONSTRUCT POWERHOUSE, SERVICE BAY, FISH WAY, NAVIGATION LOCK, AND CONCRETE TRANSITION BLOCK.
- (D) REMOVE THE STAGE 2 U/S AND D/S COFFERDAMS.
- (E) EXCAVATE THE APPROACH AND TAILRACE CHANNELS.

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN REPORT DATED ______

SCALE 0 — 500m

CLIENT: BChydro

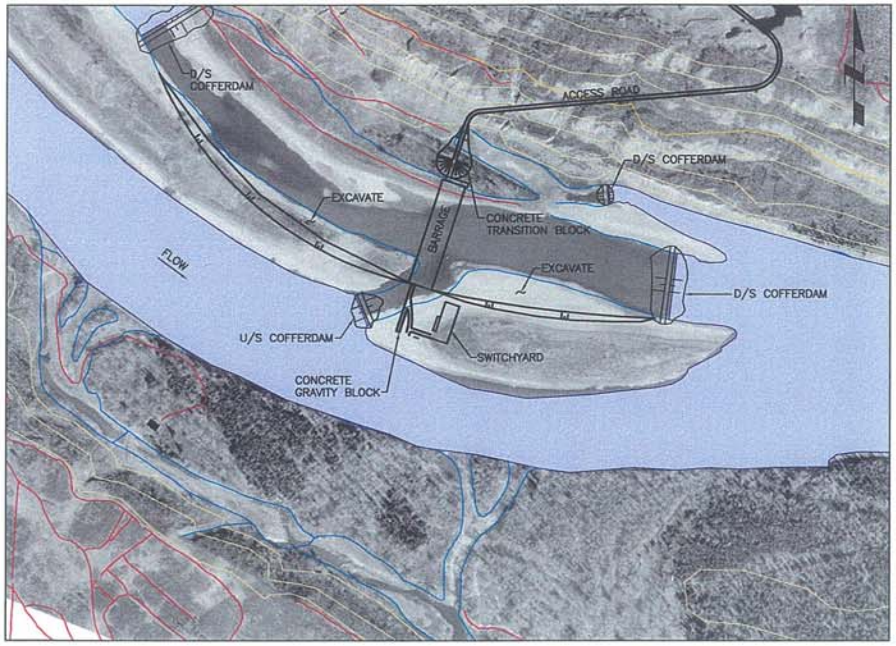
KLOHN CRIPPEN SNC·LAVALIN

PROJECT: **PEACE CASCADE**
BRITISH COLUMBIA, CANADA

TITLE: CONSTRUCTION SEQUENCING
DAM 7f

PROJECT No. PP1448

FIG. No. FIGURE 11.6




STAGE 1 – CONSTRUCTION OF BARRAGE

Ⓐ CONSTRUCT THE LEFT BANK ACCESS ROAD

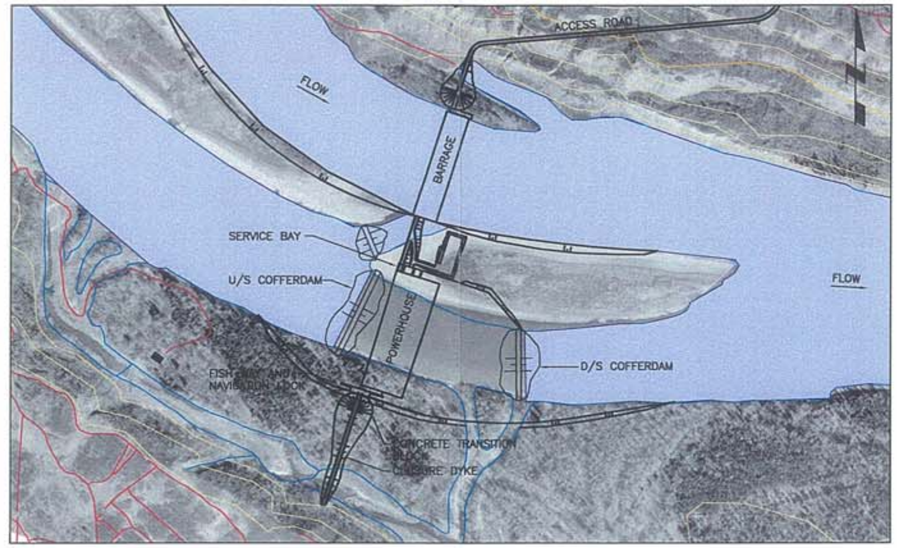
Ⓑ ACHIEVE CLOSURE OF LEFT BANK MAIN CHANNEL BY CONSTRUCTING THE TWO U/S AND TWO D/S COFFERDAMS.

Ⓒ DEWATER AREA BETWEEN COFFERDAMS

Ⓓ EXCAVATE FOUNDATION AND CONSTRUCT BARRAGE, FISHWAY, SWITCHYARD, AND TRANSITION BLOCK.

Ⓔ CONSTRUCT ACCESS TO POWERHOUSE LEFT ABUTMENT.

Ⓕ EXCAVATE RIGHT SIDE OF APPROACH, EXIT CHANNELS, AND COFFERDAMS IN CHANNELS.




STAGE 2 – DIVERSION THROUGH BARRAGE

Ⓐ OPEN BARRAGE GATES.

Ⓑ ACHIEVE CLOSURE OF RIGHT MAIN CHANNEL BY CONSTRUCTING THE STAGE 2 U/S AND D/S COFFERDAMS.

Ⓒ DIVERT RIGHT BANK CREEKS.

Ⓓ DEWATER AREA BETWEEN COFFERDAMS.

Ⓔ EXCAVATE FOUNDATION AND CONSTRUCT SERVICE BAY, POWERHOUSE, FISH WAY, NAVIGATION LOCK, AND CONCRETE GRAVITY BLOCK.

Ⓕ CONSTRUCT CONCRETE TRANSITION AND CLOSURE DYKE.

Ⓖ EXCAVATE APPROACH AND TAILRACE CHANNELS TO POWERHOUSE.

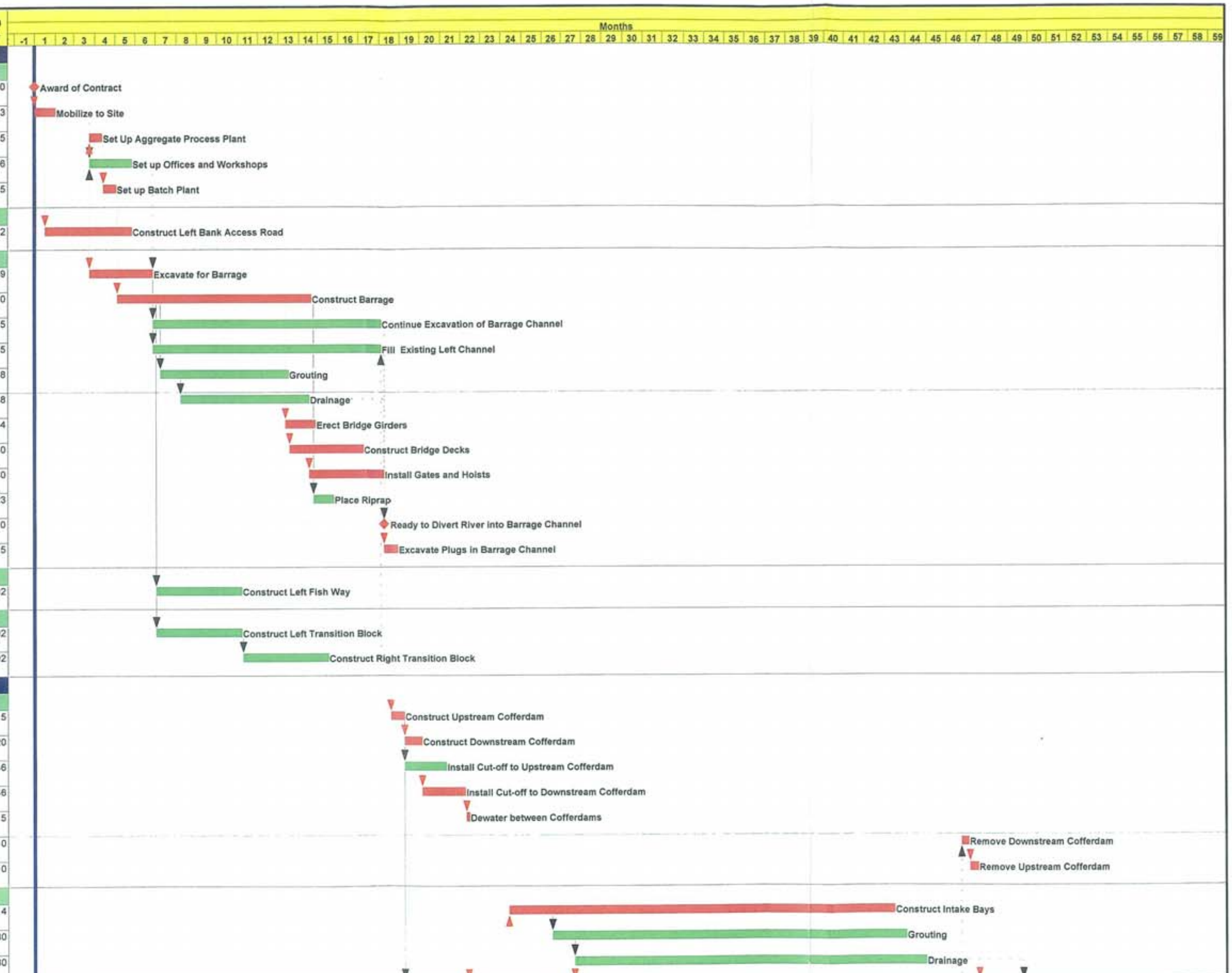
Ⓗ REMOVE STAGE 2 U/S AND D/S COFFERDAMS.

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN REPORT DATED ______

| | | |
|---|---|---|
| | CLIENT: BChydro | SCALE: 0 — 500m |
| | KLOHN CRIPPEN · SNC·LAVALIN | PROJECT: PEACE CASCADE, BRITISH COLUMBIA, CANADA |
| | | TITLE: CONSTRUCTION SEQUENCING DAM 7g |
| | | PROJECT No. PP1448 · FIG. No. FIGURE 11.7 |

| Activity ID | Activity Description | Orig Dur | Total Float | Rem Dur |
|---|---|---|---|---|
| STAGE 1 | | | | |
| GENERAL | | | | |
| 1.00.001 | Award of Contract | 0 | 0 | 0 |
| 1.00.002 | Mobilize to Site | 23 | 0 | 23 |
| 1.00.004 | Set Up Aggregate Process Plant | 15 | 0 | 15 |
| 1.00.003 | Set up Offices and Workshops | 46 | 23 | 46 |
| 1.00.005 | Set up Batch Plant | 15 | 0 | 15 |
| ACCESS ROADS | | | | |
| 1.01.001 | Construct Left Bank Access Road | 92 | 0 | 92 |
| BARRAGE | | | | |
| 1.03.001 | Excavate for Barrage | 69 | 0 | 69 |
| 1.03.002 | Construct Barrage | 210 | 0 | 210 |
| 1.03.003 | Continue Excavation of Barrage Channel | 245 | 3 | 245 |
| 1.03.004 | Fill Existing Left Channel | 245 | 3 | 245 |
| 1.03.005 | Grouting | 138 | 80 | 138 |
| 1.03.006 | Drainage | 138 | 80 | 138 |
| 1.03.007 | Erect Bridge Girders | 34 | 0 | 34 |
| 1.03.008 | Construct Bridge Decks | 80 | 0 | 80 |
| 1.03.009 | Install Gates and Hoists | 80 | 0 | 80 |
| 1.03.010 | Place Riprap | 23 | 54 | 23 |
| 1.03.011 | Ready to Divert River into Barrage Channel | 0 | 0 | 0 |
| 1.03.012 | Excavate Plugs in Barrage Channel | 15 | 0 | 15 |
| LEFT FISH WAY | | | | |
| 1.04.001 | Construct Left Fish Way | 92 | 103 | 92 |
| TRANSITION BLOCKS | | | | |
| 1.10.001 | Construct Left Transition Block | 92 | 103 | 92 |
| 1.10.002 | Construct Right Transition Block | 92 | 103 | 92 |
| STAGE 2 | | | | |
| RIVER DIVERSIONS | | | | |
| 2.02.001 | Construct Upstream Cofferdam | 15 | 0 | 15 |
| 2.02.003 | Construct Downstream Cofferdam | 20 | 0 | 20 |
| 2.02.002 | Install Cut-off to Upstream Cofferdam | 46 | 753 | 46 |
| 2.02.004 | Install Cut-off to Downstream Cofferdam | 46 | 0 | 46 |
| 2.02.005 | Dewater between Cofferdams | 5 | 0 | 5 |
| 2.02.006 | Remove Downstream Cofferdam | 10 | 0 | 10 |
| 2.02.007 | Remove Upstream Cofferdam | 10 | 0 | 10 |
| INTAKE | | | | |
| 2.05.001 | Construct Intake Bays | 414 | 0 | 414 |
| 2.05.002 | Grouting | 380 | 208 | 380 |
| 2.05.003 | Drainage | 380 | 208 | 380 |




| | |
|---|---|
| Start Date | 01JAN03 |
| Finish Date | 01AUG07 |
| Data Date | 01JAN03 |
| Run Date | 16DEC02 14:59 |

Early Bar
Progress Bar
Critical Activity

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PC7F

Sheet 1 of 2

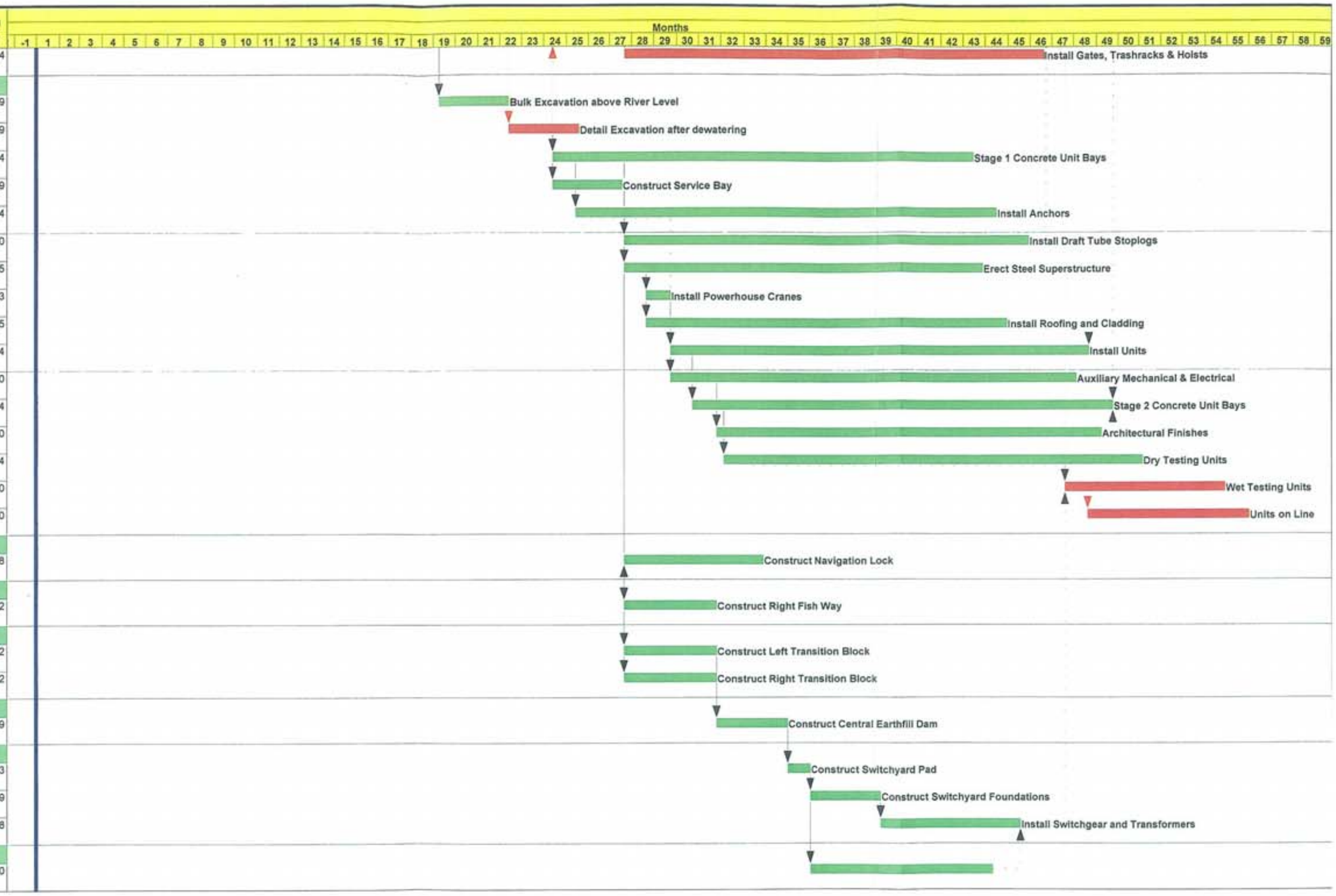
**PEACE CASCADE SITE 7f**

**Construction Schedule**

**Figure 11.8**

BC hydro
KLOHN CRIPPEN
SNC·LAVALIN

| Activity ID | Activity Description | Orig Dur | Total Float | Rem Dur |
|---|---|---|---|---|
| 2.05.004 | Install Gates, Trashracks & Hoists | 414 | 0 | 414 |
| POWERHOUSE/TAILRACE | | | | |
| 2.06.001 | Bulk Excavation above River Level | 69 | 730 | 69 |
| 2.06.002 | Detail Excavation after dewatering | 69 | 0 | 69 |
| 2.06.003 | Stage 1 Concrete Unit Bays | 414 | 15 | 414 |
| 2.06.004 | Construct Service Bay | 69 | 44 | 69 |
| 2.06.005 | Install Anchors | 414 | 184 | 414 |
| 2.06.007 | Install Draft Tube Stoplogs | 400 | 15 | 400 |
| 2.06.006 | Erect Steel Superstructure | 355 | 105 | 355 |
| 2.06.008 | Install Powerhouse Cranes | 23 | 105 | 23 |
| 2.06.009 | Install Roofing and Cladding | 355 | 116 | 355 |
| 2.06.010 | Install Units | 414 | 105 | 414 |
| 2.06.011 | Auxiliary Mechanical & Electrical | 400 | 116 | 400 |
| 2.06.012 | Stage 2 Concrete Unit Bays | 414 | 105 | 414 |
| 2.06.013 | Architectural Finishes | 380 | 116 | 380 |
| 2.06.014 | Dry Testing Units | 414 | 105 | 414 |
| 2.06.015 | Wet Testing Units | 160 | 0 | 160 |
| 2.06.016 | Units on Line | 160 | 0 | 160 |
| NAVIGATION LOCK | | | | |
| 2.08.001 | Construct Navigation Lock | 138 | 480 | 138 |
| RIGHT FISH WAY | | | | |
| 2.09.001 | Construct Right Fish Way | 92 | 480 | 92 |
| TRANSITION BLOCKS | | | | |
| 2.10.001 | Construct Left Transition Block | 92 | 44 | 92 |
| 2.10.002 | Construct Right Transition Block | 92 | 526 | 92 |
| EARTHFILL DAMS | | | | |
| 2.11.001 | Construct Central Earthfill Dam | 69 | 44 | 69 |
| SWITCHYARD | | | | |
| 2.12.001 | Construct Switchyard Pad | 23 | 44 | 23 |
| 2.12.002 | Construct Switchyard Foundations | 69 | 44 | 69 |
| 2.12.003 | Install Switchgear and Transformers | 138 | 44 | 138 |
| TRANSMISSION LINES | | | | |
| 2.13.001 | | 180 | 71 | 180 |




| | |
|---|---|
| Start Date | 01JAN03 |
| Finish Date | 01AUG07 |
| Data Date | 01JAN03 |
| Run Date | 16DEC02 14:59 |

Early Bar
Progress Bar
Critical Activity

PC7F

**PEACE CASCADE SITE 7f**

**Construction Schedule**

Sheet 2 of 2

**Figure 11.8**

BC hydro

KLOHN CRIPPEN

SNC·LAVALIN

# APPENDIX A
# ENERGY STUDIES

ESOLIN --> X:\014942~1\ENGINE~1\PROSPER\PCN_MTH.res --> 2002/11/13 (10:26:12)

PEACE CASCADE - MONTHLY SIMULATION 1972-2001

SEVEN PROJECT DEVELOPMENT

SUMMARY

Number of cycles : 1
Number of years : 30
Starting year : 1972
Number of reservoirs : 7
Type of treatment --> CONTINUE

SYSTEM PRODUCTION (MU)

| | TOTAL | JAN 31.00 | FEB 28.00 | MAR 31.00 | APR 30.00 | MAY 31.00 | JUN 30.00 | JUL 31.00 | AUG 31.00 | SEP 30.00 | OCT 31.00 | NOV 30.00 | DEC 31.00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Energy demand | 1000.00 | 84.90 | 76.90 | 84.90 | 82.20 | 84.90 | 82.20 | 84.90 | 84.90 | 82.20 | 84.90 | 82.20 | 84.90 |
| Energy transmitted | 4034.50 | 394.06 | 341.16 | 353.39 | 327.95 | 283.91 | 278.20 | 289.91 | 296.54 | 306.38 | 357.40 | 385.40 | 420.21 |
| Hydro production | 4034.50 | 394.06 | 341.16 | 353.39 | 327.95 | 283.91 | 278.20 | 289.91 | 296.54 | 306.38 | 357.40 | 385.40 | 420.21 |
| Nonhydro production | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Losses | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Energy shortage | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Export | 3034.50 | 309.16 | 264.26 | 268.49 | 245.75 | 199.01 | 196.00 | 205.01 | 211.64 | 224.18 | 272.50 | 303.20 | 335.31 |

RESULTS (M$)

| | | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gross revenues | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Nonhydro cost | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Net revenues | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Shortage pen. (Pts) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Other penalty (Pts) | 639.82 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 346.42 | 173.28 | 119.84 | 0.03 | 0.03 | 0.03 | 0.03 |
| Net benefits (Pts) | -639.82 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -346.42 | -173.28 | -119.84 | -0.03 | -0.03 | -0.03 | -0.03 |

RESERVOIRS

AVERAGE FOR ALL PERIODS

======================

| | | SEVEN_A | SEVEN_B | SEVEN_C | SEVEN_D | SEVEN_E | SEVEN_F |
|---|---|---|---|---|---|---|---|
| Code | | 1001 | 1002 | 1003 | 1004 | 1005 | 1006 |
| Powerhouse type | | PEAK | PEAK | PEAK | PEAK | PEAK | PEAK |
| Initial level | (m) | 460.00 | 454.10 | 446.20 | 438.20 | 431.00 | 425.00 |
| Final level | (m) | 460.00 | 454.10 | 446.20 | 438.20 | 431.00 | 425.00 |
| Natural inflows | (m3/s) | 1118.65 | 5.63 | 5.63 | 5.63 | 78.47 | 5.63 |
| Total inflows | (m3/s) | 1118.65 | 1124.28 | 1129.91 | 1135.53 | 1214.00 | 1219.63 |
| Evaporation | (m3/s) | ----- | ----- | ----- | ----- | ----- | ----- |
| Spilled outflow | (m3/s) | 12.43 | 12.16 | 13.43 | 13.65 | 16.86 | 17.16 |
| Diversion | (m3/s) | ----- | ----- | ----- | ----- | ----- | ----- |
| Turbine flow | (m3/s) | 1106.22 | 1112.12 | 1116.48 | 1121.88 | 1197.14 | 1202.47 |
| Turbine efficiency | (%) | 88.90 | 88.87 | 88.87 | 88.87 | 88.88 | 88.88 |
| Reservoir level | (m) | 460.01 | 454.10 | 446.21 | 438.21 | 431.01 | 425.01 |
| Tailwater level | (m) | 454.96 | 446.70 | 439.17 | 431.59 | 425.42 | 417.45 |
| Net head | (m) | 5.04 | 7.40 | 7.03 | 6.61 | 5.58 | 7.56 |
| Headlosses | (m) | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| Annual energy | (MU) | 413.74 | 620.57 | 587.54 | 557.32 | 505.06 | 688.20 |
| Power production | (MW) | 47.23 | 70.84 | 67.07 | 63.62 | 57.65 | 78.56 |
| Coeff. production | | | | | | | |
| - MW / m3/s | | 0.04 | 0.06 | 0.06 | 0.06 | 0.05 | 0.07 |
| - GWh/ hm3 | | 0.01 | 0.02 | 0.02 | 0.02 | 0.01 | 0.02 |
| Maximum capacity | (MW) | 77.00 | 118.00 | 107.00 | 101.00 | 94.00 | 130.00 |
| Maximum discharge | (m3/s) | 1980.00 | 1980.00 | 1980.00 | 1980.00 | 2100.00 | 2100.00 |
| Utility factor | (%) | 61.34 | 60.04 | 62.68 | 62.99 | 61.33 | 60.43 |

AVERAGE FOR ALL PERIODS

| ====================== | | SEVEN_G |
|---|---|---|
| Code | | 1007 |
| Powerhouse type | | PEAK |
| Initial level | (m) | 417.00 |
| Final level | (m) | 417.00 |
| | | |
| Natural inflows | (m3/s) | 11.76 |
| Total inflows | (m3/s) | 1231.38 |
| Evaporation | (m3/s) | ----- |
| Spilled outflow | (m3/s) | 17.84 |
| Diversion | (m3/s) | ----- |
| Turbine flow | (m3/s) | 1213.55 |
| Turbine efficiency | (%) | 88.88 |
| | | |
| Reservoir level | (m) | 417.01 |
| Tailwater level | (m) | 409.76 |
| Net head | (m) | 7.24 |
| Headlosses | (m) | 0.01 |
| | | |
| Annual energy | (MU) | 662.08 |
| Power production | (MW) | 75.58 |
| Coeff. production | | |
| - MW / m3/s | | 0.06 |
| - GWh/ hm3 | | 0.02 |
| Maximum capacity | (MW) | 121.00 |
| Maximum discharge | (m3/s) | 2100.00 |
| Utility factor | (%) | 62.46 |

ESOLIN --> X:\014942~1\ENGINE~1\PROSPER\PCN_MTH.res --> 2002/11/13 (10:26:12)

PEACE CASCADE - MONTHLY SIMULATION 1972-2001

SEVEN PROJECT DEVELOPMENT

ENERGY SHORTAGE TO SATISFY THE SYSTEM DEMAND (MU)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | SUM 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 73/73 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 74/74 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 75/75 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 76/76 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 77/77 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 78/78 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 79/79 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 80/80 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 81/81 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 82/82 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 83/83 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 84/84 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 85/85 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 86/86 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 87/87 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 88/88 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 89/89 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 90/90 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 91/91 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 92/92 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 93/93 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 94/94 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 95/95 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 96/96 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 97/97 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 98/98 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 99/99 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 00/00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 01/01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| AVG | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| STD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| MIN | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| MAX | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

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PEACE CASCADE - MONTHLY SIMULATION 1972-2001

SEVEN PROJECT DEVELOPMENT

ENERGY PRODUCTION OF THE POWERPLANT # 2001, SEVEN_A (MU)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | SUM 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 29.33 | 27.38 | 28.57 | 27.62 | 23.75 | 52.67 | 54.42 | 41.67 | 31.13 | 32.71 | 34.79 | 38.28 | 422.32 |
| 73/73 | 40.93 | 38.77 | 41.36 | 35.42 | 33.90 | 34.88 | 35.81 | 35.71 | 33.12 | 35.14 | 34.44 | 31.00 | 430.47 |
| 74/74 | 35.54 | 31.92 | 35.41 | 33.02 | 33.42 | 32.67 | 36.50 | 45.85 | 34.32 | 39.53 | 43.10 | 43.80 | 445.08 |
| 75/75 | 42.19 | 41.68 | 42.46 | 42.80 | 32.88 | 24.86 | 15.45 | 13.76 | 27.24 | 31.08 | 33.84 | 34.83 | 383.08 |
| 76/76 | 35.71 | 32.41 | 38.98 | 33.08 | 32.98 | 34.04 | 40.11 | 50.70 | 36.48 | 47.23 | 46.19 | 47.90 | 475.81 |
| 77/77 | 42.86 | 29.47 | 26.38 | 32.05 | 28.21 | 30.11 | 42.43 | 35.48 | 29.14 | 37.18 | 44.16 | 48.93 | 426.40 |
| 78/78 | 46.76 | 42.27 | 38.03 | 33.03 | 28.27 | 25.26 | 21.56 | 24.49 | 17.02 | 28.42 | 32.38 | 46.45 | 383.95 |
| 79/79 | 48.08 | 41.62 | 32.40 | 27.27 | 28.72 | 32.84 | 34.24 | 27.84 | 32.53 | 33.14 | 39.85 | 32.88 | 411.41 |
| 80/80 | 39.65 | 30.37 | 27.00 | 19.19 | 12.42 | 9.08 | 9.31 | 22.65 | 30.54 | 37.94 | 33.63 | 28.21 | 299.98 |
| 81/81 | 20.87 | 31.10 | 43.68 | 38.73 | 22.02 | 15.92 | 26.82 | 25.57 | 35.17 | 43.04 | 45.59 | 44.05 | 392.55 |
| 82/82 | 47.96 | 39.04 | 32.84 | 34.08 | 21.50 | 14.05 | 13.18 | 28.91 | 33.17 | 37.42 | 42.83 | 43.74 | 388.74 |
| 83/83 | 28.69 | 18.03 | 16.88 | 20.03 | 35.19 | 24.86 | 54.42 | 38.01 | 43.22 | 38.37 | 33.42 | 40.97 | 392.10 |
| 84/84 | 36.37 | 26.44 | 21.89 | 33.71 | 38.77 | 28.76 | 36.68 | 40.29 | 40.21 | 44.29 | 42.60 | 47.13 | 437.13 |
| 85/85 | 32.71 | 29.58 | 41.64 | 41.15 | 28.97 | 36.87 | 36.00 | 33.79 | 42.83 | 44.51 | 45.33 | 48.80 | 462.16 |
| 86/86 | 43.71 | 29.52 | 25.15 | 34.10 | 31.44 | 10.38 | 7.58 | 32.40 | 20.84 | 29.99 | 34.97 | 35.78 | 335.86 |
| 87/87 | 39.81 | 43.59 | 49.63 | 48.04 | 35.28 | 38.52 | 35.94 | 29.78 | 35.47 | 40.08 | 39.59 | 49.40 | 485.12 |
| 88/88 | 50.79 | 45.07 | 49.57 | 42.33 | 29.90 | 34.32 | 37.58 | 35.94 | 35.83 | 40.05 | 43.01 | 34.65 | 479.04 |
| 89/89 | 39.29 | 39.68 | 37.52 | 27.77 | 20.40 | 24.22 | 34.70 | 35.27 | 28.47 | 30.35 | 24.10 | 33.14 | 374.88 |
| 90/90 | 42.49 | 35.62 | 32.31 | 31.10 | 27.10 | 24.71 | 23.13 | 24.55 | 34.78 | 43.38 | 41.03 | 48.00 | 408.21 |
| 91/91 | 34.87 | 19.33 | 36.07 | 29.91 | 23.46 | 18.11 | 13.07 | 17.06 | 24.80 | 46.54 | 44.37 | 47.86 | 355.44 |
| 92/92 | 46.98 | 45.01 | 41.61 | 46.66 | 43.07 | 22.42 | 20.30 | 27.01 | 32.49 | 35.11 | 46.03 | 51.40 | 458.09 |
| 93/93 | 52.11 | 45.94 | 50.48 | 40.94 | 17.70 | 9.62 | 12.49 | 26.41 | 31.65 | 34.29 | 47.24 | 51.93 | 420.82 |
| 94/94 | 49.48 | 44.81 | 46.94 | 30.90 | 14.81 | 12.93 | 17.84 | 27.44 | 30.88 | 36.37 | 47.30 | 50.01 | 409.70 |
| 95/95 | 47.51 | 31.36 | 28.18 | 21.06 | 12.53 | 13.35 | 22.06 | 13.65 | 19.39 | 30.94 | 34.02 | 45.64 | 319.67 |
| 96/96 | 40.90 | 36.23 | 40.75 | 37.75 | 33.38 | 52.67 | 34.22 | 50.98 | 50.84 | 35.81 | 40.32 | 46.41 | 500.27 |
| 97/97 | 42.64 | 32.94 | 41.70 | 36.84 | 30.46 | 19.09 | 18.26 | 20.17 | 27.83 | 32.76 | 48.79 | 52.48 | 403.97 |
| 98/98 | 47.45 | 40.59 | 41.70 | 40.38 | 22.45 | 15.82 | 23.72 | 31.76 | 32.81 | 36.68 | 47.37 | 50.68 | 431.40 |
| 99/99 | 42.80 | 44.89 | 39.99 | 39.85 | 38.31 | 24.01 | 22.71 | 22.38 | 35.05 | 36.43 | 28.99 | 43.29 | 418.70 |
| 00/00 | 43.62 | 43.99 | 47.63 | 33.73 | 39.41 | 27.68 | 30.14 | 31.47 | 28.85 | 33.42 | 46.98 | 46.98 | 453.89 |
| 01/01 | 43.93 | 40.14 | 39.65 | 39.17 | 27.59 | 16.13 | 20.10 | 22.45 | 23.76 | 40.63 | 40.50 | 51.79 | 405.85 |
| AVG | 41.20 | 35.96 | 37.21 | 34.39 | 28.28 | 25.36 | 27.69 | 30.45 | 31.99 | 37.09 | 40.23 | 43.88 | 413.74 |
| STD | 7.10 | 7.70 | 8.56 | 7.18 | 7.91 | 11.33 | 12.29 | 9.56 | 7.07 | 5.06 | 6.33 | 7.02 | 47.49 |
| MIN | 20.87 | 18.03 | 16.88 | 19.19 | 12.42 | 9.08 | 7.58 | 13.65 | 17.02 | 28.42 | 24.10 | 28.21 | 299.98 |
| MAX | 52.11 | 45.94 | 50.48 | 48.04 | 43.07 | 52.67 | 54.42 | 50.98 | 50.84 | 47.23 | 48.79 | 52.48 | 500.27 |

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PEACE CASCADE - MONTHLY SIMULATION 1972-2001
SEVEN PROJECT DEVELOPMENT

MAXIMUM CAPACITY OF THE POWERPLANT # 2001, SEVEN_A (MW)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | AVG 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 |
| 73/73 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 |
| 74/74 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 |
| 75/75 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 |
| 76/76 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 |
| 77/77 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 |
| 78/78 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 |
| 79/79 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 |
| 80/80 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 |
| 81/81 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 |
| 82/82 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 |
| 83/83 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 |
| 84/84 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 |
| 85/85 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 |
| 86/86 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 |
| 87/87 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 |
| 88/88 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 |
| 89/89 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 |
| 90/90 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 |
| 91/91 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 |
| 92/92 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 72.59 | 73.10 |
| 93/93 | 71.92 | 73.09 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 72.09 | 72.95 |
| 94/94 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 |
| 95/95 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 |
| 96/96 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 45.99 | 68.52 | 73.15 | 73.15 | 73.15 | 73.15 | 70.45 |
| 97/97 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 71.56 | 73.02 |
| 98/98 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 |
| 99/99 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 |
| 00/00 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 |
| 01/01 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 72.22 | 73.07 |
| AVG | 73.11 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 72.24 | 73.00 | 73.15 | 73.15 | 73.15 | 73.01 | 73.04 |
| STD | 0.23 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 4.96 | 0.84 | 0.00 | 0.00 | 0.00 | 0.38 | 0.49 |
| MIN | 71.92 | 73.09 | 73.15 | 73.15 | 73.15 | 73.15 | 45.99 | 68.52 | 73.15 | 73.15 | 73.15 | 71.56 | 70.45 |
| MAX | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 | 73.15 |

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PEACE CASCADE - MONTHLY SIMULATION 1972-2001

SEVEN PROJECT DEVELOPMENT

ENERGY PRODUCTION OF THE POWERPLANT # 2002, SEVEN_B (MU)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | SUM 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 41.22 | 38.60 | 40.07 | 38.80 | 33.31 | 80.10 | 81.49 | 64.37 | 44.29 | 46.70 | 53.19 | 59.50 | 621.65 |
| 73/73 | 63.14 | 59.45 | 63.72 | 55.21 | 49.83 | 54.23 | 55.07 | 54.45 | 48.72 | 52.69 | 52.15 | 43.81 | 652.44 |
| 74/74 | 53.72 | 48.01 | 53.33 | 48.39 | 48.68 | 48.31 | 57.20 | 69.96 | 51.92 | 61.30 | 65.82 | 67.02 | 673.67 |
| 75/75 | 64.83 | 63.48 | 65.20 | 65.46 | 47.44 | 35.48 | 21.67 | 18.96 | 38.30 | 44.03 | 50.47 | 51.78 | 567.11 |
| 76/76 | 54.20 | 49.41 | 60.46 | 48.56 | 47.66 | 51.82 | 62.56 | 79.44 | 56.93 | 72.48 | 71.04 | 73.74 | 728.28 |
| 77/77 | 65.74 | 41.93 | 36.76 | 46.08 | 39.96 | 43.44 | 65.71 | 53.80 | 41.20 | 58.05 | 67.23 | 75.81 | 635.71 |
| 78/78 | 71.48 | 64.63 | 59.15 | 48.43 | 40.06 | 36.07 | 30.29 | 34.22 | 23.37 | 39.94 | 46.81 | 70.89 | 565.34 |
| 79/79 | 74.08 | 63.37 | 45.98 | 38.27 | 40.75 | 48.74 | 50.82 | 39.23 | 47.27 | 47.68 | 61.45 | 47.02 | 604.66 |
| 80/80 | 61.38 | 44.02 | 37.70 | 26.36 | 17.31 | 13.25 | 13.25 | 31.51 | 43.37 | 59.11 | 49.92 | 39.53 | 436.71 |
| 81/81 | 28.65 | 45.81 | 66.84 | 59.95 | 30.79 | 22.63 | 38.04 | 35.82 | 54.46 | 66.07 | 69.85 | 67.35 | 586.26 |
| 82/82 | 73.85 | 59.82 | 46.92 | 51.18 | 30.03 | 20.04 | 18.53 | 40.85 | 48.84 | 58.39 | 65.47 | 66.94 | 580.85 |
| 83/83 | 40.25 | 24.70 | 22.99 | 27.57 | 53.15 | 35.48 | 82.29 | 52.95 | 66.08 | 59.71 | 49.37 | 63.19 | 577.72 |
| 84/84 | 56.20 | 37.14 | 30.13 | 50.12 | 60.51 | 41.71 | 57.56 | 62.36 | 62.06 | 67.79 | 65.16 | 72.21 | 662.94 |
| 85/85 | 46.61 | 42.17 | 64.08 | 63.22 | 40.87 | 57.81 | 55.39 | 49.23 | 65.71 | 68.06 | 69.34 | 75.54 | 698.02 |
| 86/86 | 66.89 | 42.05 | 34.92 | 51.18 | 44.82 | 14.51 | 10.94 | 46.27 | 28.76 | 42.39 | 53.75 | 54.44 | 490.92 |
| 87/87 | 61.60 | 67.23 | 77.22 | 74.84 | 53.44 | 60.25 | 55.48 | 42.93 | 55.53 | 62.07 | 61.10 | 76.78 | 748.47 |
| 88/88 | 79.40 | 70.22 | 77.11 | 64.87 | 42.71 | 52.42 | 58.80 | 55.00 | 55.94 | 61.98 | 65.70 | 51.30 | 735.46 |
| 89/89 | 60.88 | 60.66 | 58.42 | 39.02 | 28.65 | 34.24 | 51.84 | 53.25 | 40.18 | 42.89 | 33.48 | 47.61 | 551.12 |
| 90/90 | 65.25 | 55.17 | 45.84 | 44.17 | 38.54 | 35.96 | 32.50 | 34.13 | 53.15 | 66.45 | 63.02 | 73.92 | 608.11 |
| 91/91 | 51.85 | 26.57 | 55.26 | 42.28 | 32.86 | 25.39 | 18.06 | 23.30 | 34.56 | 71.09 | 67.49 | 73.66 | 522.38 |
| 92/92 | 71.91 | 70.10 | 64.07 | 72.09 | 66.33 | 31.67 | 28.07 | 37.74 | 47.07 | 52.60 | 70.72 | 80.57 | 692.93 |
| 93/93 | 81.94 | 71.83 | 78.82 | 62.93 | 24.47 | 13.83 | 17.91 | 37.61 | 45.40 | 50.46 | 73.16 | 81.61 | 639.98 |
| 94/94 | 76.93 | 69.72 | 71.84 | 43.98 | 20.70 | 18.34 | 25.06 | 38.61 | 43.87 | 56.28 | 73.27 | 77.97 | 616.59 |
| 95/95 | 72.94 | 46.48 | 39.46 | 29.01 | 17.36 | 18.77 | 31.35 | 18.93 | 26.74 | 43.78 | 50.98 | 69.46 | 465.26 |
| 96/96 | 63.10 | 56.01 | 62.89 | 58.62 | 48.64 | 79.68 | 62.74 | 78.26 | 72.29 | 54.62 | 62.12 | 70.82 | 769.79 |
| 97/97 | 65.46 | 51.08 | 64.17 | 57.37 | 43.79 | 27.15 | 25.57 | 27.90 | 39.37 | 47.04 | 76.23 | 82.68 | 607.83 |
| 98/98 | 72.83 | 61.88 | 64.19 | 62.29 | 31.75 | 21.99 | 33.03 | 45.06 | 47.84 | 57.28 | 73.40 | 79.21 | 650.76 |
| 99/99 | 65.66 | 69.88 | 61.84 | 61.51 | 59.77 | 34.09 | 31.69 | 30.96 | 53.97 | 56.43 | 40.83 | 66.30 | 632.93 |
| 00/00 | 66.75 | 68.03 | 73.17 | 50.15 | 61.14 | 39.65 | 43.26 | 44.78 | 40.90 | 48.36 | 72.65 | 71.93 | 680.76 |
| 01/01 | 67.18 | 61.30 | 61.38 | 60.51 | 38.86 | 24.16 | 28.46 | 31.25 | 33.04 | 62.77 | 62.31 | 81.33 | 612.55 |
| AVG | 62.86 | 54.36 | 56.13 | 51.41 | 41.14 | 37.37 | 41.49 | 44.44 | 47.04 | 55.95 | 61.25 | 67.13 | 620.57 |
| STD | 12.13 | 13.23 | 14.81 | 12.51 | 12.86 | 17.80 | 19.86 | 15.77 | 11.66 | 9.16 | 10.76 | 12.27 | 80.07 |
| MIN | 28.65 | 24.70 | 22.99 | 26.36 | 17.31 | 13.25 | 10.94 | 18.93 | 23.37 | 39.94 | 33.48 | 39.53 | 436.71 |
| MAX | 81.94 | 71.83 | 78.82 | 74.84 | 66.33 | 80.10 | 82.29 | 79.44 | 72.29 | 72.48 | 76.23 | 82.68 | 769.79 |

ESOLIN -->  X:\014942~1\ENGINE~1\PROSPER\PCN_MTH.res  --> 2002/11/13   (10:26:12)
PEACE CASCADE - MONTHLY SIMULATION 1972-2001
SEVEN PROJECT DEVELOPMENT

MAXIMUM CAPACITY OF THE POWERPLANT # 2002, SEVEN_B (MW)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | AVG 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 111.24 | 109.53 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 111.81 |
| 73/73 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 |
| 74/74 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 |
| 75/75 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 |
| 76/76 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 |
| 77/77 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 |
| 78/78 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 |
| 79/79 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 |
| 80/80 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 |
| 81/81 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 |
| 82/82 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 |
| 83/83 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 110.60 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 111.97 |
| 84/84 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 |
| 85/85 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 |
| 86/86 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 |
| 87/87 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 |
| 88/88 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 |
| 89/89 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 |
| 90/90 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 |
| 91/91 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 |
| 92/92 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 |
| 93/93 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 |
| 94/94 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 |
| 95/95 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 |
| 96/96 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 110.66 | 84.32 | 105.18 | 112.10 | 112.10 | 112.10 | 112.10 | 109.04 |
| 97/97 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 |
| 98/98 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 |
| 99/99 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 |
| 00/00 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 |
| 01/01 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 |
| AVG | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.02 | 111.04 | 111.87 | 112.10 | 112.10 | 112.10 | 112.10 | 111.98 |
| STD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.30 | 5.07 | 1.26 | 0.00 | 0.00 | 0.00 | 0.00 | 0.56 |
| MIN | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 110.66 | 84.32 | 105.18 | 112.10 | 112.10 | 112.10 | 112.10 | 109.04 |
| MAX | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 | 112.10 |

ESOLIN --> X:\014942~1\ENGINE~1\PROSPER\PCN_MTH.res --> 2002/11/13 (10:26:12)
PEACE CASCADE - MONTHLY SIMULATION 1972-2001
SEVEN PROJECT DEVELOPMENT

ENERGY PRODUCTION OF THE POWERPLANT # 2003, SEVEN_C (MU)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | SUM 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 39.86 | 37.22 | 38.82 | 37.66 | 33.09 | 73.19 | 75.63 | 60.23 | 42.60 | 44.80 | 50.32 | 55.89 | 589.30 |
| 73/73 | 58.98 | 55.31 | 59.47 | 52.08 | 47.86 | 51.89 | 52.55 | 51.74 | 46.52 | 50.07 | 49.41 | 42.17 | 618.07 |
| 74/74 | 50.89 | 45.52 | 50.55 | 46.16 | 46.85 | 46.78 | 54.38 | 64.89 | 49.31 | 57.50 | 61.07 | 62.26 | 636.17 |
| 75/75 | 60.42 | 58.68 | 60.73 | 60.80 | 45.75 | 35.41 | 22.28 | 19.29 | 37.28 | 42.44 | 47.95 | 49.21 | 540.24 |
| 76/76 | 51.30 | 46.74 | 56.70 | 46.31 | 45.95 | 49.82 | 58.97 | 72.88 | 53.63 | 66.93 | 65.49 | 67.95 | 682.67 |
| 77/77 | 61.18 | 40.16 | 35.83 | 44.12 | 39.13 | 42.48 | 61.61 | 51.18 | 39.87 | 54.71 | 62.23 | 69.71 | 602.20 |
| 78/78 | 66.00 | 59.67 | 55.57 | 46.20 | 39.22 | 35.94 | 30.44 | 33.75 | 23.42 | 38.79 | 44.74 | 65.51 | 539.26 |
| 79/79 | 68.23 | 58.59 | 44.07 | 37.18 | 39.84 | 47.15 | 48.86 | 38.31 | 45.24 | 45.67 | 57.41 | 45.01 | 575.54 |
| 80/80 | 57.49 | 42.01 | 36.68 | 26.18 | 17.87 | 14.34 | 14.05 | 31.25 | 41.79 | 55.62 | 47.47 | 38.35 | 423.11 |
| 81/81 | 28.31 | 43.59 | 62.10 | 56.16 | 30.76 | 23.46 | 37.55 | 35.22 | 51.50 | 61.53 | 64.48 | 62.53 | 557.20 |
| 82/82 | 68.03 | 55.62 | 44.90 | 48.60 | 30.04 | 20.97 | 19.24 | 39.76 | 46.63 | 55.00 | 60.77 | 62.19 | 551.76 |
| 83/83 | 38.99 | 24.46 | 22.92 | 27.32 | 50.76 | 35.41 | 75.63 | 53.31 | 61.37 | 56.13 | 46.99 | 59.04 | 552.33 |
| 84/84 | 53.02 | 35.91 | 29.70 | 47.63 | 57.04 | 41.27 | 54.49 | 58.41 | 58.02 | 63.00 | 60.53 | 66.64 | 625.67 |
| 85/85 | 44.63 | 40.37 | 59.78 | 58.90 | 39.72 | 54.69 | 52.63 | 47.03 | 61.17 | 63.21 | 64.04 | 69.47 | 655.63 |
| 86/86 | 62.15 | 40.26 | 34.14 | 48.58 | 43.35 | 15.09 | 11.76 | 44.55 | 28.46 | 41.03 | 50.82 | 51.53 | 471.71 |
| 87/87 | 57.68 | 61.90 | 70.88 | 68.73 | 51.05 | 56.91 | 52.92 | 42.27 | 52.49 | 58.17 | 57.12 | 70.53 | 700.65 |
| 88/88 | 72.69 | 64.41 | 70.79 | 60.35 | 41.72 | 50.19 | 55.53 | 52.10 | 52.70 | 58.04 | 60.96 | 48.80 | 688.28 |
| 89/89 | 57.06 | 56.32 | 54.94 | 37.84 | 28.94 | 34.01 | 49.62 | 50.76 | 38.96 | 41.44 | 32.78 | 45.55 | 528.23 |
| 90/90 | 60.77 | 51.69 | 43.94 | 42.41 | 38.08 | 36.47 | 32.42 | 33.51 | 50.28 | 61.79 | 58.71 | 68.09 | 578.18 |
| 91/91 | 49.25 | 26.22 | 52.22 | 40.72 | 32.65 | 25.81 | 18.47 | 23.28 | 33.81 | 65.72 | 62.45 | 67.87 | 498.47 |
| 92/92 | 66.37 | 64.31 | 59.79 | 66.47 | 61.92 | 31.73 | 27.99 | 36.76 | 44.96 | 49.99 | 65.22 | 73.65 | 649.17 |
| 93/93 | 74.77 | 65.74 | 72.21 | 58.64 | 24.67 | 14.76 | 18.96 | 37.33 | 43.72 | 48.13 | 67.30 | 74.51 | 600.73 |
| 94/94 | 70.64 | 64.00 | 66.32 | 42.36 | 21.27 | 19.18 | 25.61 | 37.74 | 42.21 | 53.16 | 67.38 | 71.52 | 581.41 |
| 95/95 | 67.25 | 44.18 | 38.28 | 28.63 | 17.84 | 19.44 | 31.74 | 19.37 | 26.65 | 42.19 | 48.40 | 64.30 | 448.26 |
| 96/96 | 58.96 | 52.42 | 58.78 | 55.04 | 46.85 | 73.19 | 56.90 | 74.39 | 70.74 | 51.78 | 57.99 | 65.46 | 722.50 |
| 97/97 | 60.96 | 48.18 | 59.86 | 53.97 | 42.86 | 27.81 | 26.02 | 27.86 | 38.40 | 45.28 | 69.90 | 75.38 | 576.48 |
| 98/98 | 67.16 | 57.35 | 59.90 | 58.21 | 31.96 | 22.38 | 32.61 | 43.33 | 45.65 | 54.00 | 67.49 | 72.54 | 612.56 |
| 99/99 | 61.11 | 64.14 | 57.88 | 57.50 | 56.31 | 34.03 | 31.49 | 30.57 | 50.99 | 53.24 | 39.40 | 61.65 | 598.31 |
| 00/00 | 62.01 | 62.57 | 67.44 | 47.66 | 57.36 | 39.10 | 42.36 | 43.24 | 39.73 | 46.27 | 66.88 | 66.40 | 641.02 |
| 01/01 | 62.39 | 56.86 | 57.49 | 56.59 | 37.99 | 26.07 | 29.00 | 31.03 | 32.45 | 58.71 | 58.12 | 74.28 | 580.97 |
| AVG | 58.62 | 50.81 | 52.76 | 48.63 | 39.96 | 36.63 | 40.06 | 42.84 | 45.02 | 52.81 | 57.13 | 62.27 | 587.54 |
| STD | 10.50 | 11.49 | 12.97 | 10.97 | 11.56 | 15.85 | 17.72 | 14.20 | 10.60 | 7.91 | 9.26 | 10.49 | 71.23 |
| MIN | 28.31 | 24.46 | 22.92 | 26.18 | 17.84 | 14.34 | 11.76 | 19.29 | 23.42 | 38.79 | 32.78 | 38.35 | 423.11 |
| MAX | 74.77 | 65.74 | 72.21 | 68.73 | 61.92 | 73.19 | 75.63 | 74.39 | 70.74 | 66.93 | 69.90 | 75.38 | 722.50 |

ESOLIN --> X:\014942~1\ENGINE~1\PROSPER\PCN_MTH.res --> 2002/11/13 (10:26:12)
PEACE CASCADE - MONTHLY SIMULATION 1972-2001
SEVEN PROJECT DEVELOPMENT

MAXIMUM CAPACITY OF THE POWERPLANT # 2003, SEVEN_C (MW)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | AVG 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 |
| 73/73 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 |
| 74/74 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 |
| 75/75 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 |
| 76/76 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 |
| 77/77 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 |
| 78/78 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 |
| 79/79 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 |
| 80/80 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 |
| 81/81 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 |
| 82/82 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 |
| 83/83 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 |
| 84/84 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 |
| 85/85 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 |
| 86/86 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 |
| 87/87 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 |
| 88/88 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 |
| 89/89 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 |
| 90/90 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 |
| 91/91 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 |
| 92/92 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 |
| 93/93 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 |
| 94/94 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 |
| 95/95 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 |
| 96/96 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 76.48 | 99.99 | 101.65 | 101.65 | 101.65 | 101.65 | 99.37 |
| 97/97 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 |
| 98/98 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 |
| 99/99 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 |
| 00/00 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 |
| 01/01 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 |
| AVG | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 100.81 | 101.59 | 101.65 | 101.65 | 101.65 | 101.65 | 101.57 |
| STD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.60 | 0.30 | 0.00 | 0.00 | 0.00 | 0.00 | 0.42 |
| MIN | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 76.48 | 99.99 | 101.65 | 101.65 | 101.65 | 101.65 | 99.37 |
| MAX | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 | 101.65 |

ESOLIN --> X:\014942~1\ENGINE~1\PROSPER\PCN_MTH.res --> 2002/11/13 (10:26:12)
PEACE CASCADE - MONTHLY SIMULATION 1972-2001
SEVEN PROJECT DEVELOPMENT

ENERGY PRODUCTION OF THE POWERPLANT # 2004, SEVEN_D (MU)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | SUM 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 37.37 | 34.96 | 36.34 | 35.32 | 31.13 | 69.08 | 71.39 | 57.58 | 40.33 | 42.39 | 47.82 | 53.21 | 556.91 |
| 73/73 | 56.18 | 52.71 | 56.65 | 49.61 | 45.68 | 50.05 | 50.42 | 49.35 | 44.16 | 47.57 | 46.93 | 39.69 | 588.99 |
| 74/74 | 48.30 | 43.17 | 47.96 | 43.75 | 44.69 | 45.02 | 52.22 | 62.04 | 46.92 | 54.83 | 58.24 | 59.35 | 606.49 |
| 75/75 | 57.56 | 55.93 | 57.86 | 58.01 | 43.62 | 33.83 | 21.00 | 17.88 | 35.01 | 40.04 | 45.48 | 46.65 | 512.88 |
| 76/76 | 48.70 | 44.38 | 53.98 | 43.90 | 43.81 | 48.01 | 56.61 | 69.13 | 51.16 | 63.77 | 62.32 | 64.63 | 650.39 |
| 77/77 | 58.30 | 37.91 | 33.39 | 41.75 | 37.05 | 40.84 | 59.15 | 48.79 | 37.59 | 52.14 | 59.37 | 66.20 | 572.47 |
| 78/78 | 62.87 | 56.83 | 52.89 | 43.79 | 37.13 | 34.35 | 28.73 | 31.60 | 21.64 | 36.40 | 42.32 | 62.43 | 510.98 |
| 79/79 | 64.87 | 55.85 | 41.59 | 34.84 | 37.75 | 45.39 | 46.79 | 36.07 | 42.91 | 43.24 | 54.70 | 42.52 | 546.52 |
| 80/80 | 54.74 | 39.72 | 34.22 | 24.18 | 16.74 | 13.93 | 13.39 | 29.18 | 39.51 | 53.02 | 45.01 | 35.88 | 399.54 |
| 81/81 | 26.12 | 41.27 | 59.19 | 53.54 | 28.87 | 22.39 | 35.63 | 33.03 | 49.09 | 58.71 | 61.41 | 59.62 | 528.87 |
| 82/82 | 64.69 | 53.01 | 42.41 | 46.16 | 28.19 | 20.06 | 18.17 | 37.51 | 44.27 | 52.42 | 57.96 | 59.29 | 524.12 |
| 83/83 | 36.50 | 22.52 | 21.01 | 25.27 | 48.53 | 33.83 | 71.39 | 50.96 | 58.61 | 53.51 | 44.54 | 56.24 | 522.90 |
| 84/84 | 50.40 | 33.66 | 27.44 | 45.16 | 54.58 | 39.94 | 52.13 | 55.70 | 55.40 | 60.16 | 57.73 | 63.46 | 595.76 |
| 85/85 | 42.15 | 38.11 | 56.94 | 56.15 | 37.40 | 52.46 | 50.31 | 44.57 | 58.53 | 60.35 | 61.00 | 65.99 | 623.96 |
| 86/86 | 59.24 | 38.01 | 31.73 | 46.10 | 41.17 | 14.16 | 11.32 | 42.27 | 26.38 | 38.67 | 48.34 | 48.95 | 446.34 |
| 87/87 | 54.93 | 58.83 | 67.23 | 65.23 | 48.85 | 54.72 | 50.82 | 40.67 | 50.13 | 55.48 | 54.44 | 66.94 | 668.28 |
| 88/88 | 68.83 | 61.07 | 67.15 | 57.61 | 39.77 | 48.22 | 53.10 | 49.59 | 50.19 | 55.31 | 58.14 | 46.24 | 655.22 |
| 89/89 | 54.32 | 53.68 | 52.28 | 35.49 | 27.32 | 32.20 | 47.41 | 48.43 | 36.68 | 39.04 | 30.50 | 43.06 | 500.41 |
| 90/90 | 57.91 | 49.21 | 41.46 | 40.07 | 36.23 | 35.49 | 30.56 | 31.21 | 47.79 | 58.90 | 55.94 | 64.74 | 549.53 |
| 91/91 | 46.66 | 24.20 | 49.61 | 38.34 | 30.69 | 24.35 | 17.17 | 21.40 | 31.53 | 62.65 | 59.56 | 64.56 | 470.70 |
| 92/92 | 63.20 | 60.98 | 56.98 | 63.27 | 59.26 | 30.07 | 26.02 | 34.34 | 42.54 | 47.48 | 62.06 | 69.67 | 615.87 |
| 93/93 | 70.63 | 62.24 | 68.40 | 55.89 | 22.96 | 14.17 | 18.20 | 35.57 | 41.56 | 45.65 | 63.93 | 70.43 | 569.63 |
| 94/94 | 67.03 | 60.72 | 63.16 | 40.13 | 20.00 | 18.26 | 24.19 | 35.50 | 39.91 | 50.61 | 64.01 | 67.81 | 551.33 |
| 95/95 | 63.99 | 41.85 | 35.80 | 26.48 | 16.62 | 18.36 | 30.27 | 18.06 | 24.72 | 39.76 | 45.93 | 61.34 | 423.18 |
| 96/96 | 56.17 | 49.91 | 55.99 | 52.46 | 44.72 | 69.08 | 38.83 | 68.08 | 67.53 | 49.28 | 55.29 | 62.39 | 669.73 |
| 97/97 | 58.09 | 45.82 | 57.02 | 51.44 | 41.10 | 26.57 | 24.51 | 25.92 | 36.28 | 43.04 | 66.26 | 71.18 | 547.24 |
| 98/98 | 63.90 | 54.68 | 57.08 | 55.57 | 30.33 | 20.93 | 30.45 | 40.92 | 43.22 | 51.41 | 64.09 | 68.70 | 581.29 |
| 99/99 | 58.23 | 60.83 | 55.12 | 54.84 | 53.80 | 32.38 | 29.49 | 28.37 | 48.48 | 50.63 | 36.99 | 58.74 | 567.92 |
| 00/00 | 59.09 | 59.43 | 64.15 | 45.17 | 54.69 | 37.42 | 40.57 | 40.99 | 37.57 | 43.84 | 63.57 | 63.24 | 609.73 |
| 01/01 | 59.48 | 54.21 | 54.74 | 53.90 | 35.76 | 25.92 | 27.59 | 28.99 | 30.24 | 55.95 | 55.37 | 70.22 | 552.37 |
| AVG | 55.68 | 48.19 | 49.99 | 46.11 | 37.95 | 35.05 | 37.59 | 40.46 | 42.66 | 50.21 | 54.31 | 59.11 | 557.32 |
| STD | 10.13 | 11.09 | 12.60 | 10.70 | 11.21 | 15.11 | 16.69 | 13.55 | 10.36 | 7.71 | 8.94 | 10.01 | 67.79 |
| MIN | 26.12 | 22.52 | 21.01 | 24.18 | 16.62 | 13.93 | 11.32 | 17.88 | 21.64 | 36.40 | 30.50 | 35.88 | 399.54 |
| MAX | 70.63 | 62.24 | 68.40 | 65.23 | 59.26 | 69.08 | 71.39 | 69.13 | 67.53 | 63.77 | 66.26 | 71.18 | 669.73 |

ESOLIN --> X:\014942~1\ENGINE~1\PROSPER\PCN_MTH.res --> 2002/11/13 (10:26:12)
PEACE CASCADE - MONTHLY SIMULATION 1972-2001
SEVEN PROJECT DEVELOPMENT

MAXIMUM CAPACITY OF THE POWERPLANT # 2004, SEVEN_D (MW)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | AVG 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 |
| 73/73 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 |
| 74/74 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 |
| 75/75 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 |
| 76/76 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 |
| 77/77 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 |
| 78/78 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 |
| 79/79 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 |
| 80/80 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 |
| 81/81 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 |
| 82/82 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 |
| 83/83 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 |
| 84/84 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 |
| 85/85 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 |
| 86/86 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 |
| 87/87 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 |
| 88/88 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 |
| 89/89 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 |
| 90/90 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 |
| 91/91 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 |
| 92/92 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 |
| 93/93 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 |
| 94/94 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 |
| 95/95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 |
| 96/96 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 52.19 | 91.50 | 95.95 | 95.95 | 95.95 | 95.95 | 91.86 |
| 97/97 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 |
| 98/98 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 |
| 99/99 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 |
| 00/00 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 |
| 01/01 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 |
| AVG | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 94.49 | 95.80 | 95.95 | 95.95 | 95.95 | 95.95 | 95.81 |
| STD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 7.99 | 0.81 | 0.00 | 0.00 | 0.00 | 0.00 | 0.75 |
| MIN | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 52.19 | 91.50 | 95.95 | 95.95 | 95.95 | 95.95 | 91.86 |
| MAX | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 | 95.95 |

ESOLIN --> X:\014942~1\ENGINE~1\PROSPER\PCN_MTH.res --> 2002/11/13 (10:26:12)
PEACE CASCADE - MONTHLY SIMULATION 1972-2001
SEVEN PROJECT DEVELOPMENT

ENERGY PRODUCTION OF THE POWERPLANT # 2005, SEVEN_E (MU)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | SUM 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 31.94 | 29.85 | 31.03 | 30.90 | 31.08 | 64.30 | 66.44 | 52.16 | 36.12 | 37.31 | 41.35 | 45.87 | 498.35 |
| 73/73 | 48.40 | 45.44 | 48.80 | 43.23 | 43.22 | 51.10 | 49.24 | 45.02 | 39.41 | 41.79 | 40.57 | 34.09 | 530.31 |
| 74/74 | 41.42 | 36.98 | 41.10 | 38.13 | 42.39 | 47.03 | 50.74 | 56.07 | 41.80 | 48.13 | 50.61 | 51.37 | 545.77 |
| 75/75 | 49.64 | 48.36 | 49.89 | 50.70 | 41.48 | 38.11 | 25.09 | 18.57 | 31.62 | 35.32 | 39.31 | 40.11 | 468.19 |
| 76/76 | 41.78 | 38.03 | 46.41 | 38.26 | 41.64 | 49.45 | 54.43 | 62.54 | 45.47 | 56.14 | 54.33 | 56.18 | 584.66 |
| 77/77 | 50.30 | 32.39 | 28.50 | 36.40 | 36.05 | 43.66 | 56.57 | 44.55 | 33.83 | 45.76 | 51.62 | 57.65 | 517.27 |
| 78/78 | 54.44 | 49.18 | 45.45 | 38.17 | 36.11 | 38.52 | 31.44 | 30.02 | 20.31 | 32.21 | 36.56 | 54.16 | 466.56 |
| 79/79 | 56.30 | 48.28 | 35.56 | 30.49 | 36.62 | 47.33 | 46.24 | 33.80 | 38.33 | 38.04 | 47.43 | 36.52 | 494.93 |
| 80/80 | 47.11 | 33.97 | 29.22 | 21.41 | 19.18 | 22.09 | 18.91 | 27.98 | 35.44 | 46.54 | 38.89 | 30.81 | 371.53 |
| 81/81 | 22.32 | 35.32 | 51.08 | 46.70 | 29.20 | 28.87 | 37.12 | 31.23 | 43.66 | 51.59 | 53.49 | 51.61 | 482.19 |
| 82/82 | 56.13 | 45.71 | 36.27 | 40.23 | 28.62 | 27.00 | 22.79 | 35.03 | 39.51 | 46.01 | 50.35 | 51.31 | 478.96 |
| 83/83 | 31.20 | 19.21 | 17.99 | 22.33 | 45.62 | 38.11 | 66.44 | 47.10 | 52.05 | 46.97 | 38.48 | 48.58 | 474.07 |
| 84/84 | 43.14 | 28.68 | 23.38 | 38.87 | 50.25 | 46.27 | 48.00 | 49.00 | 49.36 | 53.15 | 50.19 | 55.13 | 535.42 |
| 85/85 | 36.07 | 32.52 | 48.98 | 48.75 | 33.51 | 49.70 | 46.88 | 39.22 | 53.51 | 53.28 | 53.00 | 57.47 | 552.89 |
| 86/86 | 51.20 | 32.46 | 27.00 | 39.85 | 38.63 | 16.33 | 17.55 | 38.88 | 23.72 | 34.76 | 42.06 | 42.24 | 404.69 |
| 87/87 | 47.35 | 51.07 | 58.44 | 57.36 | 46.05 | 53.31 | 49.77 | 44.62 | 45.33 | 48.93 | 47.30 | 58.33 | 607.85 |
| 88/88 | 60.20 | 53.18 | 58.40 | 50.85 | 40.10 | 47.57 | 48.74 | 43.87 | 43.71 | 48.18 | 50.52 | 39.85 | 585.17 |
| 89/89 | 46.72 | 46.27 | 44.85 | 31.05 | 30.33 | 33.87 | 45.03 | 44.85 | 32.88 | 34.55 | 26.34 | 37.07 | 453.82 |
| 90/90 | 49.96 | 42.24 | 35.37 | 34.83 | 38.07 | 45.83 | 32.21 | 27.77 | 41.42 | 51.07 | 48.31 | 56.16 | 503.24 |
| 91/91 | 39.89 | 20.61 | 42.48 | 33.05 | 30.44 | 27.35 | 18.49 | 18.99 | 27.77 | 54.78 | 51.67 | 56.05 | 421.57 |
| 92/92 | 54.70 | 53.06 | 49.19 | 56.04 | 53.93 | 33.11 | 24.83 | 29.83 | 36.83 | 41.64 | 53.99 | 61.11 | 548.26 |
| 93/93 | 61.98 | 54.37 | 59.65 | 48.49 | 22.88 | 21.35 | 26.52 | 39.13 | 38.77 | 40.12 | 55.85 | 62.00 | 531.12 |
| 94/94 | 58.37 | 52.83 | 54.80 | 36.04 | 22.47 | 23.62 | 28.72 | 33.32 | 35.54 | 44.22 | 55.84 | 59.34 | 505.12 |
| 95/95 | 55.47 | 35.81 | 30.58 | 22.93 | 17.62 | 22.32 | 35.91 | 20.15 | 23.26 | 34.85 | 39.79 | 53.32 | 392.02 |
| 96/96 | 48.51 | 43.00 | 48.30 | 45.67 | 42.77 | 62.31 | 45.51 | 59.33 | 56.39 | 43.58 | 48.26 | 54.25 | 597.90 |
| 97/97 | 50.27 | 39.39 | 49.12 | 44.76 | 42.44 | 32.68 | 27.73 | 25.13 | 34.85 | 40.08 | 58.51 | 62.69 | 507.65 |
| 98/98 | 55.40 | 47.29 | 49.45 | 49.45 | 33.99 | 22.62 | 28.52 | 35.94 | 37.47 | 44.70 | 55.83 | 60.14 | 520.80 |
| 99/99 | 50.25 | 52.95 | 47.46 | 48.15 | 48.34 | 35.75 | 29.01 | 25.37 | 41.94 | 43.60 | 31.64 | 50.64 | 505.09 |
| 00/00 | 50.88 | 51.52 | 55.53 | 38.82 | 48.07 | 40.60 | 42.95 | 37.85 | 35.02 | 38.54 | 55.59 | 54.89 | 550.27 |
| 01/01 | 51.47 | 46.88 | 47.10 | 46.54 | 33.50 | 44.49 | 32.97 | 27.79 | 27.04 | 48.71 | 47.84 | 61.67 | 515.98 |
| AVG | 48.09 | 41.56 | 43.05 | 40.28 | 36.82 | 38.49 | 38.49 | 37.50 | 38.08 | 44.15 | 47.18 | 51.35 | 505.06 |
| STD | 9.01 | 9.83 | 11.08 | 9.40 | 9.18 | 12.46 | 13.75 | 11.63 | 8.72 | 6.61 | 7.95 | 9.00 | 58.13 |
| MIN | 22.32 | 19.21 | 17.99 | 21.41 | 17.62 | 16.33 | 17.55 | 18.57 | 20.31 | 32.21 | 26.34 | 30.81 | 371.53 |
| MAX | 61.98 | 54.37 | 59.65 | 57.36 | 53.93 | 64.30 | 66.44 | 62.54 | 56.39 | 56.14 | 58.51 | 62.69 | 607.85 |

ESOLIN --> X:\014942~1\ENGINE~1\PROSPER\PCN_MTH.res --> 2002/11/13 (10:26:12)
PEACE CASCADE - MONTHLY SIMULATION 1972-2001
SEVEN PROJECT DEVELOPMENT

MAXIMUM CAPACITY OF THE POWERPLANT # 2005, SEVEN_E (MW)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | AVG 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 |
| 73/73 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 |
| 74/74 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 |
| 75/75 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 |
| 76/76 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.25 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 |
| 77/77 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 |
| 78/78 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 |
| 79/79 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 |
| 80/80 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 |
| 81/81 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 |
| 82/82 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 |
| 83/83 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 |
| 84/84 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 |
| 85/85 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 |
| 86/86 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 |
| 87/87 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 |
| 88/88 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 |
| 89/89 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 |
| 90/90 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 |
| 91/91 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 |
| 92/92 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 |
| 93/93 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 |
| 94/94 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 |
| 95/95 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 |
| 96/96 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 86.55 | 61.17 | 79.75 | 89.30 | 89.30 | 89.30 | 89.30 | 85.87 |
| 97/97 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.17 | 89.29 |
| 98/98 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 |
| 99/99 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 |
| 00/00 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 |
| 01/01 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 |
| AVG | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.21 | 88.36 | 88.98 | 89.30 | 89.30 | 89.30 | 89.30 | 89.19 |
| STD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.50 | 5.14 | 1.74 | 0.00 | 0.00 | 0.00 | 0.02 | 0.63 |
| MIN | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 86.55 | 61.17 | 79.75 | 89.30 | 89.30 | 89.30 | 89.17 | 85.87 |
| MAX | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 | 89.30 |

ESOLIN --> X:\014942~1\ENGINE~1\PROSPER\PCN_MTH.res --> 2002/11/13 (10:26:12)
PEACE CASCADE - MONTHLY SIMULATION 1972-2001
SEVEN PROJECT DEVELOPMENT

ENERGY PRODUCTION OF THE POWERPLANT # 2006, SEVEN_F (MU)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | SUM 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 42.89 | 40.09 | 41.66 | 41.56 | 42.20 | 88.92 | 91.88 | 71.35 | 48.77 | 50.32 | 55.91 | 62.17 | 677.71 |
| 73/73 | 65.73 | 61.82 | 66.30 | 58.59 | 58.87 | 70.51 | 67.49 | 61.22 | 53.33 | 56.53 | 54.82 | 45.82 | 721.04 |
| 74/74 | 55.92 | 49.90 | 55.48 | 51.48 | 57.70 | 64.72 | 69.63 | 77.04 | 56.65 | 65.45 | 69.03 | 69.98 | 742.98 |
| 75/75 | 67.49 | 66.02 | 67.85 | 69.19 | 56.44 | 52.25 | 34.27 | 25.15 | 42.63 | 47.58 | 53.07 | 54.11 | 636.06 |
| 76/76 | 56.42 | 51.37 | 62.92 | 51.66 | 56.67 | 68.15 | 74.96 | 86.72 | 61.81 | 77.00 | 74.46 | 76.99 | 799.12 |
| 77/77 | 68.44 | 43.55 | 38.23 | 49.08 | 48.93 | 59.97 | 78.08 | 60.56 | 45.62 | 62.10 | 70.49 | 79.16 | 704.19 |
| 78/78 | 74.42 | 67.22 | 61.56 | 51.52 | 49.02 | 52.82 | 42.84 | 40.56 | 27.36 | 43.35 | 49.26 | 74.02 | 633.95 |
| 79/79 | 77.14 | 65.91 | 47.80 | 41.00 | 49.71 | 65.13 | 63.25 | 45.69 | 51.83 | 51.33 | 64.49 | 49.15 | 672.45 |
| 80/80 | 63.91 | 45.72 | 39.20 | 28.75 | 26.16 | 30.54 | 25.98 | 37.81 | 47.83 | 63.19 | 52.49 | 41.37 | 502.94 |
| 81/81 | 29.90 | 47.59 | 69.56 | 63.49 | 39.65 | 39.68 | 50.57 | 42.20 | 59.27 | 70.38 | 73.23 | 70.32 | 655.82 |
| 82/82 | 76.90 | 62.21 | 48.78 | 54.38 | 38.87 | 37.15 | 31.18 | 47.35 | 53.46 | 62.45 | 68.66 | 69.90 | 651.28 |
| 83/83 | 41.88 | 25.72 | 24.08 | 29.99 | 62.23 | 52.25 | 91.88 | 62.88 | 71.22 | 63.80 | 51.92 | 66.00 | 643.86 |
| 84/84 | 58.31 | 38.49 | 31.32 | 52.44 | 68.71 | 63.97 | 65.50 | 66.69 | 67.36 | 72.67 | 68.43 | 75.45 | 729.35 |
| 85/85 | 48.52 | 43.72 | 66.56 | 66.38 | 45.21 | 68.18 | 63.93 | 52.95 | 73.50 | 72.83 | 72.50 | 78.89 | 753.17 |
| 86/86 | 69.73 | 43.65 | 36.20 | 53.83 | 52.40 | 22.32 | 24.18 | 52.65 | 31.89 | 46.86 | 56.93 | 57.09 | 547.73 |
| 87/87 | 64.25 | 70.00 | 80.32 | 79.00 | 62.87 | 73.57 | 68.27 | 61.36 | 61.71 | 66.60 | 64.32 | 80.17 | 832.44 |
| 88/88 | 82.95 | 73.14 | 80.26 | 69.46 | 54.68 | 65.30 | 66.52 | 59.46 | 59.24 | 65.48 | 68.89 | 53.75 | 799.13 |
| 89/89 | 63.36 | 63.00 | 60.71 | 41.76 | 41.39 | 46.13 | 61.40 | 61.04 | 44.33 | 46.54 | 35.36 | 49.91 | 614.93 |
| 90/90 | 67.96 | 57.27 | 47.54 | 46.90 | 51.96 | 63.66 | 43.81 | 37.35 | 56.01 | 69.56 | 65.71 | 76.95 | 684.69 |
| 91/91 | 53.78 | 27.60 | 57.38 | 44.44 | 41.30 | 37.35 | 25.09 | 25.48 | 37.33 | 74.97 | 70.55 | 76.79 | 572.07 |
| 92/92 | 74.79 | 72.96 | 66.88 | 77.10 | 73.97 | 45.20 | 33.51 | 40.07 | 49.63 | 56.32 | 73.96 | 84.33 | 748.72 |
| 93/93 | 85.65 | 74.91 | 82.12 | 65.98 | 30.99 | 29.39 | 36.53 | 53.52 | 52.60 | 54.21 | 76.72 | 85.70 | 728.32 |
| 94/94 | 80.22 | 72.62 | 74.95 | 48.70 | 30.69 | 32.45 | 39.25 | 45.03 | 47.95 | 59.90 | 76.70 | 81.68 | 690.14 |
| 95/95 | 75.92 | 48.28 | 41.04 | 30.75 | 23.99 | 30.55 | 49.23 | 27.39 | 31.35 | 46.90 | 53.75 | 72.80 | 531.96 |
| 96/96 | 65.90 | 58.37 | 65.61 | 62.04 | 58.29 | 86.91 | 69.52 | 85.03 | 77.62 | 59.06 | 65.69 | 74.16 | 828.19 |
| 97/97 | 68.41 | 53.27 | 66.76 | 60.77 | 58.15 | 44.91 | 37.84 | 33.95 | 47.19 | 54.37 | 80.74 | 86.75 | 693.10 |
| 98/98 | 75.83 | 64.48 | 67.24 | 67.49 | 46.47 | 30.76 | 38.48 | 48.41 | 50.52 | 60.55 | 76.67 | 82.87 | 709.78 |
| 99/99 | 68.36 | 72.80 | 64.40 | 65.57 | 65.89 | 48.88 | 39.28 | 34.11 | 56.73 | 58.97 | 42.49 | 68.92 | 686.40 |
| 00/00 | 69.26 | 70.66 | 76.00 | 52.37 | 65.37 | 55.65 | 58.83 | 51.22 | 47.39 | 52.03 | 76.35 | 75.09 | 750.22 |
| 01/01 | 70.12 | 63.88 | 63.90 | 63.20 | 45.28 | 62.23 | 45.19 | 37.58 | 36.38 | 66.22 | 65.04 | 85.17 | 704.20 |
| AVG | 65.48 | 56.54 | 58.42 | 54.63 | 50.14 | 52.98 | 52.95 | 51.06 | 51.62 | 59.92 | 64.29 | 70.18 | 688.20 |
| STD | 12.68 | 13.81 | 15.44 | 13.10 | 12.59 | 17.35 | 19.21 | 16.38 | 12.12 | 9.28 | 11.24 | 12.83 | 81.55 |
| MIN | 29.90 | 25.72 | 24.08 | 28.75 | 23.99 | 22.32 | 24.18 | 25.15 | 27.36 | 43.35 | 35.36 | 41.37 | 502.94 |
| MAX | 85.65 | 74.91 | 82.12 | 79.00 | 73.97 | 88.92 | 91.88 | 86.72 | 77.62 | 77.00 | 80.74 | 86.75 | 832.44 |

ESOLIN -->  X:\014942~1\ENGINE~1\PROSPER\PCN_MTH.res  --> 2002/11/13   (10:26:12)

PEACE CASCADE - MONTHLY SIMULATION 1972-2001

SEVEN PROJECT DEVELOPMENT

MAXIMUM CAPACITY OF THE POWERPLANT # 2006, SEVEN_F (MW)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | AVG 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 |
| 73/73 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 |
| 74/74 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 |
| 75/75 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 |
| 76/76 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.35 | 123.50 | 123.50 | 123.50 | 123.50 | 123.49 |
| 77/77 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 |
| 78/78 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 |
| 79/79 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 |
| 80/80 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 |
| 81/81 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 |
| 82/82 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 |
| 83/83 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 |
| 84/84 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 |
| 85/85 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 |
| 86/86 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 |
| 87/87 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 |
| 88/88 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 |
| 89/89 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 |
| 90/90 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 |
| 91/91 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 |
| 92/92 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 |
| 93/93 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 |
| 94/94 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 |
| 95/95 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 |
| 96/96 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 120.70 | 93.45 | 114.28 | 123.50 | 123.50 | 123.50 | 123.50 | 119.93 |
| 97/97 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.34 | 123.49 |
| 98/98 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 |
| 99/99 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 |
| 00/00 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 |
| 01/01 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 |
| AVG | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.41 | 122.50 | 123.19 | 123.50 | 123.50 | 123.50 | 123.49 | 123.38 |
| STD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.51 | 5.49 | 1.68 | 0.00 | 0.00 | 0.00 | 0.03 | 0.65 |
| MIN | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 120.70 | 93.45 | 114.28 | 123.50 | 123.50 | 123.50 | 123.34 | 119.93 |
| MAX | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 | 123.50 |

ESOLIN -->  X:\014942~1\ENGINE~1\PROSPER\PCN_MTH.res  --> 2002/11/13   (10:26:12)

PEACE CASCADE - MONTHLY SIMULATION 1972-2001

SEVEN PROJECT DEVELOPMENT

ENERGY PRODUCTION OF THE POWERPLANT # 2007, SEVEN_G (MU)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | SUM 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 41.96 | 39.01 | 40.93 | 40.84 | 42.58 | 82.76 | 85.52 | 67.74 | 47.07 | 48.55 | 53.55 | 59.25 | 649.76 |
| 73/73 | 62.41 | 58.54 | 62.92 | 56.06 | 57.43 | 68.01 | 64.82 | 58.72 | 51.27 | 54.25 | 52.56 | 44.41 | 691.39 |
| 74/74 | 53.54 | 47.79 | 53.14 | 49.59 | 56.38 | 62.93 | 66.70 | 72.75 | 54.29 | 62.30 | 65.30 | 66.22 | 710.93 |
| 75/75 | 63.98 | 62.26 | 64.30 | 65.52 | 55.24 | 51.79 | 35.45 | 26.48 | 41.70 | 46.02 | 50.95 | 51.92 | 615.63 |
| 76/76 | 54.00 | 49.13 | 59.89 | 49.75 | 55.45 | 65.94 | 71.38 | 81.01 | 58.94 | 72.51 | 70.08 | 72.40 | 760.49 |
| 77/77 | 64.82 | 41.94 | 37.99 | 47.38 | 48.38 | 58.72 | 74.11 | 58.12 | 44.16 | 59.29 | 66.59 | 74.29 | 675.80 |
| 78/78 | 70.11 | 63.32 | 58.66 | 49.63 | 48.47 | 52.31 | 42.80 | 40.37 | 28.25 | 42.49 | 47.45 | 69.79 | 613.66 |
| 79/79 | 72.51 | 62.16 | 46.07 | 40.37 | 49.11 | 63.30 | 61.05 | 44.63 | 49.89 | 49.48 | 61.27 | 47.35 | 647.18 |
| 80/80 | 60.73 | 43.91 | 38.77 | 29.35 | 27.54 | 32.72 | 27.90 | 37.99 | 46.51 | 60.59 | 50.54 | 40.80 | 497.35 |
| 81/81 | 30.59 | 45.72 | 65.84 | 60.54 | 41.66 | 41.01 | 49.03 | 41.44 | 56.48 | 66.52 | 68.93 | 66.49 | 634.24 |
| 82/82 | 72.27 | 58.87 | 46.93 | 52.07 | 39.25 | 38.57 | 33.36 | 46.58 | 51.50 | 59.65 | 65.18 | 66.25 | 630.48 |
| 83/83 | 41.16 | 26.36 | 25.03 | 30.74 | 60.27 | 51.54 | 85.52 | 62.31 | 67.24 | 60.79 | 49.87 | 62.66 | 623.50 |
| 84/84 | 55.71 | 37.69 | 31.82 | 50.34 | 65.92 | 62.81 | 62.97 | 63.39 | 63.94 | 68.97 | 64.88 | 71.09 | 699.53 |
| 85/85 | 46.76 | 42.12 | 63.15 | 62.99 | 44.84 | 65.69 | 61.13 | 50.87 | 69.27 | 68.91 | 68.32 | 74.04 | 718.10 |
| 86/86 | 65.97 | 42.04 | 36.21 | 51.60 | 51.06 | 25.26 | 25.95 | 50.82 | 32.28 | 45.40 | 54.47 | 54.67 | 535.73 |
| 87/87 | 61.10 | 65.77 | 75.25 | 74.18 | 61.37 | 70.56 | 65.53 | 60.59 | 59.07 | 63.27 | 61.15 | 75.23 | 793.08 |
| 88/88 | 77.55 | 68.47 | 75.20 | 65.77 | 53.70 | 63.43 | 63.48 | 56.85 | 56.50 | 62.21 | 65.08 | 51.53 | 759.78 |
| 89/89 | 60.25 | 59.57 | 57.85 | 40.86 | 41.89 | 45.67 | 59.25 | 58.63 | 43.29 | 45.12 | 35.51 | 48.18 | 596.07 |
| 90/90 | 64.47 | 54.49 | 45.86 | 45.45 | 51.44 | 63.45 | 43.33 | 37.31 | 53.54 | 65.79 | 62.24 | 72.32 | 659.69 |
| 91/91 | 51.57 | 28.11 | 54.89 | 43.17 | 41.84 | 38.58 | 26.58 | 26.42 | 37.07 | 70.67 | 66.64 | 72.25 | 557.78 |
| 92/92 | 70.46 | 68.35 | 63.67 | 72.74 | 70.55 | 44.80 | 34.15 | 39.61 | 47.64 | 54.07 | 69.62 | 78.72 | 714.39 |
| 93/93 | 79.81 | 69.99 | 76.79 | 62.50 | 32.46 | 30.68 | 37.50 | 52.19 | 50.88 | 52.13 | 72.01 | 79.88 | 696.82 |
| 94/94 | 75.19 | 68.05 | 70.60 | 47.41 | 33.29 | 34.71 | 39.61 | 43.91 | 46.21 | 57.23 | 72.03 | 76.48 | 664.71 |
| 95/95 | 71.43 | 46.30 | 40.39 | 31.26 | 26.80 | 32.50 | 49.17 | 28.48 | 31.84 | 45.30 | 51.49 | 68.69 | 523.65 |
| 96/96 | 62.55 | 55.46 | 62.29 | 59.41 | 57.09 | 79.30 | 63.40 | 83.04 | 79.34 | 56.62 | 62.30 | 69.89 | 790.68 |
| 97/97 | 64.78 | 50.85 | 63.32 | 58.43 | 58.27 | 45.83 | 38.80 | 34.49 | 45.58 | 52.57 | 75.76 | 80.80 | 669.47 |
| 98/98 | 71.36 | 60.91 | 63.77 | 64.00 | 46.66 | 32.18 | 38.45 | 46.67 | 48.48 | 57.71 | 71.92 | 77.48 | 679.61 |
| 99/99 | 64.74 | 68.19 | 61.21 | 62.29 | 63.45 | 48.53 | 39.53 | 34.47 | 54.18 | 56.27 | 41.37 | 65.20 | 659.42 |
| 00/00 | 65.50 | 66.32 | 71.48 | 50.22 | 62.19 | 54.51 | 57.24 | 49.57 | 46.38 | 50.27 | 71.83 | 70.78 | 716.28 |
| 01/01 | 66.32 | 60.37 | 60.75 | 60.04 | 44.43 | 61.35 | 45.55 | 38.14 | 36.33 | 62.88 | 61.69 | 79.45 | 677.31 |
| AVG | 62.12 | 53.74 | 55.83 | 52.48 | 49.63 | 52.31 | 51.64 | 49.79 | 49.97 | 57.26 | 61.02 | 66.28 | 662.08 |
| STD | 11.27 | 12.32 | 13.77 | 11.72 | 11.14 | 15.17 | 16.86 | 14.92 | 11.32 | 8.36 | 10.03 | 11.41 | 72.88 |
| MIN | 30.59 | 26.36 | 25.03 | 29.35 | 26.80 | 25.26 | 25.95 | 26.42 | 28.25 | 42.49 | 35.51 | 40.80 | 497.35 |
| MAX | 79.81 | 69.99 | 76.79 | 74.18 | 70.55 | 82.76 | 85.52 | 83.04 | 79.34 | 72.51 | 75.76 | 80.80 | 793.08 |

ESOLIN --> X:\014942~1\ENGINE~1\PROSPER\PCN_MTH.res --> 2002/11/13 (10:26:12)
PEACE CASCADE - MONTHLY SIMULATION 1972-2001
SEVEN PROJECT DEVELOPMENT

MAXIMUM CAPACITY OF THE POWERPLANT # 2007, SEVEN_G (MW)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | AVG 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 |
| 73/73 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 |
| 74/74 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 |
| 75/75 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 |
| 76/76 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.62 | 114.95 | 114.95 | 114.95 | 114.95 | 114.92 |
| 77/77 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 |
| 78/78 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 |
| 79/79 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 |
| 80/80 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 |
| 81/81 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 |
| 82/82 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 |
| 83/83 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 |
| 84/84 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 |
| 85/85 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 |
| 86/86 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 |
| 87/87 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 |
| 88/88 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 |
| 89/89 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 |
| 90/90 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 |
| 91/91 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 |
| 92/92 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 |
| 93/93 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 |
| 94/94 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 |
| 95/95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 |
| 96/96 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 110.14 | 85.21 | 111.61 | 114.95 | 114.95 | 114.95 | 114.95 | 111.74 |
| 97/97 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.73 | 114.93 |
| 98/98 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 |
| 99/99 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 |
| 00/00 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 |
| 01/01 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 |
| AVG | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.79 | 113.96 | 114.83 | 114.95 | 114.95 | 114.95 | 114.94 | 114.84 |
| STD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.88 | 5.43 | 0.61 | 0.00 | 0.00 | 0.00 | 0.04 | 0.58 |
| MIN | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 110.14 | 85.21 | 111.61 | 114.95 | 114.95 | 114.95 | 114.73 | 111.74 |
| MAX | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 | 114.95 |

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PEACE CASCADE - MONTHLY SIMULATION 1972-2001

SEVEN PROJECT DEVELOPMENT

TURBINE DISCHARGE OF THE POWERPLANT # 2001, SEVEN_A (m3/s)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | AVG 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 836.99 | 870.00 | 811.99 | 811.00 | 657.99 | 1798.70 | 1855.71 | 1363.00 | 933.00 | 954.99 | 1145.00 | 1251.98 | 1108.77 |
| 73/73 | 1338.98 | 1404.00 | 1352.98 | 1193.00 | 1017.99 | 1151.00 | 1134.99 | 1128.00 | 1036.00 | 1090.99 | 1120.00 | 892.99 | 1153.36 |
| 74/74 | 1116.99 | 1104.00 | 1107.99 | 1030.00 | 991.99 | 1010.00 | 1184.98 | 1500.00 | 1112.00 | 1292.98 | 1456.99 | 1432.98 | 1196.29 |
| 75/75 | 1379.98 | 1514.00 | 1388.98 | 1446.99 | 963.99 | 719.00 | 413.99 | 367.00 | 798.00 | 895.99 | 1080.00 | 1071.99 | 999.04 |
| 76/76 | 1127.99 | 1140.00 | 1274.98 | 1034.00 | 968.99 | 1093.00 | 1311.98 | 1750.00 | 1233.00 | 1566.98 | 1591.99 | 1600.98 | 1309.97 |
| 77/77 | 1401.98 | 951.00 | 740.99 | 976.00 | 799.99 | 897.00 | 1387.98 | 1113.00 | 863.00 | 1215.98 | 1492.99 | 1653.98 | 1126.65 |
| 78/78 | 1543.98 | 1546.00 | 1243.98 | 1031.00 | 801.99 | 732.00 | 590.99 | 681.00 | 474.00 | 806.99 | 994.00 | 1528.98 | 995.49 |
| 79/79 | 1609.98 | 1511.00 | 940.99 | 799.00 | 816.99 | 1020.00 | 1036.99 | 788.00 | 1002.00 | 976.99 | 1346.99 | 963.99 | 1064.38 |
| 80/80 | 1296.98 | 1003.00 | 760.99 | 539.00 | 330.00 | 248.00 | 246.00 | 624.00 | 912.00 | 1240.98 | 1067.00 | 799.99 | 754.33 |
| 81/81 | 569.99 | 1048.00 | 1428.98 | 1308.99 | 604.99 | 442.00 | 754.99 | 715.00 | 1173.00 | 1407.98 | 1560.99 | 1440.98 | 1037.00 |
| 82/82 | 1603.98 | 1414.00 | 961.99 | 1096.00 | 588.99 | 388.00 | 351.00 | 823.00 | 1039.00 | 1223.98 | 1447.99 | 1430.98 | 1028.01 |
| 83/83 | 815.99 | 543.00 | 453.99 | 565.00 | 1093.99 | 719.00 | 1822.08 | 1093.31 | 1460.99 | 1254.98 | 1054.00 | 1339.98 | 1022.68 |
| 84/84 | 1174.98 | 835.00 | 600.99 | 1072.00 | 1267.98 | 850.00 | 1198.98 | 1318.00 | 1358.99 | 1448.98 | 1439.99 | 1561.98 | 1180.10 |
| 85/85 | 954.99 | 957.00 | 1361.98 | 1390.99 | 824.99 | 1246.00 | 1147.99 | 1012.00 | 1447.99 | 1455.98 | 1547.99 | 1646.98 | 1250.24 |
| 86/86 | 1429.98 | 954.00 | 701.99 | 1097.00 | 907.99 | 284.00 | 200.00 | 942.00 | 590.00 | 858.99 | 1158.00 | 1132.99 | 854.72 |
| 87/87 | 1301.98 | 1619.00 | 1690.98 | 1691.99 | 1099.99 | 1301.99 | 1143.99 | 852.00 | 1197.00 | 1310.98 | 1337.99 | 1678.98 | 1349.72 |
| 88/88 | 1754.98 | 1706.00 | 1687.98 | 1430.99 | 855.99 | 1112.00 | 1228.98 | 1144.00 | 1211.00 | 1309.98 | 1453.99 | 1060.99 | 1326.95 |
| 89/89 | 1284.98 | 1437.00 | 1226.98 | 816.00 | 555.99 | 698.00 | 1063.99 | 1099.00 | 840.00 | 870.99 | 694.00 | 976.99 | 961.98 |
| 90/90 | 1389.98 | 1290.00 | 937.99 | 932.00 | 763.99 | 714.00 | 638.99 | 683.00 | 1144.00 | 1418.98 | 1386.99 | 1605.98 | 1074.07 |
| 91/91 | 1073.99 | 586.00 | 1152.99 | 890.00 | 648.99 | 506.00 | 348.00 | 459.00 | 717.00 | 1532.98 | 1499.99 | 1598.98 | 920.71 |
| 92/92 | 1554.98 | 1702.00 | 1360.98 | 1616.99 | 1408.98 | 640.00 | 552.99 | 761.00 | 1000.00 | 1088.99 | 1583.99 | 1789.98 | 1251.89 |
| 93/93 | 1831.98 | 1759.00 | 1737.98 | 1383.99 | 476.99 | 263.00 | 332.00 | 742.00 | 955.00 | 1039.99 | 1647.99 | 1820.98 | 1162.17 |
| 94/94 | 1682.98 | 1690.00 | 1552.98 | 925.00 | 395.99 | 356.00 | 480.99 | 775.00 | 924.00 | 1174.98 | 1650.99 | 1711.98 | 1106.91 |
| 95/95 | 1580.98 | 1065.00 | 798.99 | 597.00 | 333.00 | 368.00 | 605.99 | 364.00 | 545.00 | 890.99 | 1092.00 | 1492.98 | 810.83 |
| 96/96 | 1337.98 | 1312.00 | 1332.98 | 1276.00 | 989.99 | 1811.94 | 1881.00 | 1881.00 | 1622.31 | 1134.99 | 1362.99 | 1526.98 | 1456.34 |
| 97/97 | 1394.98 | 1183.00 | 1363.98 | 1245.00 | 874.99 | 536.00 | 492.99 | 549.00 | 818.00 | 957.99 | 1733.99 | 1853.98 | 1082.85 |
| 98/98 | 1577.98 | 1470.00 | 1363.98 | 1364.99 | 617.99 | 439.00 | 656.99 | 919.00 | 1018.00 | 1198.98 | 1654.99 | 1748.98 | 1167.32 |
| 99/99 | 1399.98 | 1695.00 | 1307.98 | 1346.99 | 1252.98 | 691.00 | 625.99 | 616.00 | 1164.00 | 1179.98 | 858.00 | 1415.98 | 1126.10 |
| 00/00 | 1426.98 | 1642.00 | 1586.98 | 1073.00 | 1288.98 | 813.00 | 863.99 | 909.00 | 853.00 | 991.99 | 1633.99 | 1554.98 | 1217.74 |
| 01/01 | 1436.98 | 1454.00 | 1296.98 | 1323.99 | 779.99 | 448.00 | 546.99 | 618.00 | 683.00 | 1328.98 | 1368.99 | 1812.98 | 1090.08 |
| AVG | 1341.18 | 1280.13 | 1184.48 | 1110.13 | 832.79 | 776.52 | 870.08 | 919.61 | 1004.14 | 1170.85 | 1348.83 | 1446.78 | 1106.22 |
| STD | 286.74 | 343.72 | 341.47 | 295.85 | 281.74 | 410.68 | 480.06 | 371.69 | 272.41 | 213.96 | 263.96 | 298.63 | 158.09 |
| MIN | 569.99 | 543.00 | 453.99 | 539.00 | 330.00 | 248.00 | 200.00 | 364.00 | 474.00 | 806.99 | 694.00 | 799.99 | 754.33 |
| MAX | 1831.98 | 1759.00 | 1737.98 | 1691.99 | 1408.98 | 1811.94 | 1881.00 | 1881.00 | 1622.31 | 1566.98 | 1733.99 | 1853.98 | 1456.34 |

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PEACE CASCADE - MONTHLY SIMULATION 1972-2001

SEVEN PROJECT DEVELOPMENT

TURBINE DISCHARGE OF THE POWERPLANT # 2002, SEVEN_B (m3/s)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | AVG 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 837.87 | 870.77 | 812.84 | 813.49 | 668.60 | 1881.00 | 1881.00 | 1369.69 | 937.24 | 958.02 | 1146.64 | 1253.16 | 1120.41 |
| 73/73 | 1339.86 | 1404.77 | 1353.83 | 1195.49 | 1028.60 | 1171.75 | 1149.11 | 1134.69 | 1040.24 | 1094.02 | 1121.64 | 894.17 | 1158.99 |
| 74/74 | 1117.87 | 1104.77 | 1108.84 | 1032.49 | 1002.60 | 1030.75 | 1199.10 | 1506.69 | 1116.24 | 1296.01 | 1458.63 | 1434.16 | 1201.92 |
| 75/75 | 1380.86 | 1514.77 | 1389.83 | 1449.48 | 974.60 | 739.75 | 428.11 | 373.69 | 802.24 | 899.02 | 1081.64 | 1073.17 | 1004.67 |
| 76/76 | 1128.87 | 1140.77 | 1275.83 | 1036.49 | 979.60 | 1113.75 | 1326.10 | 1756.69 | 1237.24 | 1570.01 | 1593.63 | 1602.16 | 1315.59 |
| 77/77 | 1402.86 | 951.77 | 741.84 | 978.49 | 810.60 | 917.75 | 1402.10 | 1119.69 | 867.24 | 1219.01 | 1494.63 | 1655.16 | 1132.28 |
| 78/78 | 1544.86 | 1546.77 | 1244.83 | 1033.49 | 812.60 | 752.75 | 605.11 | 687.69 | 478.24 | 810.02 | 995.64 | 1530.16 | 1001.11 |
| 79/79 | 1610.86 | 1511.77 | 941.84 | 801.49 | 827.60 | 1040.75 | 1051.11 | 794.69 | 1006.24 | 980.02 | 1348.63 | 965.17 | 1070.01 |
| 80/80 | 1297.86 | 1003.77 | 761.84 | 541.49 | 340.61 | 268.75 | 260.12 | 630.69 | 916.24 | 1244.01 | 1068.64 | 801.17 | 759.96 |
| 81/81 | 570.87 | 1048.77 | 1429.83 | 1311.48 | 615.60 | 462.75 | 769.11 | 721.69 | 1177.24 | 1411.01 | 1562.63 | 1442.16 | 1042.62 |
| 82/82 | 1604.86 | 1414.77 | 962.84 | 1098.49 | 599.60 | 408.75 | 365.12 | 829.69 | 1043.24 | 1227.01 | 1449.63 | 1432.16 | 1033.63 |
| 83/83 | 816.87 | 543.77 | 454.84 | 567.49 | 1104.60 | 739.75 | 1881.00 | 1100.00 | 1465.23 | 1258.01 | 1055.64 | 1341.16 | 1032.11 |
| 84/84 | 1175.60 | 835.68 | 601.76 | 1073.30 | 1277.02 | 878.58 | 1207.59 | 1321.20 | 1363.68 | 1453.06 | 1441.92 | 1563.29 | 1185.50 |
| 85/85 | 955.94 | 957.70 | 1362.68 | 1392.77 | 830.13 | 1258.76 | 1156.77 | 1014.93 | 1455.69 | 1459.62 | 1549.33 | 1648.15 | 1254.21 |
| 86/86 | 1430.98 | 954.75 | 702.70 | 1098.61 | 916.35 | 294.46 | 214.50 | 948.37 | 593.04 | 863.16 | 1160.17 | 1134.44 | 859.31 |
| 87/87 | 1303.03 | 1619.86 | 1691.68 | 1694.65 | 1111.48 | 1318.83 | 1158.71 | 874.89 | 1203.21 | 1314.38 | 1339.93 | 1680.25 | 1356.77 |
| 88/88 | 1755.79 | 1706.74 | 1688.75 | 1434.61 | 870.12 | 1128.33 | 1236.75 | 1147.58 | 1213.14 | 1312.06 | 1455.50 | 1062.25 | 1331.53 |
| 89/89 | 1285.79 | 1437.62 | 1227.66 | 818.25 | 570.83 | 712.31 | 1074.58 | 1107.06 | 844.25 | 874.19 | 695.66 | 978.49 | 967.24 |
| 90/90 | 1391.00 | 1290.66 | 938.74 | 934.34 | 780.00 | 750.26 | 651.49 | 685.94 | 1145.69 | 1420.30 | 1387.95 | 1606.80 | 1080.51 |
| 91/91 | 1074.65 | 586.75 | 1153.70 | 891.58 | 659.12 | 520.85 | 355.76 | 461.05 | 719.42 | 1535.17 | 1501.37 | 1600.06 | 924.52 |
| 92/92 | 1555.79 | 1702.75 | 1362.40 | 1621.26 | 1417.21 | 656.16 | 558.78 | 762.78 | 1001.59 | 1091.91 | 1585.38 | 1790.80 | 1255.72 |
| 93/93 | 1832.54 | 1759.51 | 1738.54 | 1385.46 | 484.68 | 280.54 | 352.72 | 760.01 | 962.81 | 1043.02 | 1649.64 | 1822.21 | 1168.94 |
| 94/94 | 1683.98 | 1690.88 | 1554.07 | 930.20 | 408.65 | 373.61 | 496.77 | 781.44 | 927.65 | 1177.48 | 1652.52 | 1713.38 | 1112.75 |
| 95/95 | 1581.81 | 1065.74 | 799.82 | 598.51 | 341.75 | 382.39 | 627.21 | 372.99 | 549.78 | 893.42 | 1093.73 | 1494.48 | 816.52 |
| 96/96 | 1339.09 | 1312.93 | 1334.00 | 1278.72 | 1001.56 | 1881.00 | 1881.00 | 1881.00 | 1626.57 | 1138.72 | 1365.23 | 1528.41 | 1464.45 |
| 97/97 | 1396.16 | 1183.94 | 1364.79 | 1247.96 | 893.79 | 558.59 | 507.20 | 555.37 | 826.20 | 965.65 | 1736.91 | 1855.12 | 1090.19 |
| 98/98 | 1578.87 | 1470.96 | 1365.38 | 1369.46 | 635.68 | 449.48 | 662.58 | 921.65 | 1019.71 | 1200.88 | 1656.16 | 1749.98 | 1171.50 |
| 99/99 | 1400.85 | 1695.85 | 1308.86 | 1350.02 | 1259.51 | 709.12 | 634.43 | 619.01 | 1165.51 | 1181.03 | 858.81 | 1416.66 | 1129.91 |
| 00/00 | 1427.50 | 1642.56 | 1587.59 | 1074.09 | 1292.07 | 832.48 | 882.05 | 915.54 | 860.41 | 995.20 | 1636.07 | 1556.22 | 1223.08 |
| 01/01 | 1438.10 | 1454.96 | 1297.83 | 1325.15 | 786.84 | 494.71 | 566.94 | 625.18 | 686.21 | 1330.97 | 1370.11 | 1813.89 | 1097.74 |
| AVG | 1342.06 | 1280.90 | 1185.33 | 1112.63 | 843.40 | 800.29 | 884.76 | 926.05 | 1008.38 | 1173.88 | 1350.47 | 1447.96 | 1112.12 |
| STD | 286.73 | 343.72 | 341.47 | 296.05 | 280.76 | 420.39 | 482.63 | 370.96 | 272.49 | 213.67 | 264.03 | 298.58 | 158.23 |
| MIN | 570.87 | 543.77 | 454.84 | 541.49 | 340.61 | 268.75 | 214.50 | 372.99 | 478.24 | 810.02 | 695.66 | 801.17 | 759.96 |
| MAX | 1832.54 | 1759.51 | 1738.54 | 1694.65 | 1417.21 | 1881.00 | 1881.00 | 1881.00 | 1626.57 | 1570.01 | 1736.91 | 1855.12 | 1464.45 |

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PEACE CASCADE - MONTHLY SIMULATION 1972-2001

SEVEN PROJECT DEVELOPMENT

TURBINE DISCHARGE OF THE POWERPLANT # 2003, SEVEN_C (m3/s)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | AVG 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 838.75 | 871.54 | 813.69 | 815.98 | 679.21 | 1785.18 | 1818.85 | 1376.38 | 941.48 | 961.05 | 1148.28 | 1254.34 | 1109.97 |
| 73/73 | 1340.74 | 1405.54 | 1354.68 | 1197.98 | 1039.21 | 1192.50 | 1163.23 | 1141.38 | 1044.48 | 1097.05 | 1123.28 | 895.35 | 1164.61 |
| 74/74 | 1118.75 | 1105.54 | 1109.69 | 1034.98 | 1013.21 | 1051.50 | 1213.22 | 1513.38 | 1120.48 | 1299.04 | 1460.27 | 1435.34 | 1207.54 |
| 75/75 | 1381.74 | 1515.54 | 1390.68 | 1451.97 | 985.21 | 760.50 | 442.23 | 380.38 | 806.48 | 902.05 | 1083.28 | 1074.35 | 1010.30 |
| 76/76 | 1129.75 | 1141.54 | 1276.68 | 1038.98 | 990.21 | 1134.50 | 1340.22 | 1763.38 | 1241.48 | 1573.04 | 1595.27 | 1603.34 | 1321.22 |
| 77/77 | 1403.74 | 952.54 | 742.69 | 980.98 | 821.21 | 938.50 | 1416.22 | 1126.38 | 871.48 | 1222.04 | 1496.27 | 1656.34 | 1137.90 |
| 78/78 | 1545.74 | 1547.54 | 1245.68 | 1035.98 | 823.21 | 773.50 | 619.23 | 694.38 | 482.48 | 813.05 | 997.28 | 1531.34 | 1006.74 |
| 79/79 | 1611.74 | 1512.54 | 942.69 | 803.98 | 838.21 | 1061.50 | 1065.23 | 801.38 | 1010.48 | 983.05 | 1350.27 | 966.35 | 1075.63 |
| 80/80 | 1298.74 | 1004.54 | 762.69 | 543.98 | 351.22 | 289.50 | 274.24 | 637.38 | 920.48 | 1247.04 | 1070.28 | 802.35 | 765.58 |
| 81/81 | 571.75 | 1049.54 | 1430.68 | 1313.97 | 626.21 | 483.50 | 783.23 | 728.38 | 1181.48 | 1414.04 | 1564.27 | 1443.34 | 1048.25 |
| 82/82 | 1605.74 | 1415.54 | 963.69 | 1100.98 | 610.21 | 429.50 | 379.24 | 836.38 | 1047.48 | 1230.04 | 1451.27 | 1433.34 | 1039.26 |
| 83/83 | 817.75 | 544.54 | 455.69 | 569.98 | 1115.21 | 760.50 | 1796.79 | 1106.78 | 1469.47 | 1261.04 | 1057.28 | 1342.34 | 1029.39 |
| 84/84 | 1176.22 | 836.36 | 602.53 | 1074.60 | 1286.06 | 907.16 | 1216.20 | 1324.40 | 1368.37 | 1457.14 | 1443.85 | 1564.60 | 1190.90 |
| 85/85 | 956.89 | 958.40 | 1363.38 | 1394.55 | 835.27 | 1271.52 | 1165.55 | 1017.86 | 1463.39 | 1463.26 | 1550.67 | 1649.32 | 1258.18 |
| 86/86 | 1431.98 | 955.50 | 703.41 | 1100.22 | 924.71 | 304.92 | 229.00 | 954.74 | 596.08 | 867.33 | 1162.34 | 1135.89 | 863.89 |
| 87/87 | 1304.08 | 1620.72 | 1692.38 | 1697.31 | 1122.97 | 1335.67 | 1173.43 | 897.78 | 1209.42 | 1317.78 | 1341.87 | 1681.52 | 1363.83 |
| 88/88 | 1756.60 | 1707.48 | 1689.52 | 1438.23 | 884.25 | 1144.66 | 1244.52 | 1151.16 | 1215.28 | 1314.14 | 1457.01 | 1063.51 | 1336.11 |
| 89/89 | 1286.60 | 1438.24 | 1228.34 | 820.50 | 585.67 | 726.62 | 1085.17 | 1115.12 | 848.50 | 877.39 | 697.32 | 979.99 | 972.51 |
| 90/90 | 1392.02 | 1291.32 | 939.49 | 936.68 | 796.01 | 786.52 | 663.99 | 688.88 | 1147.38 | 1421.62 | 1388.91 | 1607.62 | 1086.96 |
| 91/91 | 1075.31 | 587.50 | 1154.41 | 893.16 | 669.25 | 535.70 | 363.52 | 463.10 | 721.84 | 1537.36 | 1502.75 | 1601.14 | 928.33 |
| 92/92 | 1556.60 | 1703.50 | 1363.82 | 1625.53 | 1425.44 | 672.32 | 564.57 | 764.56 | 1003.18 | 1094.83 | 1586.77 | 1791.62 | 1259.55 |
| 93/93 | 1833.10 | 1760.02 | 1739.10 | 1386.93 | 492.37 | 298.08 | 373.44 | 778.02 | 970.62 | 1046.05 | 1651.29 | 1823.44 | 1175.72 |
| 94/94 | 1684.98 | 1691.76 | 1555.16 | 935.40 | 421.31 | 391.22 | 512.55 | 787.88 | 931.30 | 1179.98 | 1654.05 | 1714.78 | 1118.59 |
| 95/95 | 1582.64 | 1066.48 | 800.65 | 600.02 | 350.50 | 396.78 | 648.43 | 381.98 | 554.56 | 895.85 | 1095.46 | 1495.98 | 822.20 |
| 96/96 | 1340.20 | 1313.86 | 1335.02 | 1281.44 | 1013.13 | 1800.98 | 1881.00 | 1881.00 | 1630.92 | 1142.45 | 1367.47 | 1529.84 | 1460.31 |
| 97/97 | 1397.34 | 1184.88 | 1365.60 | 1250.92 | 912.59 | 581.18 | 521.41 | 561.74 | 834.40 | 973.31 | 1739.83 | 1856.26 | 1097.54 |
| 98/98 | 1579.76 | 1471.92 | 1366.78 | 1373.93 | 653.37 | 459.96 | 668.17 | 924.30 | 1021.42 | 1202.78 | 1657.33 | 1750.98 | 1175.68 |
| 99/99 | 1401.72 | 1696.70 | 1309.74 | 1353.05 | 1266.04 | 727.24 | 642.87 | 622.02 | 1167.02 | 1182.08 | 859.62 | 1417.34 | 1133.73 |
| 00/00 | 1428.02 | 1643.12 | 1588.20 | 1075.18 | 1295.16 | 851.96 | 900.11 | 922.08 | 867.82 | 998.41 | 1638.15 | 1557.46 | 1228.42 |
| 01/01 | 1439.22 | 1455.92 | 1298.68 | 1326.31 | 793.69 | 541.42 | 586.89 | 632.36 | 689.42 | 1332.96 | 1371.23 | 1814.80 | 1105.41 |
| AVG | 1342.94 | 1281.67 | 1186.18 | 1115.12 | 854.01 | 813.15 | 891.76 | 932.50 | 1012.62 | 1176.91 | 1352.11 | 1449.14 | 1116.47 |
| STD | 286.72 | 343.72 | 341.48 | 296.26 | 279.81 | 401.82 | 469.23 | 370.29 | 272.59 | 213.38 | 264.10 | 298.53 | 157.66 |
| MIN | 571.75 | 544.54 | 455.69 | 543.98 | 350.50 | 289.50 | 229.00 | 380.38 | 482.48 | 813.05 | 697.32 | 802.35 | 765.58 |
| MAX | 1833.10 | 1760.02 | 1739.10 | 1697.31 | 1425.44 | 1800.98 | 1881.00 | 1881.00 | 1630.92 | 1573.04 | 1739.83 | 1856.26 | 1460.31 |

ESOLIN --> X:\014942~1\ENGINE~1\PROSPER\PCN_MTH.res --> 2002/11/13 (10:26:12)

PEACE CASCADE - MONTHLY SIMULATION 1972-2001

SEVEN PROJECT DEVELOPMENT

TURBINE DISCHARGE OF THE POWERPLANT # 2004, SEVEN_D (m3/s)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | AVG 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 839.63 | 872.31 | 814.54 | 818.47 | 689.82 | 1792.66 | 1838.61 | 1383.07 | 945.72 | 964.08 | 1149.92 | 1255.52 | 1114.99 |
| 73/73 | 1341.62 | 1406.31 | 1355.53 | 1200.47 | 1049.82 | 1213.25 | 1177.35 | 1148.07 | 1048.72 | 1100.08 | 1124.92 | 896.53 | 1170.24 |
| 74/74 | 1119.63 | 1106.31 | 1110.54 | 1037.47 | 1023.82 | 1072.25 | 1227.34 | 1520.07 | 1124.72 | 1302.07 | 1461.91 | 1436.52 | 1213.17 |
| 75/75 | 1382.62 | 1516.31 | 1391.53 | 1454.46 | 995.82 | 781.25 | 456.35 | 387.07 | 810.72 | 905.08 | 1084.92 | 1075.53 | 1015.92 |
| 76/76 | 1130.63 | 1142.31 | 1277.53 | 1041.47 | 1000.82 | 1155.25 | 1354.34 | 1770.07 | 1245.72 | 1576.07 | 1596.91 | 1604.52 | 1326.85 |
| 77/77 | 1404.62 | 953.31 | 743.54 | 983.47 | 831.82 | 959.25 | 1430.34 | 1133.07 | 875.72 | 1225.07 | 1497.91 | 1657.52 | 1143.53 |
| 78/78 | 1546.62 | 1548.31 | 1246.53 | 1038.47 | 833.82 | 794.25 | 633.35 | 701.07 | 486.72 | 816.08 | 998.92 | 1532.52 | 1012.36 |
| 79/79 | 1612.62 | 1513.31 | 943.54 | 806.47 | 848.82 | 1082.25 | 1079.35 | 808.07 | 1014.72 | 986.08 | 1351.91 | 967.53 | 1081.26 |
| 80/80 | 1299.62 | 1005.31 | 763.54 | 546.47 | 361.83 | 310.25 | 288.36 | 644.07 | 924.72 | 1250.07 | 1071.92 | 803.53 | 771.21 |
| 81/81 | 572.63 | 1050.31 | 1431.53 | 1316.46 | 636.82 | 504.25 | 797.35 | 735.07 | 1185.72 | 1417.07 | 1565.91 | 1444.52 | 1053.87 |
| 82/82 | 1606.62 | 1416.31 | 964.54 | 1103.47 | 620.82 | 450.25 | 393.36 | 843.07 | 1051.72 | 1233.07 | 1452.91 | 1434.52 | 1044.88 |
| 83/83 | 818.63 | 545.31 | 456.54 | 572.47 | 1125.82 | 781.25 | 1807.13 | 1113.65 | 1473.71 | 1264.07 | 1058.92 | 1343.52 | 1034.71 |
| 84/84 | 1176.84 | 837.04 | 603.30 | 1075.90 | 1295.10 | 935.74 | 1224.81 | 1327.60 | 1373.06 | 1461.22 | 1445.78 | 1565.91 | 1196.30 |
| 85/85 | 957.84 | 959.10 | 1364.08 | 1396.33 | 840.41 | 1284.28 | 1174.33 | 1020.79 | 1471.09 | 1466.90 | 1552.01 | 1650.49 | 1262.15 |
| 86/86 | 1432.98 | 956.25 | 704.12 | 1101.83 | 933.07 | 315.38 | 243.50 | 961.11 | 599.12 | 871.50 | 1164.51 | 1137.34 | 868.47 |
| 87/87 | 1305.13 | 1621.58 | 1693.08 | 1699.97 | 1134.46 | 1352.51 | 1188.15 | 920.67 | 1215.63 | 1321.18 | 1343.81 | 1682.79 | 1370.88 |
| 88/88 | 1757.41 | 1708.22 | 1690.29 | 1441.85 | 898.38 | 1160.99 | 1252.29 | 1154.74 | 1217.42 | 1316.22 | 1458.52 | 1064.77 | 1340.69 |
| 89/89 | 1287.41 | 1438.86 | 1229.02 | 822.75 | 600.51 | 740.93 | 1095.76 | 1123.18 | 852.75 | 880.59 | 698.98 | 981.49 | 977.77 |
| 90/90 | 1393.04 | 1291.98 | 940.24 | 939.02 | 812.02 | 822.78 | 676.49 | 691.82 | 1149.07 | 1422.94 | 1389.87 | 1608.44 | 1093.40 |
| 91/91 | 1075.97 | 588.25 | 1155.12 | 894.74 | 679.38 | 550.55 | 371.28 | 465.15 | 724.26 | 1539.55 | 1504.13 | 1602.22 | 932.14 |
| 92/92 | 1557.41 | 1704.25 | 1365.24 | 1629.80 | 1433.67 | 688.48 | 570.36 | 766.34 | 1004.77 | 1097.75 | 1588.16 | 1792.44 | 1263.38 |
| 93/93 | 1833.66 | 1760.53 | 1739.66 | 1388.40 | 500.06 | 315.62 | 394.16 | 796.03 | 978.43 | 1049.08 | 1652.94 | 1824.67 | 1182.50 |
| 94/94 | 1685.98 | 1692.64 | 1556.25 | 940.60 | 433.97 | 408.83 | 528.33 | 794.32 | 934.95 | 1182.48 | 1655.58 | 1716.18 | 1124.43 |
| 95/95 | 1583.47 | 1067.22 | 801.48 | 601.53 | 359.25 | 411.17 | 669.65 | 390.97 | 559.34 | 898.28 | 1097.19 | 1497.48 | 827.88 |
| 96/96 | 1341.31 | 1314.79 | 1336.04 | 1284.16 | 1024.70 | 1820.86 | 1881.00 | 1881.00 | 1635.37 | 1146.18 | 1369.71 | 1531.27 | 1464.39 |
| 97/97 | 1398.52 | 1185.82 | 1366.41 | 1253.88 | 931.39 | 603.77 | 535.62 | 568.11 | 842.60 | 980.97 | 1742.75 | 1857.40 | 1104.89 |
| 98/98 | 1580.65 | 1472.88 | 1368.18 | 1378.40 | 671.06 | 470.44 | 673.76 | 926.95 | 1023.13 | 1204.68 | 1658.50 | 1751.98 | 1179.86 |
| 99/99 | 1402.59 | 1697.55 | 1310.62 | 1356.08 | 1272.57 | 745.36 | 651.31 | 625.03 | 1168.53 | 1183.13 | 860.43 | 1418.02 | 1137.55 |
| 00/00 | 1428.54 | 1643.68 | 1588.81 | 1076.27 | 1298.25 | 871.44 | 918.17 | 928.62 | 875.23 | 1001.62 | 1640.23 | 1558.70 | 1233.76 |
| 01/01 | 1440.34 | 1456.88 | 1299.53 | 1327.47 | 800.54 | 588.13 | 606.84 | 639.54 | 692.63 | 1334.95 | 1372.35 | 1815.71 | 1113.07 |
| AVG | 1343.82 | 1282.44 | 1187.03 | 1117.62 | 864.62 | 832.79 | 904.63 | 938.95 | 1016.87 | 1179.94 | 1353.75 | 1450.32 | 1121.88 |
| STD | 286.71 | 343.72 | 341.49 | 296.47 | 278.89 | 400.98 | 468.06 | 369.67 | 272.71 | 213.10 | 264.17 | 298.47 | 157.57 |
| MIN | 572.63 | 545.31 | 456.54 | 546.47 | 359.25 | 310.25 | 243.50 | 387.07 | 486.72 | 816.08 | 698.98 | 803.53 | 771.21 |
| MAX | 1833.66 | 1760.53 | 1739.66 | 1699.97 | 1433.67 | 1820.86 | 1881.00 | 1881.00 | 1635.37 | 1576.07 | 1742.75 | 1857.40 | 1464.39 |

ESOLIN --> X:\014942~1\ENGINE~1\PROSPER\PCN_MTH.res --> 2002/11/13 (10:26:12)

PEACE CASCADE - MONTHLY SIMULATION 1972-2001

SEVEN PROJECT DEVELOPMENT

TURBINE DISCHARGE OF THE POWERPLANT # 2005, SEVEN_E (m3/s)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | AVG 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 851.83 | 883.11 | 826.14 | 851.37 | 827.62 | 1955.57 | 1973.18 | 1479.57 | 1007.62 | 1007.28 | 1172.22 | 1271.82 | 1177.23 |
| 73/73 | 1353.82 | 1417.11 | 1367.13 | 1233.37 | 1187.62 | 1501.55 | 1381.55 | 1244.57 | 1110.62 | 1143.28 | 1147.22 | 912.83 | 1248.70 |
| 74/74 | 1131.83 | 1117.11 | 1122.14 | 1070.37 | 1161.61 | 1360.55 | 1431.54 | 1616.57 | 1186.62 | 1345.27 | 1484.21 | 1452.82 | 1291.63 |
| 75/75 | 1394.82 | 1527.11 | 1403.13 | 1487.36 | 1133.62 | 1069.55 | 660.55 | 483.57 | 872.62 | 948.28 | 1107.22 | 1091.83 | 1094.39 |
| 76/76 | 1142.83 | 1153.11 | 1289.13 | 1074.37 | 1138.62 | 1443.55 | 1558.54 | 1866.57 | 1307.62 | 1619.27 | 1619.21 | 1620.82 | 1405.31 |
| 77/77 | 1416.82 | 964.11 | 755.14 | 1016.37 | 969.62 | 1247.55 | 1634.54 | 1229.57 | 937.62 | 1268.27 | 1520.21 | 1673.82 | 1222.00 |
| 78/78 | 1558.82 | 1559.11 | 1258.13 | 1071.37 | 971.62 | 1082.55 | 837.55 | 797.57 | 548.62 | 859.28 | 1021.22 | 1548.82 | 1090.83 |
| 79/79 | 1624.82 | 1524.11 | 955.14 | 839.37 | 986.62 | 1370.55 | 1283.55 | 904.57 | 1076.62 | 1029.28 | 1374.21 | 983.83 | 1159.72 |
| 80/80 | 1311.82 | 1016.11 | 775.14 | 579.37 | 499.62 | 598.55 | 492.55 | 740.57 | 986.62 | 1293.27 | 1094.22 | 819.83 | 849.67 |
| 81/81 | 584.83 | 1061.11 | 1443.13 | 1349.36 | 774.62 | 792.55 | 1001.55 | 831.57 | 1247.62 | 1460.27 | 1588.21 | 1460.82 | 1132.34 |
| 82/82 | 1618.82 | 1427.11 | 976.14 | 1136.37 | 758.62 | 738.55 | 597.55 | 939.57 | 1113.62 | 1276.27 | 1475.21 | 1450.82 | 1123.35 |
| 83/83 | 830.83 | 556.11 | 468.14 | 605.37 | 1263.62 | 1069.55 | 1946.84 | 1210.49 | 1535.61 | 1307.27 | 1081.22 | 1359.82 | 1107.73 |
| 84/84 | 1185.14 | 846.34 | 613.70 | 1093.40 | 1415.10 | 1334.73 | 1340.81 | 1373.70 | 1440.56 | 1513.62 | 1469.38 | 1583.31 | 1270.21 |
| 85/85 | 970.44 | 968.40 | 1373.18 | 1419.53 | 896.21 | 1452.28 | 1304.33 | 1064.69 | 1589.09 | 1518.00 | 1570.41 | 1667.19 | 1316.90 |
| 86/86 | 1446.98 | 966.55 | 713.52 | 1124.53 | 1047.07 | 438.38 | 456.50 | 1054.51 | 644.62 | 931.90 | 1195.01 | 1157.24 | 932.00 |
| 87/87 | 1319.53 | 1633.58 | 1702.88 | 1733.57 | 1277.46 | 1581.51 | 1399.15 | 1231.67 | 1303.23 | 1371.48 | 1369.71 | 1698.79 | 1466.88 |
| 88/88 | 1768.41 | 1719.12 | 1701.49 | 1492.75 | 1091.38 | 1378.99 | 1365.29 | 1207.84 | 1249.12 | 1346.82 | 1480.92 | 1083.77 | 1404.67 |
| 89/89 | 1299.31 | 1447.96 | 1239.02 | 855.85 | 806.51 | 938.93 | 1244.76 | 1239.18 | 909.55 | 926.09 | 719.48 | 999.99 | 1051.12 |
| 90/90 | 1405.44 | 1300.58 | 949.74 | 968.02 | 1030.02 | 1319.77 | 859.49 | 734.82 | 1174.37 | 1442.84 | 1404.17 | 1620.04 | 1182.79 |
| 91/91 | 1085.07 | 598.35 | 1164.42 | 914.64 | 809.38 | 748.55 | 481.27 | 494.75 | 760.56 | 1570.85 | 1521.93 | 1616.12 | 983.57 |
| 92/92 | 1567.81 | 1714.35 | 1379.94 | 1683.30 | 1540.67 | 916.48 | 653.36 | 792.34 | 1029.57 | 1138.75 | 1606.76 | 1804.04 | 1315.81 |
| 93/93 | 1841.96 | 1768.23 | 1747.96 | 1410.30 | 600.06 | 577.62 | 700.15 | 1062.03 | 1090.43 | 1092.18 | 1676.34 | 1842.67 | 1281.23 |
| 94/94 | 1700.28 | 1704.94 | 1571.35 | 1005.20 | 588.97 | 641.83 | 761.33 | 891.02 | 989.95 | 1218.98 | 1675.88 | 1736.18 | 1204.48 |
| 95/95 | 1595.17 | 1077.82 | 813.28 | 622.33 | 458.34 | 605.17 | 965.65 | 525.97 | 631.64 | 934.48 | 1122.59 | 1519.48 | 906.34 |
| 96/96 | 1357.61 | 1328.19 | 1350.84 | 1314.46 | 1173.69 | 1995.00 | 1995.00 | 1995.00 | 1696.67 | 1198.68 | 1402.51 | 1552.07 | 1530.84 |
| 97/97 | 1415.82 | 1199.62 | 1377.81 | 1284.18 | 1163.39 | 903.77 | 733.62 | 661.71 | 968.60 | 1090.97 | 1778.25 | 1873.10 | 1203.95 |
| 98/98 | 1592.85 | 1486.38 | 1388.48 | 1443.80 | 910.06 | 613.44 | 755.56 | 966.55 | 1049.53 | 1234.18 | 1675.60 | 1766.28 | 1238.69 |
| 99/99 | 1415.09 | 1709.65 | 1323.12 | 1398.78 | 1351.97 | 996.36 | 769.31 | 668.23 | 1191.03 | 1199.43 | 873.03 | 1428.42 | 1190.32 |
| 00/00 | 1436.44 | 1651.78 | 1597.31 | 1091.87 | 1343.25 | 1148.44 | 1179.17 | 1023.32 | 973.73 | 1044.22 | 1666.53 | 1574.60 | 1309.08 |
| 01/01 | 1456.14 | 1470.68 | 1311.63 | 1343.87 | 895.94 | 1275.12 | 880.84 | 735.34 | 739.53 | 1364.15 | 1387.95 | 1828.01 | 1222.48 |
| AVG | 1356.05 | 1293.26 | 1198.61 | 1150.49 | 1002.43 | 1103.23 | 1088.17 | 1035.58 | 1078.77 | 1223.16 | 1376.03 | 1466.64 | 1197.14 |
| STD | 286.66 | 343.85 | 341.66 | 299.43 | 271.40 | 400.79 | 452.29 | 375.65 | 275.60 | 209.48 | 264.94 | 297.83 | 157.86 |
| MIN | 584.83 | 556.11 | 468.14 | 579.37 | 458.34 | 438.38 | 456.50 | 483.57 | 548.62 | 859.28 | 719.48 | 819.83 | 849.67 |
| MAX | 1841.96 | 1768.23 | 1747.96 | 1733.57 | 1540.67 | 1995.00 | 1995.00 | 1995.00 | 1696.67 | 1619.27 | 1778.25 | 1873.10 | 1530.84 |

ESOLIN --> X:\014942~1\ENGINE~1\PROSPER\PCN_MTH.res --> 2002/11/13 (10:26:12)
PEACE CASCADE - MONTHLY SIMULATION 1972-2001
SEVEN PROJECT DEVELOPMENT

TURBINE DISCHARGE OF THE POWERPLANT # 2006, SEVEN_F (m3/s)

| | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | AVG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YEAR | 31.0 | 28.0 | 31.0 | 30.0 | 31.0 | 30.0 | 31.0 | 31.0 | 30.0 | 31.0 | 30.0 | 31.0 | 365.0 |
| 72/72 | 852.71 | 883.88 | 826.99 | 853.86 | 838.23 | 1966.76 | 1977.98 | 1486.26 | 1011.86 | 1010.31 | 1173.86 | 1273.00 | 1181.28 |
| 73/73 | 1354.70 | 1417.88 | 1367.98 | 1235.86 | 1198.23 | 1522.30 | 1395.67 | 1251.26 | 1114.86 | 1146.31 | 1148.86 | 914.01 | 1254.33 |
| 74/74 | 1132.71 | 1117.88 | 1122.99 | 1072.86 | 1172.22 | 1381.30 | 1445.66 | 1623.26 | 1190.86 | 1348.30 | 1485.85 | 1454.00 | 1297.26 |
| 75/75 | 1395.70 | 1527.88 | 1403.98 | 1489.85 | 1144.23 | 1090.30 | 674.67 | 490.26 | 876.86 | 951.31 | 1108.86 | 1093.01 | 1100.01 |
| 76/76 | 1143.71 | 1153.88 | 1289.98 | 1076.86 | 1149.23 | 1464.30 | 1572.66 | 1873.26 | 1311.86 | 1622.30 | 1620.85 | 1622.00 | 1410.94 |
| 77/77 | 1417.70 | 964.88 | 755.99 | 1018.86 | 980.23 | 1268.30 | 1648.66 | 1236.26 | 941.86 | 1271.30 | 1521.85 | 1675.00 | 1227.62 |
| 78/78 | 1559.70 | 1559.88 | 1258.98 | 1073.86 | 982.23 | 1103.30 | 851.67 | 804.26 | 552.86 | 862.31 | 1022.86 | 1550.00 | 1096.46 |
| 79/79 | 1625.70 | 1524.88 | 955.99 | 841.86 | 997.23 | 1391.30 | 1297.67 | 911.26 | 1080.86 | 1032.31 | 1375.85 | 985.01 | 1165.35 |
| 80/80 | 1312.70 | 1016.88 | 775.99 | 581.86 | 510.23 | 619.30 | 506.67 | 747.26 | 990.86 | 1296.30 | 1095.86 | 821.01 | 855.30 |
| 81/81 | 585.71 | 1061.88 | 1443.98 | 1351.85 | 785.23 | 813.30 | 1015.67 | 838.26 | 1251.86 | 1463.30 | 1589.85 | 1462.00 | 1137.96 |
| 82/82 | 1619.70 | 1427.88 | 976.99 | 1138.86 | 769.23 | 759.30 | 611.67 | 946.26 | 1117.86 | 1279.30 | 1476.85 | 1452.00 | 1128.98 |
| 83/83 | 831.71 | 556.88 | 468.99 | 607.86 | 1274.23 | 1090.30 | 1959.50 | 1217.40 | 1539.85 | 1310.30 | 1082.86 | 1361.00 | 1113.25 |
| 84/84 | 1185.76 | 847.02 | 614.47 | 1094.70 | 1424.14 | 1363.31 | 1349.42 | 1376.90 | 1445.25 | 1517.70 | 1471.31 | 1584.62 | 1275.61 |
| 85/85 | 971.39 | 969.10 | 1373.88 | 1421.31 | 901.35 | 1465.04 | 1313.11 | 1067.62 | 1596.79 | 1521.64 | 1571.75 | 1668.36 | 1320.87 |
| 86/86 | 1447.98 | 967.30 | 714.23 | 1126.14 | 1055.43 | 448.84 | 471.00 | 1060.88 | 647.66 | 936.07 | 1197.18 | 1158.69 | 936.58 |
| 87/87 | 1320.58 | 1634.44 | 1703.58 | 1736.23 | 1288.95 | 1598.35 | 1413.87 | 1254.56 | 1309.44 | 1374.88 | 1371.65 | 1700.06 | 1473.93 |
| 88/88 | 1769.22 | 1719.86 | 1702.26 | 1496.37 | 1105.51 | 1395.32 | 1373.06 | 1211.42 | 1251.26 | 1348.90 | 1482.43 | 1085.03 | 1409.25 |
| 89/89 | 1300.12 | 1448.58 | 1239.70 | 858.10 | 821.35 | 953.24 | 1255.35 | 1247.24 | 913.80 | 929.29 | 721.14 | 1001.49 | 1056.38 |
| 90/90 | 1406.46 | 1301.24 | 950.49 | 970.36 | 1046.03 | 1356.03 | 871.99 | 737.76 | 1176.06 | 1444.16 | 1405.13 | 1620.86 | 1189.24 |
| 91/91 | 1085.73 | 599.10 | 1165.13 | 916.22 | 819.51 | 763.40 | 489.03 | 496.80 | 762.98 | 1573.04 | 1523.31 | 1617.20 | 987.37 |
| 92/92 | 1568.62 | 1715.10 | 1381.36 | 1687.57 | 1548.90 | 932.64 | 659.15 | 794.12 | 1031.16 | 1141.67 | 1608.15 | 1804.86 | 1319.64 |
| 93/93 | 1842.52 | 1768.74 | 1748.52 | 1411.77 | 607.75 | 595.16 | 720.87 | 1080.04 | 1098.24 | 1095.21 | 1677.99 | 1843.90 | 1288.01 |
| 94/94 | 1701.28 | 1705.82 | 1572.44 | 1010.40 | 601.63 | 659.44 | 777.11 | 897.46 | 993.60 | 1221.48 | 1677.41 | 1737.58 | 1210.32 |
| 95/95 | 1596.00 | 1078.56 | 814.11 | 623.84 | 467.09 | 619.56 | 986.87 | 534.96 | 636.42 | 936.91 | 1124.32 | 1520.98 | 912.02 |
| 96/96 | 1358.72 | 1329.12 | 1351.86 | 1317.18 | 1185.26 | 1995.00 | 1995.00 | 1995.00 | 1700.93 | 1202.41 | 1404.75 | 1553.50 | 1533.28 |
| 97/97 | 1417.00 | 1200.56 | 1378.62 | 1287.14 | 1182.19 | 926.36 | 747.83 | 668.08 | 976.80 | 1098.63 | 1781.17 | 1874.24 | 1211.30 |
| 98/98 | 1593.74 | 1487.34 | 1389.88 | 1448.27 | 927.75 | 623.92 | 761.15 | 969.20 | 1051.24 | 1236.08 | 1676.77 | 1767.28 | 1242.87 |
| 99/99 | 1415.96 | 1710.50 | 1324.00 | 1401.81 | 1358.50 | 1014.48 | 777.75 | 671.24 | 1192.54 | 1200.48 | 873.84 | 1429.10 | 1194.14 |
| 00/00 | 1436.96 | 1652.34 | 1597.92 | 1092.96 | 1346.34 | 1167.92 | 1197.23 | 1029.86 | 981.14 | 1047.43 | 1668.61 | 1575.84 | 1314.42 |
| 01/01 | 1457.26 | 1471.64 | 1312.48 | 1345.03 | 902.79 | 1321.83 | 900.79 | 742.52 | 742.74 | 1366.14 | 1389.07 | 1828.92 | 1230.15 |
| AVG | 1356.92 | 1294.03 | 1199.46 | 1152.99 | 1013.04 | 1122.33 | 1100.62 | 1042.03 | 1083.01 | 1226.19 | 1377.67 | 1467.82 | 1202.47 |
| STD | 286.65 | 343.85 | 341.66 | 299.68 | 271.06 | 400.80 | 450.82 | 375.76 | 275.88 | 209.28 | 265.02 | 297.77 | 157.75 |
| MIN | 585.71 | 556.88 | 468.99 | 581.86 | 467.09 | 448.84 | 471.00 | 490.26 | 552.86 | 862.31 | 721.14 | 821.01 | 855.30 |
| MAX | 1842.52 | 1768.74 | 1748.52 | 1736.23 | 1548.90 | 1995.00 | 1995.00 | 1995.00 | 1700.93 | 1622.30 | 1781.17 | 1874.24 | 1533.28 |

ESOLIN -->  X:\014942~1\ENGINE~1\PROSPER\PCN_MTH.res  --> 2002/11/13   (10:26:12)

PEACE CASCADE - MONTHLY SIMULATION 1972-2001

SEVEN PROJECT DEVELOPMENT

TURBINE DISCHARGE OF THE POWERPLANT # 2007, SEVEN_G (m3/s)

| | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | AVG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YEAR | 31.0 | 28.0 | 31.0 | 30.0 | 31.0 | 30.0 | 31.0 | 31.0 | 30.0 | 31.0 | 30.0 | 31.0 | 365.0 |
| 72/72 | 854.57 | 885.36 | 828.87 | 860.50 | 869.88 | 1957.63 | 1969.90 | 1497.29 | 1017.96 | 1015.74 | 1178.16 | 1275.69 | 1185.99 |
| 73/73 | 1356.56 | 1419.36 | 1369.86 | 1242.50 | 1229.88 | 1566.01 | 1419.43 | 1262.29 | 1120.96 | 1151.74 | 1153.16 | 916.70 | 1266.08 |
| 74/74 | 1134.57 | 1119.36 | 1124.87 | 1079.50 | 1203.87 | 1425.01 | 1469.42 | 1634.29 | 1196.96 | 1353.73 | 1490.15 | 1456.69 | 1309.02 |
| 75/75 | 1397.56 | 1529.36 | 1405.86 | 1496.49 | 1175.88 | 1134.01 | 698.43 | 501.29 | 882.96 | 956.74 | 1113.16 | 1095.70 | 1111.77 |
| 76/76 | 1145.57 | 1155.36 | 1291.86 | 1083.50 | 1180.88 | 1508.01 | 1596.42 | 1884.29 | 1317.96 | 1627.73 | 1625.15 | 1624.69 | 1422.69 |
| 77/77 | 1419.56 | 966.36 | 757.87 | 1025.50 | 1011.88 | 1312.01 | 1672.42 | 1247.29 | 947.96 | 1276.73 | 1526.15 | 1677.69 | 1239.38 |
| 78/78 | 1561.56 | 1561.36 | 1260.86 | 1080.50 | 1013.88 | 1147.01 | 875.43 | 815.29 | 558.96 | 867.74 | 1027.16 | 1552.69 | 1108.21 |
| 79/79 | 1627.56 | 1526.36 | 957.87 | 848.50 | 1028.88 | 1435.01 | 1321.43 | 922.29 | 1086.96 | 1037.74 | 1380.15 | 987.70 | 1177.11 |
| 80/80 | 1313.30 | 1017.36 | 776.49 | 583.65 | 523.53 | 661.00 | 531.17 | 757.86 | 1004.36 | 1309.80 | 1103.03 | 825.84 | 866.37 |
| 81/81 | 589.34 | 1064.59 | 1446.59 | 1360.31 | 847.03 | 864.80 | 1027.07 | 841.64 | 1253.27 | 1464.70 | 1592.12 | 1463.71 | 1150.70 |
| 82/82 | 1620.92 | 1428.86 | 977.85 | 1141.10 | 788.03 | 802.80 | 650.87 | 969.86 | 1126.83 | 1285.79 | 1486.95 | 1457.30 | 1142.49 |
| 83/83 | 834.68 | 558.80 | 470.61 | 615.30 | 1301.73 | 1127.80 | 1949.74 | 1232.47 | 1544.34 | 1314.77 | 1086.35 | 1363.07 | 1121.48 |
| 84/84 | 1187.41 | 848.57 | 616.41 | 1097.96 | 1448.74 | 1421.61 | 1371.12 | 1382.06 | 1452.80 | 1530.50 | 1478.61 | 1588.25 | 1288.08 |
| 85/85 | 974.01 | 971.08 | 1375.92 | 1426.63 | 927.75 | 1501.14 | 1323.61 | 1070.66 | 1601.99 | 1528.75 | 1574.76 | 1670.43 | 1329.67 |
| 86/86 | 1450.01 | 968.99 | 716.10 | 1129.23 | 1075.13 | 493.14 | 490.00 | 1069.44 | 650.78 | 942.33 | 1201.41 | 1161.91 | 946.36 |
| 87/87 | 1322.95 | 1636.27 | 1704.93 | 1745.12 | 1329.75 | 1638.75 | 1438.37 | 1309.86 | 1321.14 | 1378.94 | 1376.76 | 1704.41 | 1490.78 |
| 88/88 | 1771.12 | 1720.77 | 1703.35 | 1503.46 | 1138.51 | 1438.62 | 1384.36 | 1215.57 | 1253.87 | 1351.54 | 1484.16 | 1086.22 | 1418.51 |
| 89/89 | 1301.11 | 1449.40 | 1240.56 | 860.94 | 852.75 | 984.14 | 1275.75 | 1260.14 | 925.00 | 934.93 | 727.27 | 1007.06 | 1067.24 |
| 90/90 | 1410.37 | 1303.11 | 953.04 | 978.82 | 1084.23 | 1439.23 | 888.99 | 741.79 | 1177.83 | 1445.31 | 1406.16 | 1622.30 | 1202.95 |
| 91/91 | 1087.21 | 600.98 | 1167.17 | 921.63 | 851.51 | 803.00 | 503.23 | 499.92 | 765.38 | 1576.84 | 1527.51 | 1620.54 | 996.85 |
| 92/92 | 1571.13 | 1717.06 | 1389.44 | 1702.37 | 1573.60 | 963.24 | 668.82 | 796.64 | 1031.77 | 1147.34 | 1611.81 | 1806.36 | 1328.51 |
| 93/93 | 1843.22 | 1769.21 | 1749.13 | 1413.31 | 630.75 | 613.86 | 746.37 | 1102.14 | 1111.24 | 1100.62 | 1680.91 | 1845.52 | 1297.72 |
| 94/94 | 1702.99 | 1707.58 | 1574.85 | 1026.10 | 649.23 | 708.14 | 796.61 | 903.78 | 997.04 | 1225.04 | 1681.63 | 1739.99 | 1223.47 |
| 95/95 | 1597.63 | 1079.85 | 815.60 | 627.25 | 507.99 | 655.86 | 1030.37 | 543.72 | 640.64 | 939.60 | 1126.55 | 1522.91 | 924.48 |
| 96/96 | 1360.19 | 1330.56 | 1353.41 | 1330.38 | 1221.36 | 1995.00 | 1995.00 | 1995.00 | 1707.92 | 1209.66 | 1407.84 | 1555.63 | 1539.42 |
| 97/97 | 1418.50 | 1201.88 | 1380.24 | 1304.24 | 1250.98 | 987.86 | 777.13 | 676.47 | 981.96 | 1111.23 | 1792.37 | 1876.85 | 1229.80 |
| 98/98 | 1595.82 | 1489.26 | 1391.94 | 1454.44 | 971.75 | 648.52 | 768.81 | 971.99 | 1052.19 | 1237.05 | 1678.39 | 1768.93 | 1250.96 |
| 99/99 | 1417.43 | 1711.92 | 1325.54 | 1407.55 | 1383.50 | 1053.38 | 794.75 | 676.12 | 1194.15 | 1201.02 | 874.25 | 1429.51 | 1202.40 |
| 00/00 | 1437.44 | 1653.15 | 1599.21 | 1094.87 | 1350.85 | 1202.52 | 1225.22 | 1039.73 | 1001.24 | 1056.25 | 1675.64 | 1579.85 | 1324.55 |
| 01/01 | 1459.35 | 1473.20 | 1313.95 | 1347.15 | 916.99 | 1382.13 | 945.99 | 761.52 | 747.18 | 1368.80 | 1391.43 | 1831.12 | 1243.33 |
| AVG | 1358.79 | 1295.51 | 1201.34 | 1159.63 | 1044.69 | 1162.37 | 1120.21 | 1052.76 | 1089.12 | 1231.62 | 1381.97 | 1470.51 | 1213.55 |
| STD | 286.33 | 343.71 | 341.74 | 300.88 | 269.99 | 397.21 | 445.22 | 376.75 | 276.01 | 209.11 | 265.38 | 297.40 | 157.65 |
| MIN | 589.34 | 558.80 | 470.61 | 583.65 | 507.99 | 493.14 | 490.00 | 499.92 | 558.96 | 867.74 | 727.27 | 825.84 | 866.37 |
| MAX | 1843.22 | 1769.21 | 1749.13 | 1745.12 | 1573.60 | 1995.00 | 1995.00 | 1995.00 | 1707.92 | 1627.73 | 1792.37 | 1876.85 | 1539.42 |

ESOLIN --> X:\014942~1\ENGINE~1\PROSPER\PCN_MTH.res --> 2002/11/13 (10:26:12)
PEACE CASCADE - MONTHLY SIMULATION 1972-2001
SEVEN PROJECT DEVELOPMENT

OUTFLOW DISCHARGE FROM THE SPILLWAY # 3001, SEVEN_A_SPILLWAY (m3/s)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | AVG 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 156.97 | 272.57 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 36.05 |
| 73/73 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 74/74 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 75/75 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 76/76 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 77/77 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 78/78 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 79/79 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 80/80 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 81/81 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 82/82 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 83/83 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 202.58 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 17.21 |
| 84/84 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 85/85 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 86/86 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 87/87 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 88/88 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 89/89 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 90/90 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 91/91 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 92/92 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 93/93 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 94/94 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 95/95 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 96/96 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 180.73 | 2915.25 | 673.69 | 0.00 | 0.00 | 0.00 | 0.00 | 319.67 |
| 97/97 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 98/98 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 99/99 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 00/00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 01/01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| AVG | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 11.26 | 113.01 | 22.46 | 0.00 | 0.00 | 0.00 | 0.00 | 12.43 |
| STD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 42.95 | 532.75 | 123.00 | 0.00 | 0.00 | 0.00 | 0.00 | 58.47 |
| MIN | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| MAX | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 180.73 | 2915.25 | 673.69 | 0.00 | 0.00 | 0.00 | 0.00 | 319.67 |

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PEACE CASCADE - MONTHLY SIMULATION 1972-2001
SEVEN PROJECT DEVELOPMENT

OUTFLOW DISCHARGE FROM THE SPILLWAY # 3002, SEVEN_B_SPILLWAY (m3/s)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | AVG 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 95.42 | 261.40 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 30.04 |
| 73/73 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 74/74 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 75/75 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 76/76 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 77/77 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 78/78 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 79/79 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 80/80 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 81/81 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 82/82 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 83/83 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 157.78 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 13.40 |
| 84/84 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 85/85 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 86/86 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 87/87 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 88/88 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 89/89 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 90/90 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 91/91 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 92/92 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 93/93 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 94/94 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 95/95 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 96/96 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 151.75 | 2954.38 | 681.21 | 0.00 | 0.00 | 0.00 | 0.00 | 321.25 |
| 97/97 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 98/98 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 99/99 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 00/00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 01/01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| AVG | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 8.24 | 112.45 | 22.71 | 0.00 | 0.00 | 0.00 | 0.00 | 12.16 |
| STD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 32.21 | 539.55 | 124.37 | 0.00 | 0.00 | 0.00 | 0.00 | 58.68 |
| MIN | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| MAX | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 151.75 | 2954.38 | 681.21 | 0.00 | 0.00 | 0.00 | 0.00 | 321.25 |

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PEACE CASCADE - MONTHLY SIMULATION 1972-2001
SEVEN PROJECT DEVELOPMENT

OUTFLOW DISCHARGE FROM THE SPILLWAY # 3003, SEVEN_C_SPILLWAY (m3/s)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | AVG 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 211.90 | 337.76 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 46.10 |
| 73/73 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 74/74 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 75/75 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 76/76 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 77/77 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 78/78 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 79/79 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 80/80 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 81/81 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 82/82 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 83/83 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 256.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 21.74 |
| 84/84 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 85/85 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 86/86 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 87/87 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 88/88 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 89/89 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 90/90 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 91/91 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 92/92 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 93/93 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 94/94 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 95/95 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 96/96 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 271.75 | 2993.60 | 688.64 | 0.00 | 0.00 | 0.00 | 0.00 | 335.07 |
| 97/97 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 98/98 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 99/99 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 00/00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 01/01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| AVG | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 16.12 | 119.58 | 22.95 | 0.00 | 0.00 | 0.00 | 0.00 | 13.43 |
| STD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 61.85 | 548.11 | 125.73 | 0.00 | 0.00 | 0.00 | 0.00 | 61.44 |
| MIN | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| MAX | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 271.75 | 2993.60 | 688.64 | 0.00 | 0.00 | 0.00 | 0.00 | 335.07 |

ESOLIN --> X:\014942~1\ENGINE~1\PROSPER\PCN_MTH.res --> 2002/11/13 (10:26:12)
PEACE CASCADE - MONTHLY SIMULATION 1972-2001
SEVEN PROJECT DEVELOPMENT

OUTFLOW DISCHARGE FROM THE SPILLWAY # 3004, SEVEN_D_SPILLWAY (m3/s)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | AVG 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 224.98 | 332.31 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 46.71 |
| 73/73 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 74/74 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 75/75 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 76/76 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 77/77 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 78/78 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 79/79 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 80/80 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 81/81 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 82/82 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 83/83 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 259.62 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 22.05 |
| 84/84 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 85/85 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 86/86 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 87/87 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 88/88 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 89/89 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 90/90 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 91/91 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 92/92 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 93/93 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 94/94 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 95/95 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 96/96 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 291.77 | 3032.91 | 695.98 | 0.00 | 0.00 | 0.00 | 0.00 | 340.68 |
| 97/97 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 98/98 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 99/99 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 00/00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 01/01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| AVG | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 17.22 | 120.83 | 23.20 | 0.00 | 0.00 | 0.00 | 0.00 | 13.65 |
| STD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 66.14 | 555.18 | 127.07 | 0.00 | 0.00 | 0.00 | 0.00 | 62.46 |
| MIN | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| MAX | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 291.77 | 3032.91 | 695.98 | 0.00 | 0.00 | 0.00 | 0.00 | 340.68 |

ESOLIN --> X:\014942~1\ENGINE~1\PROSPER\PCN_MTH.res --> 2002/11/13 (10:26:12)
PEACE CASCADE - MONTHLY SIMULATION 1972-2001
SEVEN PROJECT DEVELOPMENT

OUTFLOW DISCHARGE FROM THE SPILLWAY # 3005, SEVEN_E_SPILLWAY (m3/s)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | AVG 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 350.01 | 402.28 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 62.93 |
| 73/73 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 74/74 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 75/75 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 76/76 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 77/77 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 78/78 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 79/79 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 80/80 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 81/81 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 82/82 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 83/83 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 323.76 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 27.50 |
| 84/84 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 85/85 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 86/86 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 87/87 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 88/88 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 89/89 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 90/90 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 91/91 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 92/92 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 93/93 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 94/94 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 95/95 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 96/96 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 701.27 | 3518.24 | 692.98 | 0.00 | 0.00 | 0.00 | 0.00 | 415.30 |
| 97/97 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 98/98 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 99/99 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 00/00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 01/01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| AVG | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 35.04 | 141.48 | 23.10 | 0.00 | 0.00 | 0.00 | 0.00 | 16.86 |
| STD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 141.11 | 644.45 | 126.52 | 0.00 | 0.00 | 0.00 | 0.00 | 76.26 |
| MIN | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| MAX | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 701.27 | 3518.24 | 692.98 | 0.00 | 0.00 | 0.00 | 0.00 | 415.30 |

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PEACE CASCADE - MONTHLY SIMULATION 1972-2001

SEVEN PROJECT DEVELOPMENT

OUTFLOW DISCHARGE FROM THE SPILLWAY # 3006, SEVEN_F_SPILLWAY (m3/s)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | AVG 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 359.35 | 411.81 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 64.51 |
| 73/73 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 74/74 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 75/75 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 76/76 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 77/77 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 78/78 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 79/79 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 80/80 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 81/81 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 82/82 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 83/83 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 325.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 27.60 |
| 84/84 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 85/85 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 86/86 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 87/87 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 88/88 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 89/89 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 90/90 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 91/91 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 92/92 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 93/93 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 94/94 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 95/95 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 96/96 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 741.13 | 3557.59 | 700.50 | 0.00 | 0.00 | 0.00 | 0.00 | 422.56 |
| 97/97 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 98/98 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 99/99 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 00/00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 01/01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| AVG | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 36.68 | 143.15 | 23.35 | 0.00 | 0.00 | 0.00 | 0.00 | 17.16 |
| STD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 148.33 | 651.71 | 127.89 | 0.00 | 0.00 | 0.00 | 0.00 | 77.60 |
| MIN | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| MAX | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 741.13 | 3557.59 | 700.50 | 0.00 | 0.00 | 0.00 | 0.00 | 422.56 |

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PEACE CASCADE - MONTHLY SIMULATION 1972-2001
SEVEN PROJECT DEVELOPMENT

OUTFLOW DISCHARGE FROM THE SPILLWAY # 3007, SEVEN_G_SPILLWAY (m3/s)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | AVG 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 412.01 | 443.82 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 71.56 |
| 73/73 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 74/74 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 75/75 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 76/76 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 77/77 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 78/78 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 79/79 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 80/80 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 81/81 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 82/82 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 83/83 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 391.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 33.23 |
| 84/84 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 85/85 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 86/86 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 87/87 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 88/88 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 89/89 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 90/90 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 91/91 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 92/92 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 93/93 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 94/94 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 95/95 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 96/96 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 798.15 | 3584.76 | 709.63 | 0.00 | 0.00 | 0.00 | 0.00 | 430.33 |
| 97/97 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 98/98 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 99/99 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 00/00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 01/01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| AVG | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 40.34 | 147.33 | 23.65 | 0.00 | 0.00 | 0.00 | 0.00 | 17.84 |
| STD | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 161.67 | 657.83 | 129.56 | 0.00 | 0.00 | 0.00 | 0.00 | 79.19 |
| MIN | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| MAX | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 798.15 | 3584.76 | 709.63 | 0.00 | 0.00 | 0.00 | 0.00 | 430.33 |

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PEACE CASCADE - MONTHLY SIMULATION 1972-2001

SEVEN PROJECT DEVELOPMENT

NATURAL INFLOW DISCHARGE IN THE RESERVOIR # 1001, SEVEN_A (m3/s)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | AVG 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 836.99 | 870.00 | 811.99 | 811.00 | 657.99 | 1955.99 | 2127.97 | 1363.00 | 933.00 | 954.99 | 1145.00 | 1251.98 | 1144.83 |
| 73/73 | 1338.98 | 1404.00 | 1352.98 | 1193.00 | 1017.99 | 1151.00 | 1134.99 | 1128.00 | 1036.00 | 1090.99 | 1120.00 | 892.99 | 1153.36 |
| 74/74 | 1116.99 | 1104.00 | 1107.99 | 1030.00 | 991.99 | 1010.00 | 1184.98 | 1500.00 | 1112.00 | 1292.98 | 1456.99 | 1432.98 | 1196.29 |
| 75/75 | 1379.98 | 1514.00 | 1388.98 | 1446.99 | 963.99 | 719.00 | 413.99 | 367.00 | 798.00 | 895.99 | 1080.00 | 1071.99 | 999.04 |
| 76/76 | 1127.99 | 1140.00 | 1274.98 | 1034.00 | 968.99 | 1093.00 | 1311.98 | 1750.00 | 1233.00 | 1566.98 | 1591.99 | 1600.98 | 1309.97 |
| 77/77 | 1401.98 | 951.00 | 740.99 | 976.00 | 799.99 | 897.00 | 1387.98 | 1113.00 | 863.00 | 1215.98 | 1492.99 | 1653.98 | 1126.65 |
| 78/78 | 1543.98 | 1546.00 | 1243.98 | 1031.00 | 801.99 | 732.00 | 590.99 | 681.00 | 474.00 | 806.99 | 994.00 | 1528.98 | 995.49 |
| 79/79 | 1609.98 | 1511.00 | 940.99 | 799.00 | 816.99 | 1020.00 | 1036.99 | 788.00 | 1002.00 | 976.99 | 1346.99 | 963.99 | 1064.38 |
| 80/80 | 1296.98 | 1003.00 | 760.99 | 539.00 | 330.00 | 248.00 | 246.00 | 624.00 | 912.00 | 1240.98 | 1067.00 | 799.99 | 754.33 |
| 81/81 | 569.99 | 1048.00 | 1428.98 | 1308.99 | 604.99 | 442.00 | 754.99 | 715.00 | 1173.00 | 1407.98 | 1560.99 | 1440.98 | 1037.00 |
| 82/82 | 1603.98 | 1414.00 | 961.99 | 1096.00 | 588.99 | 388.00 | 351.00 | 823.00 | 1039.00 | 1223.98 | 1447.99 | 1430.98 | 1028.01 |
| 83/83 | 815.99 | 543.00 | 453.99 | 565.00 | 1093.99 | 719.00 | 2024.97 | 1093.00 | 1460.99 | 1254.98 | 1054.00 | 1339.98 | 1039.88 |
| 84/84 | 1174.98 | 835.00 | 600.99 | 1072.00 | 1267.98 | 850.00 | 1198.98 | 1318.00 | 1358.99 | 1448.98 | 1439.99 | 1561.98 | 1180.10 |
| 85/85 | 954.99 | 957.00 | 1361.98 | 1390.99 | 824.99 | 1246.00 | 1147.99 | 1012.00 | 1447.99 | 1455.98 | 1547.99 | 1646.98 | 1250.24 |
| 86/86 | 1429.98 | 954.00 | 701.99 | 1097.00 | 907.99 | 284.00 | 200.00 | 942.00 | 590.00 | 858.99 | 1158.00 | 1132.99 | 854.72 |
| 87/87 | 1301.98 | 1619.00 | 1690.98 | 1691.99 | 1099.99 | 1301.99 | 1143.99 | 852.00 | 1197.00 | 1310.98 | 1337.99 | 1678.98 | 1349.72 |
| 88/88 | 1754.98 | 1706.00 | 1687.98 | 1430.99 | 855.99 | 1112.00 | 1228.98 | 1144.00 | 1211.00 | 1309.98 | 1453.99 | 1060.99 | 1326.95 |
| 89/89 | 1284.98 | 1437.00 | 1226.98 | 816.00 | 555.99 | 698.00 | 1063.99 | 1099.00 | 840.00 | 870.99 | 694.00 | 976.99 | 961.98 |
| 90/90 | 1389.98 | 1290.00 | 937.99 | 932.00 | 763.99 | 714.00 | 638.99 | 683.00 | 1144.00 | 1418.98 | 1386.99 | 1605.98 | 1074.07 |
| 91/91 | 1073.99 | 586.00 | 1152.99 | 890.00 | 648.99 | 506.00 | 348.00 | 459.00 | 717.00 | 1532.98 | 1499.99 | 1598.98 | 920.71 |
| 92/92 | 1554.98 | 1702.00 | 1360.98 | 1616.99 | 1408.98 | 640.00 | 552.99 | 761.00 | 1000.00 | 1088.99 | 1583.99 | 1789.98 | 1251.89 |
| 93/93 | 1831.98 | 1759.00 | 1737.98 | 1383.99 | 476.99 | 263.00 | 332.00 | 742.00 | 955.00 | 1039.99 | 1647.99 | 1820.98 | 1162.17 |
| 94/94 | 1682.98 | 1690.00 | 1552.98 | 925.00 | 395.99 | 356.00 | 480.99 | 775.00 | 924.00 | 1174.98 | 1650.99 | 1711.98 | 1106.91 |
| 95/95 | 1580.98 | 1065.00 | 798.99 | 597.00 | 333.00 | 368.00 | 605.99 | 364.00 | 545.00 | 890.99 | 1092.00 | 1492.98 | 810.83 |
| 96/96 | 1337.98 | 1312.00 | 1332.98 | 1276.00 | 989.99 | 1992.99 | 4795.94 | 2555.00 | 1621.99 | 1134.99 | 1362.99 | 1526.98 | 1776.01 |
| 97/97 | 1394.98 | 1183.00 | 1363.98 | 1245.00 | 874.99 | 536.00 | 492.99 | 549.00 | 818.00 | 957.99 | 1733.99 | 1853.98 | 1082.85 |
| 98/98 | 1577.98 | 1470.00 | 1363.98 | 1364.99 | 617.99 | 439.00 | 656.99 | 919.00 | 1018.00 | 1198.98 | 1654.99 | 1748.98 | 1167.32 |
| 99/99 | 1399.98 | 1695.00 | 1307.98 | 1346.99 | 1252.98 | 691.00 | 625.99 | 616.00 | 1164.00 | 1179.98 | 858.00 | 1415.98 | 1126.10 |
| 00/00 | 1426.98 | 1642.00 | 1586.98 | 1073.00 | 1288.98 | 813.00 | 863.99 | 909.00 | 853.00 | 991.99 | 1633.99 | 1554.98 | 1217.74 |
| 01/01 | 1436.98 | 1454.00 | 1296.98 | 1323.99 | 779.99 | 448.00 | 546.99 | 618.00 | 683.00 | 1328.98 | 1368.99 | 1812.98 | 1090.08 |
| AVG | 1341.18 | 1280.13 | 1184.48 | 1110.13 | 832.79 | 787.80 | 983.09 | 942.07 | 1004.13 | 1170.85 | 1348.83 | 1446.78 | 1118.65 |
| STD | 286.74 | 343.72 | 341.47 | 295.85 | 281.74 | 441.05 | 865.60 | 444.95 | 272.39 | 213.96 | 263.96 | 298.63 | 189.83 |
| MIN | 569.99 | 543.00 | 453.99 | 539.00 | 330.00 | 248.00 | 200.00 | 364.00 | 474.00 | 806.99 | 694.00 | 799.99 | 754.33 |
| MAX | 1831.98 | 1759.00 | 1737.98 | 1691.99 | 1408.98 | 1992.99 | 4795.94 | 2555.00 | 1621.99 | 1566.98 | 1733.99 | 1853.98 | 1776.01 |

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PEACE CASCADE - MONTHLY SIMULATION 1972-2001
SEVEN PROJECT DEVELOPMENT

NATURAL INFLOW DISCHARGE IN THE RESERVOIR # 1002, SEVEN_B (m3/s)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | AVG 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 73/73 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 74/74 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 75/75 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 76/76 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 77/77 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 78/78 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 79/79 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 80/80 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 81/81 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 82/82 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 83/83 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 84/84 | 0.62 | 0.68 | 0.77 | 1.30 | 9.04 | 28.58 | 8.61 | 3.20 | 4.69 | 4.08 | 1.93 | 1.31 | 5.40 |
| 85/85 | 0.95 | 0.70 | 0.70 | 1.78 | 5.14 | 12.76 | 8.78 | 2.93 | 7.70 | 3.64 | 1.34 | 1.17 | 3.97 |
| 86/86 | 1.00 | 0.75 | 0.71 | 1.61 | 8.36 | 10.46 | 14.50 | 6.37 | 3.04 | 4.17 | 2.17 | 1.45 | 4.58 |
| 87/87 | 1.05 | 0.86 | 0.70 | 2.66 | 11.49 | 16.84 | 14.72 | 22.89 | 6.21 | 3.40 | 1.94 | 1.27 | 7.05 |
| 88/88 | 0.81 | 0.74 | 0.77 | 3.62 | 14.13 | 16.33 | 7.77 | 3.58 | 2.14 | 2.08 | 1.51 | 1.26 | 4.58 |
| 89/89 | 0.81 | 0.62 | 0.68 | 2.25 | 14.84 | 14.31 | 10.59 | 8.06 | 4.25 | 3.20 | 1.66 | 1.50 | 5.26 |
| 90/90 | 1.02 | 0.66 | 0.75 | 2.34 | 16.01 | 36.26 | 12.50 | 2.94 | 1.69 | 1.32 | 0.96 | 0.82 | 6.44 |
| 91/91 | 0.66 | 0.75 | 0.71 | 1.58 | 10.13 | 14.85 | 7.76 | 2.05 | 2.42 | 2.19 | 1.38 | 1.08 | 3.81 |
| 92/92 | 0.81 | 0.75 | 1.42 | 4.27 | 8.23 | 16.16 | 5.79 | 1.78 | 1.59 | 2.92 | 1.39 | 0.82 | 3.83 |
| 93/93 | 0.56 | 0.51 | 0.56 | 1.47 | 7.69 | 17.54 | 20.72 | 18.01 | 7.81 | 3.03 | 1.65 | 1.23 | 6.78 |
| 94/94 | 1.00 | 0.88 | 1.09 | 5.20 | 12.66 | 17.61 | 15.78 | 6.44 | 3.65 | 2.50 | 1.53 | 1.40 | 5.84 |
| 95/95 | 0.83 | 0.74 | 0.83 | 1.51 | 8.75 | 14.39 | 21.22 | 8.99 | 4.78 | 2.43 | 1.73 | 1.50 | 5.68 |
| 96/96 | 1.11 | 0.93 | 1.02 | 2.72 | 11.57 | 40.08 | 39.13 | 7.52 | 4.26 | 3.73 | 2.24 | 1.43 | 9.69 |
| 97/97 | 1.18 | 0.94 | 0.81 | 2.96 | 18.80 | 22.59 | 14.21 | 6.37 | 8.20 | 7.66 | 2.92 | 1.14 | 7.35 |
| 98/98 | 0.89 | 0.96 | 1.40 | 4.47 | 17.69 | 10.48 | 5.59 | 2.65 | 1.71 | 1.90 | 1.17 | 1.00 | 4.18 |
| 99/99 | 0.87 | 0.85 | 0.88 | 3.03 | 6.53 | 18.12 | 8.44 | 3.01 | 1.51 | 1.05 | 0.81 | 0.68 | 3.82 |
| 00/00 | 0.52 | 0.56 | 0.61 | 1.09 | 3.09 | 19.48 | 18.06 | 6.54 | 7.41 | 3.21 | 2.08 | 1.24 | 5.34 |
| 01/01 | 1.12 | 0.96 | 0.85 | 1.16 | 6.85 | 46.71 | 19.95 | 7.18 | 3.21 | 1.99 | 1.12 | 0.91 | 7.66 |
| AVG | 0.88 | 0.77 | 0.85 | 2.50 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| STD | 0.15 | 0.10 | 0.19 | 0.94 | 3.35 | 7.94 | 6.16 | 4.25 | 1.79 | 1.12 | 0.40 | 0.19 | 1.24 |
| MIN | 0.52 | 0.51 | 0.56 | 1.09 | 3.09 | 10.46 | 5.59 | 1.78 | 1.51 | 1.05 | 0.81 | 0.68 | 3.81 |
| MAX | 1.18 | 0.96 | 1.42 | 5.20 | 18.80 | 46.71 | 39.13 | 22.89 | 8.20 | 7.66 | 2.92 | 1.50 | 9.69 |

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PEACE CASCADE - MONTHLY SIMULATION 1972-2001
SEVEN PROJECT DEVELOPMENT

NATURAL INFLOW DISCHARGE IN THE RESERVOIR # 1003, SEVEN_C (m3/s)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | AVG 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 73/73 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 74/74 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 75/75 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 76/76 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 77/77 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 78/78 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 79/79 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 80/80 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 81/81 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 82/82 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 83/83 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 84/84 | 0.62 | 0.68 | 0.77 | 1.30 | 9.04 | 28.58 | 8.61 | 3.20 | 4.69 | 4.08 | 1.93 | 1.31 | 5.40 |
| 85/85 | 0.95 | 0.70 | 0.70 | 1.78 | 5.14 | 12.76 | 8.78 | 2.93 | 7.70 | 3.64 | 1.34 | 1.17 | 3.97 |
| 86/86 | 1.00 | 0.75 | 0.71 | 1.61 | 8.36 | 10.46 | 14.50 | 6.37 | 3.04 | 4.17 | 2.17 | 1.45 | 4.58 |
| 87/87 | 1.05 | 0.86 | 0.70 | 2.66 | 11.49 | 16.84 | 14.72 | 22.89 | 6.21 | 3.40 | 1.94 | 1.27 | 7.05 |
| 88/88 | 0.81 | 0.74 | 0.77 | 3.62 | 14.13 | 16.33 | 7.77 | 3.58 | 2.14 | 2.08 | 1.51 | 1.26 | 4.58 |
| 89/89 | 0.81 | 0.62 | 0.68 | 2.25 | 14.84 | 14.31 | 10.59 | 8.06 | 4.25 | 3.20 | 1.66 | 1.50 | 5.26 |
| 90/90 | 1.02 | 0.66 | 0.75 | 2.34 | 16.01 | 36.26 | 12.50 | 2.94 | 1.69 | 1.32 | 0.96 | 0.82 | 6.44 |
| 91/91 | 0.66 | 0.75 | 0.71 | 1.58 | 10.13 | 14.85 | 7.76 | 2.05 | 2.42 | 2.19 | 1.38 | 1.08 | 3.81 |
| 92/92 | 0.81 | 0.75 | 1.42 | 4.27 | 8.23 | 16.16 | 5.79 | 1.78 | 1.59 | 2.92 | 1.39 | 0.82 | 3.83 |
| 93/93 | 0.56 | 0.51 | 0.56 | 1.47 | 7.69 | 17.54 | 20.72 | 18.01 | 7.81 | 3.03 | 1.65 | 1.23 | 6.78 |
| 94/94 | 1.00 | 0.88 | 1.09 | 5.20 | 12.66 | 17.61 | 15.78 | 6.44 | 3.65 | 2.50 | 1.53 | 1.40 | 5.84 |
| 95/95 | 0.83 | 0.74 | 0.83 | 1.51 | 8.75 | 14.39 | 21.22 | 8.99 | 4.78 | 2.43 | 1.73 | 1.50 | 5.68 |
| 96/96 | 1.11 | 0.93 | 1.02 | 2.72 | 11.57 | 40.08 | 39.13 | 7.52 | 4.26 | 3.73 | 2.24 | 1.43 | 9.69 |
| 97/97 | 1.18 | 0.94 | 0.81 | 2.96 | 18.80 | 22.59 | 14.21 | 6.37 | 8.20 | 7.66 | 2.92 | 1.14 | 7.35 |
| 98/98 | 0.89 | 0.96 | 1.40 | 4.47 | 17.69 | 10.48 | 5.59 | 2.65 | 1.71 | 1.90 | 1.17 | 1.00 | 4.18 |
| 99/99 | 0.87 | 0.85 | 0.88 | 3.03 | 6.53 | 18.12 | 8.44 | 3.01 | 1.51 | 1.05 | 0.81 | 0.68 | 3.82 |
| 00/00 | 0.52 | 0.56 | 0.61 | 1.09 | 3.09 | 19.48 | 18.06 | 6.54 | 7.41 | 3.21 | 2.08 | 1.24 | 5.34 |
| 01/01 | 1.12 | 0.96 | 0.85 | 1.16 | 6.85 | 46.71 | 19.95 | 7.18 | 3.21 | 1.99 | 1.12 | 0.91 | 7.66 |
| AVG | 0.88 | 0.77 | 0.85 | 2.50 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| STD | 0.15 | 0.10 | 0.19 | 0.94 | 3.35 | 7.94 | 6.16 | 4.25 | 1.79 | 1.12 | 0.40 | 0.19 | 1.24 |
| MIN | 0.52 | 0.51 | 0.56 | 1.09 | 3.09 | 10.46 | 5.59 | 1.78 | 1.51 | 1.05 | 0.81 | 0.68 | 3.81 |
| MAX | 1.18 | 0.96 | 1.42 | 5.20 | 18.80 | 46.71 | 39.13 | 22.89 | 8.20 | 7.66 | 2.92 | 1.50 | 9.69 |

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PEACE CASCADE - MONTHLY SIMULATION 1972-2001

SEVEN PROJECT DEVELOPMENT

NATURAL INFLOW DISCHARGE IN THE RESERVOIR # 1004, SEVEN_D (m3/s)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | AVG 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 73/73 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 74/74 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 75/75 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 76/76 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 77/77 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 78/78 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 79/79 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 80/80 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 81/81 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 82/82 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 83/83 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 84/84 | 0.62 | 0.68 | 0.77 | 1.30 | 9.04 | 28.58 | 8.61 | 3.20 | 4.69 | 4.08 | 1.93 | 1.31 | 5.40 |
| 85/85 | 0.95 | 0.70 | 0.70 | 1.78 | 5.14 | 12.76 | 8.78 | 2.93 | 7.70 | 3.64 | 1.34 | 1.17 | 3.97 |
| 86/86 | 1.00 | 0.75 | 0.71 | 1.61 | 8.36 | 10.46 | 14.50 | 6.37 | 3.04 | 4.17 | 2.17 | 1.45 | 4.58 |
| 87/87 | 1.05 | 0.86 | 0.70 | 2.66 | 11.49 | 16.84 | 14.72 | 22.89 | 6.21 | 3.40 | 1.94 | 1.27 | 7.05 |
| 88/88 | 0.81 | 0.74 | 0.77 | 3.62 | 14.13 | 16.33 | 7.77 | 3.58 | 2.14 | 2.08 | 1.51 | 1.26 | 4.58 |
| 89/89 | 0.81 | 0.62 | 0.68 | 2.25 | 14.84 | 14.31 | 10.59 | 8.06 | 4.25 | 3.20 | 1.66 | 1.50 | 5.26 |
| 90/90 | 1.02 | 0.66 | 0.75 | 2.34 | 16.01 | 36.26 | 12.50 | 2.94 | 1.69 | 1.32 | 0.96 | 0.82 | 6.44 |
| 91/91 | 0.66 | 0.75 | 0.71 | 1.58 | 10.13 | 14.85 | 7.76 | 2.05 | 2.42 | 2.19 | 1.38 | 1.08 | 3.81 |
| 92/92 | 0.81 | 0.75 | 1.42 | 4.27 | 8.23 | 16.16 | 5.79 | 1.78 | 1.59 | 2.92 | 1.39 | 0.82 | 3.83 |
| 93/93 | 0.56 | 0.51 | 0.56 | 1.47 | 7.69 | 17.54 | 20.72 | 18.01 | 7.81 | 3.03 | 1.65 | 1.23 | 6.78 |
| 94/94 | 1.00 | 0.88 | 1.09 | 5.20 | 12.66 | 17.61 | 15.78 | 6.44 | 3.65 | 2.50 | 1.53 | 1.40 | 5.84 |
| 95/95 | 0.83 | 0.74 | 0.83 | 1.51 | 8.75 | 14.39 | 21.22 | 8.99 | 4.78 | 2.43 | 1.73 | 1.50 | 5.68 |
| 96/96 | 1.11 | 0.93 | 1.02 | 2.72 | 11.57 | 40.08 | 39.13 | 7.52 | 4.26 | 3.73 | 2.24 | 1.43 | 9.69 |
| 97/97 | 1.18 | 0.94 | 0.81 | 2.96 | 18.80 | 22.59 | 14.21 | 6.37 | 8.20 | 7.66 | 2.92 | 1.14 | 7.35 |
| 98/98 | 0.89 | 0.96 | 1.40 | 4.47 | 17.69 | 10.48 | 5.59 | 2.65 | 1.71 | 1.90 | 1.17 | 1.00 | 4.18 |
| 99/99 | 0.87 | 0.85 | 0.88 | 3.03 | 6.53 | 18.12 | 8.44 | 3.01 | 1.51 | 1.05 | 0.81 | 0.68 | 3.82 |
| 00/00 | 0.52 | 0.56 | 0.61 | 1.09 | 3.09 | 19.48 | 18.06 | 6.54 | 7.41 | 3.21 | 2.08 | 1.24 | 5.34 |
| 01/01 | 1.12 | 0.96 | 0.85 | 1.16 | 6.85 | 46.71 | 19.95 | 7.18 | 3.21 | 1.99 | 1.12 | 0.91 | 7.66 |
| AVG | 0.88 | 0.77 | 0.85 | 2.50 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| STD | 0.15 | 0.10 | 0.19 | 0.94 | 3.35 | 7.94 | 6.16 | 4.25 | 1.79 | 1.12 | 0.40 | 0.19 | 1.24 |
| MIN | 0.52 | 0.51 | 0.56 | 1.09 | 3.09 | 10.46 | 5.59 | 1.78 | 1.51 | 1.05 | 0.81 | 0.68 | 3.81 |
| MAX | 1.18 | 0.96 | 1.42 | 5.20 | 18.80 | 46.71 | 39.13 | 22.89 | 8.20 | 7.66 | 2.92 | 1.50 | 9.69 |

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PEACE CASCADE - MONTHLY SIMULATION 1972-2001

SEVEN PROJECT DEVELOPMENT

NATURAL INFLOW DISCHARGE IN THE RESERVOIR # 1005, SEVEN_E (m3/s)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | AVG 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 12.20 | 10.80 | 11.60 | 32.90 | 137.80 | 288.30 | 204.20 | 96.50 | 61.90 | 43.20 | 22.30 | 16.30 | 78.47 |
| 73/73 | 12.20 | 10.80 | 11.60 | 32.90 | 137.80 | 288.30 | 204.20 | 96.50 | 61.90 | 43.20 | 22.30 | 16.30 | 78.47 |
| 74/74 | 12.20 | 10.80 | 11.60 | 32.90 | 137.80 | 288.30 | 204.20 | 96.50 | 61.90 | 43.20 | 22.30 | 16.30 | 78.47 |
| 75/75 | 12.20 | 10.80 | 11.60 | 32.90 | 137.80 | 288.30 | 204.20 | 96.50 | 61.90 | 43.20 | 22.30 | 16.30 | 78.47 |
| 76/76 | 12.20 | 10.80 | 11.60 | 32.90 | 137.80 | 288.30 | 204.20 | 96.50 | 61.90 | 43.20 | 22.30 | 16.30 | 78.47 |
| 77/77 | 12.20 | 10.80 | 11.60 | 32.90 | 137.80 | 288.30 | 204.20 | 96.50 | 61.90 | 43.20 | 22.30 | 16.30 | 78.47 |
| 78/78 | 12.20 | 10.80 | 11.60 | 32.90 | 137.80 | 288.30 | 204.20 | 96.50 | 61.90 | 43.20 | 22.30 | 16.30 | 78.47 |
| 79/79 | 12.20 | 10.80 | 11.60 | 32.90 | 137.80 | 288.30 | 204.20 | 96.50 | 61.90 | 43.20 | 22.30 | 16.30 | 78.47 |
| 80/80 | 12.20 | 10.80 | 11.60 | 32.90 | 137.80 | 288.30 | 204.20 | 96.50 | 61.90 | 43.20 | 22.30 | 16.30 | 78.47 |
| 81/81 | 12.20 | 10.80 | 11.60 | 32.90 | 137.80 | 288.30 | 204.20 | 96.50 | 61.90 | 43.20 | 22.30 | 16.30 | 78.47 |
| 82/82 | 12.20 | 10.80 | 11.60 | 32.90 | 137.80 | 288.30 | 204.20 | 96.50 | 61.90 | 43.20 | 22.30 | 16.30 | 78.47 |
| 83/83 | 12.20 | 10.80 | 11.60 | 32.90 | 137.80 | 288.30 | 204.20 | 96.50 | 61.90 | 43.20 | 22.30 | 16.30 | 78.47 |
| 84/84 | 8.30 | 9.30 | 10.40 | 17.50 | 120.00 | 399.00 | 116.00 | 46.10 | 67.50 | 52.40 | 23.60 | 17.40 | 73.91 |
| 85/85 | 12.60 | 9.30 | 9.10 | 23.20 | 55.80 | 168.00 | 130.00 | 43.90 | 118.00 | 51.10 | 18.40 | 16.70 | 54.75 |
| 86/86 | 14.00 | 10.30 | 9.40 | 22.70 | 114.00 | 123.00 | 213.00 | 93.40 | 45.50 | 60.40 | 30.50 | 19.90 | 63.52 |
| 87/87 | 14.40 | 12.00 | 9.80 | 33.60 | 143.00 | 229.00 | 211.00 | 311.00 | 87.60 | 50.30 | 25.90 | 16.00 | 96.00 |
| 88/88 | 11.00 | 10.90 | 11.20 | 50.90 | 193.00 | 218.00 | 113.00 | 53.10 | 31.70 | 30.60 | 22.40 | 19.00 | 63.98 |
| 89/89 | 11.90 | 9.10 | 10.00 | 33.10 | 206.00 | 198.00 | 149.00 | 116.00 | 56.80 | 45.50 | 20.50 | 18.50 | 73.34 |
| 90/90 | 12.40 | 8.60 | 9.50 | 29.00 | 218.00 | 497.00 | 183.00 | 43.00 | 25.30 | 19.90 | 14.30 | 11.60 | 89.39 |
| 91/91 | 9.10 | 10.10 | 9.30 | 19.90 | 130.00 | 198.00 | 110.00 | 29.60 | 36.30 | 31.30 | 17.80 | 13.90 | 51.43 |
| 92/92 | 10.40 | 10.10 | 14.70 | 53.50 | 107.00 | 228.00 | 83.00 | 26.00 | 24.80 | 41.00 | 18.60 | 11.60 | 52.42 |
| 93/93 | 8.30 | 7.70 | 8.30 | 21.90 | 100.00 | 262.00 | 306.00 | 266.00 | 112.00 | 43.10 | 23.40 | 18.00 | 98.73 |
| 94/94 | 14.30 | 12.30 | 15.10 | 64.60 | 155.00 | 233.00 | 233.00 | 96.70 | 55.00 | 36.50 | 20.30 | 20.00 | 80.05 |
| 95/95 | 11.70 | 10.60 | 11.80 | 20.80 | 99.10 | 194.00 | 296.00 | 135.00 | 72.30 | 36.20 | 25.40 | 22.00 | 78.46 |
| 96/96 | 16.30 | 13.40 | 14.80 | 30.30 | 149.00 | 584.00 | 598.99 | 111.00 | 61.30 | 52.50 | 32.80 | 20.80 | 141.07 |
| 97/97 | 17.30 | 13.80 | 11.40 | 30.30 | 232.00 | 300.00 | 198.00 | 93.60 | 126.00 | 110.00 | 35.50 | 15.70 | 99.06 |
| 98/98 | 12.20 | 13.50 | 20.30 | 65.40 | 239.00 | 143.00 | 81.80 | 39.60 | 26.40 | 29.50 | 17.10 | 14.30 | 58.83 |
| 99/99 | 12.50 | 12.10 | 12.50 | 42.70 | 79.40 | 251.00 | 118.00 | 43.20 | 22.50 | 16.30 | 12.60 | 10.40 | 52.78 |
| 00/00 | 7.90 | 8.10 | 8.50 | 15.60 | 45.00 | 277.00 | 261.00 | 94.70 | 98.50 | 42.60 | 26.30 | 15.90 | 75.32 |
| 01/01 | 15.80 | 13.80 | 12.10 | 16.40 | 95.40 | 687.00 | 274.00 | 95.80 | 46.90 | 29.20 | 15.60 | 12.30 | 109.41 |
| AVG | 12.23 | 10.82 | 11.58 | 32.87 | 137.81 | 288.29 | 204.17 | 96.52 | 61.91 | 43.23 | 22.29 | 16.32 | 78.47 |
| STD | 2.13 | 1.53 | 2.33 | 12.29 | 45.13 | 118.59 | 93.74 | 59.43 | 25.98 | 15.64 | 4.84 | 2.63 | 18.24 |
| MIN | 7.90 | 7.70 | 8.30 | 15.60 | 45.00 | 123.00 | 81.80 | 26.00 | 22.50 | 16.30 | 12.60 | 10.40 | 51.43 |
| MAX | 17.30 | 13.80 | 20.30 | 65.40 | 239.00 | 687.00 | 598.99 | 311.00 | 126.00 | 110.00 | 35.50 | 22.00 | 141.07 |

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PEACE CASCADE - MONTHLY SIMULATION 1972-2001

SEVEN PROJECT DEVELOPMENT

NATURAL INFLOW DISCHARGE IN THE RESERVOIR # 1006, SEVEN_F (m3/s)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | AVG 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 73/73 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 74/74 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 75/75 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 76/76 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 77/77 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 78/78 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 79/79 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 80/80 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 81/81 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 82/82 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 83/83 | 0.88 | 0.77 | 0.85 | 2.49 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| 84/84 | 0.62 | 0.68 | 0.77 | 1.30 | 9.04 | 28.58 | 8.61 | 3.20 | 4.69 | 4.08 | 1.93 | 1.31 | 5.40 |
| 85/85 | 0.95 | 0.70 | 0.70 | 1.78 | 5.14 | 12.76 | 8.78 | 2.93 | 7.70 | 3.64 | 1.34 | 1.17 | 3.97 |
| 86/86 | 1.00 | 0.75 | 0.71 | 1.61 | 8.36 | 10.46 | 14.50 | 6.37 | 3.04 | 4.17 | 2.17 | 1.45 | 4.58 |
| 87/87 | 1.05 | 0.86 | 0.70 | 2.66 | 11.49 | 16.84 | 14.72 | 22.89 | 6.21 | 3.40 | 1.94 | 1.27 | 7.05 |
| 88/88 | 0.81 | 0.74 | 0.77 | 3.62 | 14.13 | 16.33 | 7.77 | 3.58 | 2.14 | 2.08 | 1.51 | 1.26 | 4.58 |
| 89/89 | 0.81 | 0.62 | 0.68 | 2.25 | 14.84 | 14.31 | 10.59 | 8.06 | 4.25 | 3.20 | 1.66 | 1.50 | 5.26 |
| 90/90 | 1.02 | 0.66 | 0.75 | 2.34 | 16.01 | 36.26 | 12.50 | 2.94 | 1.69 | 1.32 | 0.96 | 0.82 | 6.44 |
| 91/91 | 0.66 | 0.75 | 0.71 | 1.58 | 10.13 | 14.85 | 7.76 | 2.05 | 2.42 | 2.19 | 1.38 | 1.08 | 3.81 |
| 92/92 | 0.81 | 0.75 | 1.42 | 4.27 | 8.23 | 16.16 | 5.79 | 1.78 | 1.59 | 2.92 | 1.39 | 0.82 | 3.83 |
| 93/93 | 0.56 | 0.51 | 0.56 | 1.47 | 7.69 | 17.54 | 20.72 | 18.01 | 7.81 | 3.03 | 1.65 | 1.23 | 6.78 |
| 94/94 | 1.00 | 0.88 | 1.09 | 5.20 | 12.66 | 17.61 | 15.78 | 6.44 | 3.65 | 2.50 | 1.53 | 1.40 | 5.84 |
| 95/95 | 0.83 | 0.74 | 0.83 | 1.51 | 8.75 | 14.39 | 21.22 | 8.99 | 4.78 | 2.43 | 1.73 | 1.50 | 5.68 |
| 96/96 | 1.11 | 0.93 | 1.02 | 2.72 | 11.57 | 40.08 | 39.13 | 7.52 | 4.26 | 3.73 | 2.24 | 1.43 | 9.69 |
| 97/97 | 1.18 | 0.94 | 0.81 | 2.96 | 18.80 | 22.59 | 14.21 | 6.37 | 8.20 | 7.66 | 2.92 | 1.14 | 7.35 |
| 98/98 | 0.89 | 0.96 | 1.40 | 4.47 | 17.69 | 10.48 | 5.59 | 2.65 | 1.71 | 1.90 | 1.17 | 1.00 | 4.18 |
| 99/99 | 0.87 | 0.85 | 0.88 | 3.03 | 6.53 | 18.12 | 8.44 | 3.01 | 1.51 | 1.05 | 0.81 | 0.68 | 3.82 |
| 00/00 | 0.52 | 0.56 | 0.61 | 1.09 | 3.09 | 19.48 | 18.06 | 6.54 | 7.41 | 3.21 | 2.08 | 1.24 | 5.34 |
| 01/01 | 1.12 | 0.96 | 0.85 | 1.16 | 6.85 | 46.71 | 19.95 | 7.18 | 3.21 | 1.99 | 1.12 | 0.91 | 7.66 |
| AVG | 0.88 | 0.77 | 0.85 | 2.50 | 10.61 | 20.75 | 14.12 | 6.69 | 4.24 | 3.03 | 1.64 | 1.18 | 5.63 |
| STD | 0.15 | 0.10 | 0.19 | 0.94 | 3.35 | 7.94 | 6.16 | 4.25 | 1.79 | 1.12 | 0.40 | 0.19 | 1.24 |
| MIN | 0.52 | 0.51 | 0.56 | 1.09 | 3.09 | 10.46 | 5.59 | 1.78 | 1.51 | 1.05 | 0.81 | 0.68 | 3.81 |
| MAX | 1.18 | 0.96 | 1.42 | 5.20 | 18.80 | 46.71 | 39.13 | 22.89 | 8.20 | 7.66 | 2.92 | 1.50 | 9.69 |

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PEACE CASCADE - MONTHLY SIMULATION 1972-2001

SEVEN PROJECT DEVELOPMENT

NATURAL INFLOW DISCHARGE IN THE RESERVOIR # 1007, SEVEN_G (m3/s)

| YEAR | JAN<br>31.0 | FEB<br>28.0 | MAR<br>31.0 | APR<br>30.0 | MAY<br>31.0 | JUN<br>30.0 | JUL<br>31.0 | AUG<br>31.0 | SEP<br>30.0 | OCT<br>31.0 | NOV<br>30.0 | DEC<br>31.0 | AVG<br>365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 1.86 | 1.48 | 1.88 | 6.64 | 31.65 | 43.71 | 23.76 | 11.03 | 6.10 | 5.43 | 4.30 | 2.69 | 11.76 |
| 73/73 | 1.86 | 1.48 | 1.88 | 6.64 | 31.65 | 43.71 | 23.76 | 11.03 | 6.10 | 5.43 | 4.30 | 2.69 | 11.76 |
| 74/74 | 1.86 | 1.48 | 1.88 | 6.64 | 31.65 | 43.71 | 23.76 | 11.03 | 6.10 | 5.43 | 4.30 | 2.69 | 11.76 |
| 75/75 | 1.86 | 1.48 | 1.88 | 6.64 | 31.65 | 43.71 | 23.76 | 11.03 | 6.10 | 5.43 | 4.30 | 2.69 | 11.76 |
| 76/76 | 1.86 | 1.48 | 1.88 | 6.64 | 31.65 | 43.71 | 23.76 | 11.03 | 6.10 | 5.43 | 4.30 | 2.69 | 11.76 |
| 77/77 | 1.86 | 1.48 | 1.88 | 6.64 | 31.65 | 43.71 | 23.76 | 11.03 | 6.10 | 5.43 | 4.30 | 2.69 | 11.76 |
| 78/78 | 1.86 | 1.48 | 1.88 | 6.64 | 31.65 | 43.71 | 23.76 | 11.03 | 6.10 | 5.43 | 4.30 | 2.69 | 11.76 |
| 79/79 | 1.86 | 1.48 | 1.88 | 6.64 | 31.65 | 43.71 | 23.76 | 11.03 | 6.10 | 5.43 | 4.30 | 2.69 | 11.76 |
| 80/80 | 0.60 | 0.48 | 0.50 | 1.79 | 13.30 | 41.70 | 24.50 | 10.60 | 13.50 | 13.50 | 7.17 | 4.83 | 11.07 |
| 81/81 | 3.63 | 2.71 | 2.61 | 8.46 | 61.80 | 51.50 | 11.40 | 3.38 | 1.41 | 1.40 | 2.27 | 1.71 | 12.74 |
| 82/82 | 1.22 | 0.98 | 0.86 | 2.24 | 18.80 | 43.50 | 39.20 | 23.60 | 8.97 | 6.49 | 10.10 | 5.30 | 13.51 |
| 83/83 | 2.97 | 1.92 | 1.62 | 7.44 | 27.50 | 37.50 | 56.70 | 14.90 | 4.49 | 4.47 | 3.49 | 2.07 | 13.86 |
| 84/84 | 1.65 | 1.55 | 1.94 | 3.26 | 24.60 | 58.30 | 21.70 | 5.16 | 7.55 | 12.80 | 7.30 | 3.63 | 12.47 |
| 85/85 | 2.62 | 1.98 | 2.04 | 5.32 | 26.40 | 36.10 | 10.50 | 3.04 | 5.20 | 7.11 | 3.01 | 2.07 | 8.80 |
| 86/86 | 2.03 | 1.69 | 1.87 | 3.09 | 19.70 | 44.30 | 19.00 | 8.56 | 3.12 | 6.26 | 4.23 | 3.22 | 9.78 |
| 87/87 | 2.37 | 1.83 | 1.35 | 8.89 | 40.80 | 40.40 | 24.50 | 55.30 | 11.70 | 4.06 | 5.11 | 4.35 | 16.85 |
| 88/88 | 1.90 | 0.91 | 1.09 | 7.09 | 33.00 | 43.30 | 11.30 | 4.15 | 2.61 | 2.64 | 1.73 | 1.19 | 9.26 |
| 89/89 | 0.99 | 0.82 | 0.86 | 2.84 | 31.40 | 30.90 | 20.40 | 12.90 | 11.20 | 5.64 | 6.13 | 5.57 | 10.86 |
| 90/90 | 3.91 | 1.87 | 2.55 | 8.46 | 38.20 | 83.20 | 17.00 | 4.03 | 1.77 | 1.15 | 1.03 | 1.44 | 13.71 |
| 91/91 | 1.48 | 1.88 | 2.04 | 5.41 | 32.00 | 39.60 | 14.20 | 3.12 | 2.40 | 3.80 | 4.20 | 3.34 | 9.48 |
| 92/92 | 2.51 | 1.96 | 8.08 | 14.80 | 24.70 | 30.60 | 9.67 | 2.52 | 0.61 | 5.67 | 3.66 | 1.50 | 8.87 |
| 93/93 | 0.70 | 0.47 | 0.61 | 1.54 | 23.00 | 18.70 | 25.50 | 22.10 | 13.00 | 5.41 | 2.92 | 1.62 | 9.71 |
| 94/94 | 1.71 | 1.76 | 2.41 | 15.70 | 47.60 | 48.70 | 19.50 | 6.32 | 3.44 | 3.56 | 4.22 | 2.41 | 13.15 |
| 95/95 | 1.63 | 1.29 | 1.49 | 3.41 | 40.90 | 36.30 | 43.50 | 8.76 | 4.22 | 2.69 | 2.23 | 1.93 | 12.46 |
| 96/96 | 1.47 | 1.44 | 1.55 | 13.20 | 36.10 | 57.20 | 27.00 | 9.31 | 6.81 | 7.25 | 3.09 | 2.13 | 13.91 |
| 97/97 | 1.50 | 1.32 | 1.62 | 17.10 | 68.80 | 61.50 | 29.30 | 8.39 | 5.16 | 12.60 | 11.20 | 2.61 | 18.51 |
| 98/98 | 2.08 | 1.92 | 2.06 | 6.17 | 44.00 | 24.60 | 7.66 | 2.79 | 0.95 | 0.97 | 1.62 | 1.65 | 8.09 |
| 99/99 | 1.47 | 1.42 | 1.54 | 5.74 | 25.00 | 38.90 | 17.00 | 4.88 | 1.61 | 0.54 | 0.41 | 0.41 | 8.26 |
| 00/00 | 0.48 | 0.81 | 1.29 | 1.91 | 4.51 | 34.60 | 28.00 | 9.87 | 20.10 | 8.82 | 7.03 | 4.01 | 10.13 |
| 01/01 | 2.09 | 1.56 | 1.47 | 2.12 | 14.20 | 60.30 | 45.20 | 19.00 | 4.44 | 2.66 | 2.36 | 2.20 | 13.18 |
| AVG | 1.86 | 1.48 | 1.88 | 6.64 | 31.65 | 43.71 | 23.76 | 11.03 | 6.10 | 5.43 | 4.30 | 2.69 | 11.76 |
| STD | 0.76 | 0.47 | 1.28 | 4.06 | 12.97 | 12.10 | 10.85 | 9.93 | 4.30 | 3.22 | 2.41 | 1.19 | 2.35 |
| MIN | 0.48 | 0.47 | 0.50 | 1.54 | 4.51 | 18.70 | 7.66 | 2.52 | 0.61 | 0.54 | 0.41 | 0.41 | 8.09 |
| MAX | 3.91 | 2.71 | 8.08 | 17.10 | 68.80 | 83.20 | 56.70 | 55.30 | 20.10 | 13.50 | 11.20 | 5.57 | 18.51 |

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PEACE CASCADE - MONTHLY SIMULATION 1972-2001

SEVEN PROJECT DEVELOPMENT

OUTFLOW DISCHARGE FROM THE RIVER LINK # 5001, DOWN_SEVEN_A (m3/s)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | AVG 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 836.99 | 870.00 | 811.99 | 811.00 | 657.99 | 1955.67 | 2128.28 | 1363.00 | 933.00 | 954.99 | 1145.00 | 1251.98 | 1144.83 |
| 73/73 | 1338.98 | 1404.00 | 1352.98 | 1193.00 | 1017.99 | 1151.00 | 1134.99 | 1128.00 | 1036.00 | 1090.99 | 1120.00 | 892.99 | 1153.36 |
| 74/74 | 1116.99 | 1104.00 | 1107.99 | 1030.00 | 991.99 | 1010.00 | 1184.98 | 1500.00 | 1112.00 | 1292.98 | 1456.99 | 1432.98 | 1196.29 |
| 75/75 | 1379.98 | 1514.00 | 1388.98 | 1446.99 | 963.99 | 719.00 | 413.99 | 367.00 | 798.00 | 895.99 | 1080.00 | 1071.99 | 999.04 |
| 76/76 | 1127.99 | 1140.00 | 1274.98 | 1034.00 | 968.99 | 1093.00 | 1311.98 | 1750.00 | 1233.00 | 1566.98 | 1591.99 | 1600.98 | 1309.97 |
| 77/77 | 1401.98 | 951.00 | 740.99 | 976.00 | 799.99 | 897.00 | 1387.98 | 1113.00 | 863.00 | 1215.98 | 1492.99 | 1653.98 | 1126.65 |
| 78/78 | 1543.98 | 1546.00 | 1243.98 | 1031.00 | 801.99 | 732.00 | 590.99 | 681.00 | 474.00 | 806.99 | 994.00 | 1528.98 | 995.49 |
| 79/79 | 1609.98 | 1511.00 | 940.99 | 799.00 | 816.99 | 1020.00 | 1036.99 | 788.00 | 1002.00 | 976.99 | 1346.99 | 963.99 | 1064.38 |
| 80/80 | 1296.98 | 1003.00 | 760.99 | 539.00 | 330.00 | 248.00 | 246.00 | 624.00 | 912.00 | 1240.98 | 1067.00 | 799.99 | 754.33 |
| 81/81 | 569.99 | 1048.00 | 1428.98 | 1308.99 | 604.99 | 442.00 | 754.99 | 715.00 | 1173.00 | 1407.98 | 1560.99 | 1440.98 | 1037.00 |
| 82/82 | 1603.98 | 1414.00 | 961.99 | 1096.00 | 588.99 | 388.00 | 351.00 | 823.00 | 1039.00 | 1223.98 | 1447.99 | 1430.98 | 1028.01 |
| 83/83 | 815.99 | 543.00 | 453.99 | 565.00 | 1093.99 | 719.00 | 2024.66 | 1093.31 | 1460.99 | 1254.98 | 1054.00 | 1339.98 | 1039.88 |
| 84/84 | 1174.98 | 835.00 | 600.99 | 1072.00 | 1267.98 | 850.00 | 1198.98 | 1318.00 | 1358.99 | 1448.98 | 1439.99 | 1561.98 | 1180.10 |
| 85/85 | 954.99 | 957.00 | 1361.98 | 1390.99 | 824.99 | 1246.00 | 1147.99 | 1012.00 | 1447.99 | 1455.98 | 1547.99 | 1646.98 | 1250.24 |
| 86/86 | 1429.98 | 954.00 | 701.99 | 1097.00 | 907.99 | 284.00 | 200.00 | 942.00 | 590.00 | 858.99 | 1158.00 | 1132.99 | 854.72 |
| 87/87 | 1301.98 | 1619.00 | 1690.98 | 1691.99 | 1099.99 | 1301.99 | 1143.99 | 852.00 | 1197.00 | 1310.98 | 1337.99 | 1678.98 | 1349.72 |
| 88/88 | 1754.98 | 1706.00 | 1687.98 | 1430.99 | 855.99 | 1112.00 | 1228.98 | 1144.00 | 1211.00 | 1309.98 | 1453.99 | 1060.99 | 1326.95 |
| 89/89 | 1284.98 | 1437.00 | 1226.98 | 816.00 | 555.99 | 698.00 | 1063.99 | 1099.00 | 840.00 | 870.99 | 694.00 | 976.99 | 961.98 |
| 90/90 | 1389.98 | 1290.00 | 937.99 | 932.00 | 763.99 | 714.00 | 638.99 | 683.00 | 1144.00 | 1418.98 | 1386.99 | 1605.98 | 1074.07 |
| 91/91 | 1073.99 | 586.00 | 1152.99 | 890.00 | 648.99 | 506.00 | 348.00 | 459.00 | 717.00 | 1532.98 | 1499.99 | 1598.98 | 920.71 |
| 92/92 | 1554.98 | 1702.00 | 1360.98 | 1616.99 | 1408.98 | 640.00 | 552.99 | 761.00 | 1000.00 | 1088.99 | 1583.99 | 1789.98 | 1251.89 |
| 93/93 | 1831.98 | 1759.00 | 1737.98 | 1383.99 | 476.99 | 263.00 | 332.00 | 742.00 | 955.00 | 1039.99 | 1647.99 | 1820.98 | 1162.17 |
| 94/94 | 1682.98 | 1690.00 | 1552.98 | 925.00 | 395.99 | 356.00 | 480.99 | 775.00 | 924.00 | 1174.98 | 1650.99 | 1711.98 | 1106.91 |
| 95/95 | 1580.98 | 1065.00 | 798.99 | 597.00 | 333.00 | 368.00 | 605.99 | 364.00 | 545.00 | 890.99 | 1092.00 | 1492.98 | 810.83 |
| 96/96 | 1337.98 | 1312.00 | 1332.98 | 1276.00 | 989.99 | 1992.67 | 4796.25 | 2554.69 | 1622.31 | 1134.99 | 1362.99 | 1526.98 | 1776.01 |
| 97/97 | 1394.98 | 1183.00 | 1363.98 | 1245.00 | 874.99 | 536.00 | 492.99 | 549.00 | 818.00 | 957.99 | 1733.99 | 1853.98 | 1082.85 |
| 98/98 | 1577.98 | 1470.00 | 1363.98 | 1364.99 | 617.99 | 439.00 | 656.99 | 919.00 | 1018.00 | 1198.98 | 1654.99 | 1748.98 | 1167.32 |
| 99/99 | 1399.98 | 1695.00 | 1307.98 | 1346.99 | 1252.98 | 691.00 | 625.99 | 616.00 | 1164.00 | 1179.98 | 858.00 | 1415.98 | 1126.10 |
| 00/00 | 1426.98 | 1642.00 | 1586.98 | 1073.00 | 1288.98 | 813.00 | 863.99 | 909.00 | 853.00 | 991.99 | 1633.99 | 1554.98 | 1217.74 |
| 01/01 | 1436.98 | 1454.00 | 1296.98 | 1323.99 | 779.99 | 448.00 | 546.99 | 618.00 | 683.00 | 1328.98 | 1368.99 | 1812.98 | 1090.08 |
| AVG | 1341.18 | 1280.13 | 1184.48 | 1110.13 | 832.79 | 787.78 | 983.10 | 942.07 | 1004.14 | 1170.85 | 1348.83 | 1446.78 | 1118.65 |
| STD | 286.74 | 343.72 | 341.47 | 295.85 | 281.74 | 440.99 | 865.65 | 444.91 | 272.41 | 213.96 | 263.96 | 298.63 | 189.83 |
| MIN | 569.99 | 543.00 | 453.99 | 539.00 | 330.00 | 248.00 | 200.00 | 364.00 | 474.00 | 806.99 | 694.00 | 799.99 | 754.33 |
| MAX | 1831.98 | 1759.00 | 1737.98 | 1691.99 | 1408.98 | 1992.67 | 4796.25 | 2554.69 | 1622.31 | 1566.98 | 1733.99 | 1853.98 | 1776.01 |

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PEACE CASCADE - MONTHLY SIMULATION 1972-2001

SEVEN PROJECT DEVELOPMENT

OUTFLOW DISCHARGE FROM THE RIVER LINK # 5002, DOWN_SEVEN_B (m3/s)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | AVG 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 837.87 | 870.77 | 812.84 | 813.49 | 668.60 | 1976.42 | 2142.40 | 1369.69 | 937.24 | 958.02 | 1146.64 | 1253.16 | 1150.45 |
| 73/73 | 1339.86 | 1404.77 | 1353.83 | 1195.49 | 1028.60 | 1171.75 | 1149.11 | 1134.69 | 1040.24 | 1094.02 | 1121.64 | 894.17 | 1158.99 |
| 74/74 | 1117.87 | 1104.77 | 1108.84 | 1032.49 | 1002.60 | 1030.75 | 1199.10 | 1506.69 | 1116.24 | 1296.01 | 1458.63 | 1434.16 | 1201.92 |
| 75/75 | 1380.86 | 1514.77 | 1389.83 | 1449.48 | 974.60 | 739.75 | 428.11 | 373.69 | 802.24 | 899.02 | 1081.64 | 1073.17 | 1004.67 |
| 76/76 | 1128.87 | 1140.77 | 1275.83 | 1036.49 | 979.60 | 1113.75 | 1326.10 | 1756.69 | 1237.24 | 1570.01 | 1593.63 | 1602.16 | 1315.59 |
| 77/77 | 1402.86 | 951.77 | 741.84 | 978.49 | 810.60 | 917.75 | 1402.10 | 1119.69 | 867.24 | 1219.01 | 1494.63 | 1655.16 | 1132.28 |
| 78/78 | 1544.86 | 1546.77 | 1244.83 | 1033.49 | 812.60 | 752.75 | 605.11 | 687.69 | 478.24 | 810.02 | 995.64 | 1530.16 | 1001.11 |
| 79/79 | 1610.86 | 1511.77 | 941.84 | 801.49 | 827.60 | 1040.75 | 1051.11 | 794.69 | 1006.24 | 980.02 | 1348.63 | 965.17 | 1070.01 |
| 80/80 | 1297.86 | 1003.77 | 761.84 | 541.49 | 340.61 | 268.75 | 260.12 | 630.69 | 916.24 | 1244.01 | 1068.64 | 801.17 | 759.96 |
| 81/81 | 570.87 | 1048.77 | 1429.83 | 1311.48 | 615.60 | 462.75 | 769.11 | 721.69 | 1177.24 | 1411.01 | 1562.63 | 1442.16 | 1042.62 |
| 82/82 | 1604.86 | 1414.77 | 962.84 | 1098.49 | 599.60 | 408.75 | 365.12 | 829.69 | 1043.24 | 1227.01 | 1449.63 | 1432.16 | 1033.63 |
| 83/83 | 816.87 | 543.77 | 454.84 | 567.49 | 1104.60 | 739.75 | 2038.78 | 1100.00 | 1465.23 | 1258.01 | 1055.64 | 1341.16 | 1045.51 |
| 84/84 | 1175.60 | 835.68 | 601.76 | 1073.30 | 1277.02 | 878.58 | 1207.59 | 1321.20 | 1363.68 | 1453.06 | 1441.92 | 1563.29 | 1185.50 |
| 85/85 | 955.94 | 957.70 | 1362.68 | 1392.77 | 830.13 | 1258.76 | 1156.77 | 1014.93 | 1455.69 | 1459.62 | 1549.33 | 1648.15 | 1254.21 |
| 86/86 | 1430.98 | 954.75 | 702.70 | 1098.61 | 916.35 | 294.46 | 214.50 | 948.37 | 593.04 | 863.16 | 1160.17 | 1134.44 | 859.31 |
| 87/87 | 1303.03 | 1619.86 | 1691.68 | 1694.65 | 1111.48 | 1318.83 | 1158.71 | 874.89 | 1203.21 | 1314.38 | 1339.93 | 1680.25 | 1356.77 |
| 88/88 | 1755.79 | 1706.74 | 1688.75 | 1434.61 | 870.12 | 1128.33 | 1236.75 | 1147.58 | 1213.14 | 1312.06 | 1455.50 | 1062.25 | 1331.53 |
| 89/89 | 1285.79 | 1437.62 | 1227.66 | 818.25 | 570.83 | 712.31 | 1074.58 | 1107.06 | 844.25 | 874.19 | 695.66 | 978.49 | 967.24 |
| 90/90 | 1391.00 | 1290.66 | 938.74 | 934.34 | 780.00 | 750.26 | 651.49 | 685.94 | 1145.69 | 1420.30 | 1387.95 | 1606.80 | 1080.51 |
| 91/91 | 1074.65 | 586.75 | 1153.70 | 891.58 | 659.12 | 520.85 | 355.76 | 461.05 | 719.42 | 1535.17 | 1501.37 | 1600.06 | 924.52 |
| 92/92 | 1555.79 | 1702.75 | 1362.40 | 1621.26 | 1417.21 | 656.16 | 558.78 | 762.78 | 1001.59 | 1091.91 | 1585.38 | 1790.80 | 1255.72 |
| 93/93 | 1832.54 | 1759.51 | 1738.54 | 1385.46 | 484.68 | 280.54 | 352.72 | 760.01 | 962.81 | 1043.02 | 1649.64 | 1822.21 | 1168.94 |
| 94/94 | 1683.98 | 1690.88 | 1554.07 | 930.20 | 408.65 | 373.61 | 496.77 | 781.44 | 927.65 | 1177.48 | 1652.52 | 1713.38 | 1112.75 |
| 95/95 | 1581.81 | 1065.74 | 799.82 | 598.51 | 341.75 | 382.39 | 627.21 | 372.99 | 549.78 | 893.42 | 1093.73 | 1494.48 | 816.52 |
| 96/96 | 1339.09 | 1312.93 | 1334.00 | 1278.72 | 1001.56 | 2032.75 | 4835.38 | 2562.21 | 1626.57 | 1138.72 | 1365.23 | 1528.41 | 1785.70 |
| 97/97 | 1396.16 | 1183.94 | 1364.79 | 1247.96 | 893.79 | 558.59 | 507.20 | 555.37 | 826.20 | 965.65 | 1736.91 | 1855.12 | 1090.19 |
| 98/98 | 1578.87 | 1470.96 | 1365.38 | 1369.46 | 635.68 | 449.48 | 662.58 | 921.65 | 1019.71 | 1200.88 | 1656.16 | 1749.98 | 1171.50 |
| 99/99 | 1400.85 | 1695.85 | 1308.86 | 1350.02 | 1259.51 | 709.12 | 634.43 | 619.01 | 1165.51 | 1181.03 | 858.81 | 1416.66 | 1129.91 |
| 00/00 | 1427.50 | 1642.56 | 1587.59 | 1074.09 | 1292.07 | 832.48 | 882.05 | 915.54 | 860.41 | 995.20 | 1636.07 | 1556.22 | 1223.08 |
| 01/01 | 1438.10 | 1454.96 | 1297.83 | 1325.15 | 786.84 | 494.71 | 566.94 | 625.18 | 686.21 | 1330.97 | 1370.11 | 1813.89 | 1097.74 |
| AVG | 1342.06 | 1280.90 | 1185.33 | 1112.63 | 843.40 | 808.53 | 997.22 | 948.76 | 1008.38 | 1173.88 | 1350.47 | 1447.96 | 1124.28 |
| STD | 286.73 | 343.72 | 341.47 | 296.05 | 280.76 | 442.93 | 869.38 | 444.91 | 272.49 | 213.67 | 264.03 | 298.58 | 190.34 |
| MIN | 570.87 | 543.77 | 454.84 | 541.49 | 340.61 | 268.75 | 214.50 | 372.99 | 478.24 | 810.02 | 695.66 | 801.17 | 759.96 |
| MAX | 1832.54 | 1759.51 | 1738.54 | 1694.65 | 1417.21 | 2032.75 | 4835.38 | 2562.21 | 1626.57 | 1570.01 | 1736.91 | 1855.12 | 1785.70 |

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PEACE CASCADE - MONTHLY SIMULATION 1972-2001

SEVEN PROJECT DEVELOPMENT

OUTFLOW DISCHARGE FROM THE RIVER LINK # 5003, DOWN_SEVEN_C (m3/s)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | AVG 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 838.75 | 871.54 | 813.69 | 815.98 | 679.21 | 1997.08 | 2156.61 | 1376.38 | 941.48 | 961.05 | 1148.28 | 1254.34 | 1156.08 |
| 73/73 | 1340.74 | 1405.54 | 1354.68 | 1197.98 | 1039.21 | 1192.50 | 1163.23 | 1141.38 | 1044.48 | 1097.05 | 1123.28 | 895.35 | 1164.61 |
| 74/74 | 1118.75 | 1105.54 | 1109.69 | 1034.98 | 1013.21 | 1051.50 | 1213.22 | 1513.38 | 1120.48 | 1299.04 | 1460.27 | 1435.34 | 1207.54 |
| 75/75 | 1381.74 | 1515.54 | 1390.68 | 1451.97 | 985.21 | 760.50 | 442.23 | 380.38 | 806.48 | 902.05 | 1083.28 | 1074.35 | 1010.30 |
| 76/76 | 1129.75 | 1141.54 | 1276.68 | 1038.98 | 990.21 | 1134.50 | 1340.22 | 1763.38 | 1241.48 | 1573.04 | 1595.27 | 1603.34 | 1321.22 |
| 77/77 | 1403.74 | 952.54 | 742.69 | 980.98 | 821.21 | 938.50 | 1416.22 | 1126.38 | 871.48 | 1222.04 | 1496.27 | 1656.34 | 1137.90 |
| 78/78 | 1545.74 | 1547.54 | 1245.68 | 1035.98 | 823.21 | 773.50 | 619.23 | 694.38 | 482.48 | 813.05 | 997.28 | 1531.34 | 1006.74 |
| 79/79 | 1611.74 | 1512.54 | 942.69 | 803.98 | 838.21 | 1061.50 | 1065.23 | 801.38 | 1010.48 | 983.05 | 1350.27 | 966.35 | 1075.63 |
| 80/80 | 1298.74 | 1004.54 | 762.69 | 543.98 | 351.22 | 289.50 | 274.24 | 637.38 | 920.48 | 1247.04 | 1070.28 | 802.35 | 765.58 |
| 81/81 | 571.75 | 1049.54 | 1430.68 | 1313.97 | 626.21 | 483.50 | 783.23 | 728.38 | 1181.48 | 1414.04 | 1564.27 | 1443.34 | 1048.25 |
| 82/82 | 1605.74 | 1415.54 | 963.69 | 1100.98 | 610.21 | 429.50 | 379.24 | 836.38 | 1047.48 | 1230.04 | 1451.27 | 1433.34 | 1039.26 |
| 83/83 | 817.75 | 544.54 | 455.69 | 569.98 | 1115.21 | 760.50 | 2052.81 | 1106.78 | 1469.47 | 1261.04 | 1057.28 | 1342.34 | 1051.13 |
| 84/84 | 1176.22 | 836.36 | 602.53 | 1074.60 | 1286.06 | 907.16 | 1216.20 | 1324.40 | 1368.37 | 1457.14 | 1443.85 | 1564.60 | 1190.90 |
| 85/85 | 956.89 | 958.40 | 1363.38 | 1394.55 | 835.27 | 1271.52 | 1165.55 | 1017.86 | 1463.39 | 1463.26 | 1550.67 | 1649.32 | 1258.18 |
| 86/86 | 1431.98 | 955.50 | 703.41 | 1100.22 | 924.71 | 304.92 | 229.00 | 954.74 | 596.08 | 867.33 | 1162.34 | 1135.89 | 863.89 |
| 87/87 | 1304.08 | 1620.72 | 1692.38 | 1697.31 | 1122.97 | 1335.67 | 1173.43 | 897.78 | 1209.42 | 1317.78 | 1341.87 | 1681.52 | 1363.83 |
| 88/88 | 1756.60 | 1707.48 | 1689.52 | 1438.23 | 884.25 | 1144.66 | 1244.52 | 1151.16 | 1215.28 | 1314.14 | 1457.01 | 1063.51 | 1336.11 |
| 89/89 | 1286.60 | 1438.24 | 1228.34 | 820.50 | 585.67 | 726.62 | 1085.17 | 1115.12 | 848.50 | 877.39 | 697.32 | 979.99 | 972.51 |
| 90/90 | 1392.02 | 1291.32 | 939.49 | 936.68 | 796.01 | 786.52 | 663.99 | 688.88 | 1147.38 | 1421.62 | 1388.91 | 1607.62 | 1086.96 |
| 91/91 | 1075.31 | 587.50 | 1154.41 | 893.16 | 669.25 | 535.70 | 363.52 | 463.10 | 721.84 | 1537.36 | 1502.75 | 1601.14 | 928.33 |
| 92/92 | 1556.60 | 1703.50 | 1363.82 | 1625.53 | 1425.44 | 672.32 | 564.57 | 764.56 | 1003.18 | 1094.83 | 1586.77 | 1791.62 | 1259.55 |
| 93/93 | 1833.10 | 1760.02 | 1739.10 | 1386.93 | 492.37 | 298.08 | 373.44 | 778.02 | 970.62 | 1046.05 | 1651.29 | 1823.44 | 1175.72 |
| 94/94 | 1684.98 | 1691.76 | 1555.16 | 935.40 | 421.31 | 391.22 | 512.55 | 787.88 | 931.30 | 1179.98 | 1654.05 | 1714.78 | 1118.59 |
| 95/95 | 1582.64 | 1066.48 | 800.65 | 600.02 | 350.50 | 396.78 | 648.43 | 381.98 | 554.56 | 895.85 | 1095.46 | 1495.98 | 822.20 |
| 96/96 | 1340.20 | 1313.86 | 1335.02 | 1281.44 | 1013.13 | 2072.74 | 4874.60 | 2569.64 | 1630.92 | 1142.45 | 1367.47 | 1529.84 | 1795.39 |
| 97/97 | 1397.34 | 1184.88 | 1365.60 | 1250.92 | 912.59 | 581.18 | 521.41 | 561.74 | 834.40 | 973.31 | 1739.83 | 1856.26 | 1097.54 |
| 98/98 | 1579.76 | 1471.92 | 1366.78 | 1373.93 | 653.37 | 459.96 | 668.17 | 924.30 | 1021.42 | 1202.78 | 1657.33 | 1750.98 | 1175.68 |
| 99/99 | 1401.72 | 1696.70 | 1309.74 | 1353.05 | 1266.04 | 727.24 | 642.87 | 622.02 | 1167.02 | 1182.08 | 859.62 | 1417.34 | 1133.73 |
| 00/00 | 1428.02 | 1643.12 | 1588.20 | 1075.18 | 1295.16 | 851.96 | 900.11 | 922.08 | 867.82 | 998.41 | 1638.15 | 1557.46 | 1228.42 |
| 01/01 | 1439.22 | 1455.92 | 1298.68 | 1326.31 | 793.69 | 541.42 | 586.89 | 632.36 | 689.42 | 1332.96 | 1371.23 | 1814.80 | 1105.41 |
| AVG | 1342.94 | 1281.67 | 1186.18 | 1115.12 | 854.01 | 829.27 | 1011.34 | 955.45 | 1012.62 | 1176.91 | 1352.11 | 1449.14 | 1129.91 |
| STD | 286.72 | 343.72 | 341.48 | 296.26 | 279.81 | 444.98 | 873.16 | 444.94 | 272.59 | 213.38 | 264.10 | 298.53 | 190.85 |
| MIN | 571.75 | 544.54 | 455.69 | 543.98 | 350.50 | 289.50 | 229.00 | 380.38 | 482.48 | 813.05 | 697.32 | 802.35 | 765.58 |
| MAX | 1833.10 | 1760.02 | 1739.10 | 1697.31 | 1425.44 | 2072.74 | 4874.60 | 2569.64 | 1630.92 | 1573.04 | 1739.83 | 1856.26 | 1795.39 |

ESOLIN --> X:\014942~1\ENGINE~1\PROSPER\PCN_MTH.res --> 2002/11/13 (10:26:12)

PEACE CASCADE - MONTHLY SIMULATION 1972-2001

SEVEN PROJECT DEVELOPMENT

OUTFLOW DISCHARGE FROM THE RIVER LINK # 5004, DOWN_SEVEN_D (m3/s)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | AVG 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 839.63 | 872.31 | 814.54 | 818.47 | 689.82 | 2017.64 | 2170.91 | 1383.07 | 945.72 | 964.08 | 1149.92 | 1255.52 | 1161.70 |
| 73/73 | 1341.62 | 1406.31 | 1355.53 | 1200.47 | 1049.82 | 1213.25 | 1177.35 | 1148.07 | 1048.72 | 1100.08 | 1124.92 | 896.53 | 1170.24 |
| 74/74 | 1119.63 | 1106.31 | 1110.54 | 1037.47 | 1023.82 | 1072.25 | 1227.34 | 1520.07 | 1124.72 | 1302.07 | 1461.91 | 1436.52 | 1213.17 |
| 75/75 | 1382.62 | 1516.31 | 1391.53 | 1454.46 | 995.82 | 781.25 | 456.35 | 387.07 | 810.72 | 905.08 | 1084.92 | 1075.53 | 1015.92 |
| 76/76 | 1130.63 | 1142.31 | 1277.53 | 1041.47 | 1000.82 | 1155.25 | 1354.34 | 1770.07 | 1245.72 | 1576.07 | 1596.91 | 1604.52 | 1326.85 |
| 77/77 | 1404.62 | 953.31 | 743.54 | 983.47 | 831.82 | 959.25 | 1430.34 | 1133.07 | 875.72 | 1225.07 | 1497.91 | 1657.52 | 1143.53 |
| 78/78 | 1546.62 | 1548.31 | 1246.53 | 1038.47 | 833.82 | 794.25 | 633.35 | 701.07 | 486.72 | 816.08 | 998.92 | 1532.52 | 1012.36 |
| 79/79 | 1612.62 | 1513.31 | 943.54 | 806.47 | 848.82 | 1082.25 | 1079.35 | 808.07 | 1014.72 | 986.08 | 1351.91 | 967.53 | 1081.26 |
| 80/80 | 1299.62 | 1005.31 | 763.54 | 546.47 | 361.83 | 310.25 | 288.36 | 644.07 | 924.72 | 1250.07 | 1071.92 | 803.53 | 771.21 |
| 81/81 | 572.63 | 1050.31 | 1431.53 | 1316.46 | 636.82 | 504.25 | 797.35 | 735.07 | 1185.72 | 1417.07 | 1565.91 | 1444.52 | 1053.87 |
| 82/82 | 1606.62 | 1416.31 | 964.54 | 1103.47 | 620.82 | 450.25 | 393.36 | 843.07 | 1051.72 | 1233.07 | 1452.91 | 1434.52 | 1044.88 |
| 83/83 | 818.63 | 545.31 | 456.54 | 572.47 | 1125.82 | 781.25 | 2066.74 | 1113.65 | 1473.71 | 1264.07 | 1058.92 | 1343.52 | 1056.76 |
| 84/84 | 1176.84 | 837.04 | 603.30 | 1075.90 | 1295.10 | 935.74 | 1224.81 | 1327.60 | 1373.06 | 1461.22 | 1445.78 | 1565.91 | 1196.30 |
| 85/85 | 957.84 | 959.10 | 1364.08 | 1396.33 | 840.41 | 1284.28 | 1174.33 | 1020.79 | 1471.09 | 1466.90 | 1552.01 | 1650.49 | 1262.15 |
| 86/86 | 1432.98 | 956.25 | 704.12 | 1101.83 | 933.07 | 315.38 | 243.50 | 961.11 | 599.12 | 871.50 | 1164.51 | 1137.34 | 868.47 |
| 87/87 | 1305.13 | 1621.58 | 1693.08 | 1699.97 | 1134.46 | 1352.51 | 1188.15 | 920.67 | 1215.63 | 1321.18 | 1343.81 | 1682.79 | 1370.88 |
| 88/88 | 1757.41 | 1708.22 | 1690.29 | 1441.85 | 898.38 | 1160.99 | 1252.29 | 1154.74 | 1217.42 | 1316.22 | 1458.52 | 1064.77 | 1340.69 |
| 89/89 | 1287.41 | 1438.86 | 1229.02 | 822.75 | 600.51 | 740.93 | 1095.76 | 1123.18 | 852.75 | 880.59 | 698.98 | 981.49 | 977.77 |
| 90/90 | 1393.04 | 1291.98 | 940.24 | 939.02 | 812.02 | 822.78 | 676.49 | 691.82 | 1149.07 | 1422.94 | 1389.87 | 1608.44 | 1093.40 |
| 91/91 | 1075.97 | 588.25 | 1155.12 | 894.74 | 679.38 | 550.55 | 371.28 | 465.15 | 724.26 | 1539.55 | 1504.13 | 1602.22 | 932.14 |
| 92/92 | 1557.41 | 1704.25 | 1365.24 | 1629.80 | 1433.67 | 688.48 | 570.36 | 766.34 | 1004.77 | 1097.75 | 1588.16 | 1792.44 | 1263.38 |
| 93/93 | 1833.66 | 1760.53 | 1739.66 | 1388.40 | 500.06 | 315.62 | 394.16 | 796.03 | 978.43 | 1049.08 | 1652.94 | 1824.67 | 1182.50 |
| 94/94 | 1685.98 | 1692.64 | 1556.25 | 940.60 | 433.97 | 408.83 | 528.33 | 794.32 | 934.95 | 1182.48 | 1655.58 | 1716.18 | 1124.43 |
| 95/95 | 1583.47 | 1067.22 | 801.48 | 601.53 | 359.25 | 411.17 | 669.65 | 390.97 | 559.34 | 898.28 | 1097.19 | 1497.48 | 827.88 |
| 96/96 | 1341.31 | 1314.79 | 1336.04 | 1284.16 | 1024.70 | 2112.62 | 4913.91 | 2576.98 | 1635.37 | 1146.18 | 1369.71 | 1531.27 | 1805.07 |
| 97/97 | 1398.52 | 1185.82 | 1366.41 | 1253.88 | 931.39 | 603.77 | 535.62 | 568.11 | 842.60 | 980.97 | 1742.75 | 1857.40 | 1104.89 |
| 98/98 | 1580.65 | 1472.88 | 1368.18 | 1378.40 | 671.06 | 470.44 | 673.76 | 926.95 | 1023.13 | 1204.68 | 1658.50 | 1751.98 | 1179.86 |
| 99/99 | 1402.59 | 1697.55 | 1310.62 | 1356.08 | 1272.57 | 745.36 | 651.31 | 625.03 | 1168.53 | 1183.13 | 860.43 | 1418.02 | 1137.55 |
| 00/00 | 1428.54 | 1643.68 | 1588.81 | 1076.27 | 1298.25 | 871.44 | 918.17 | 928.62 | 875.23 | 1001.62 | 1640.23 | 1558.70 | 1233.76 |
| 01/01 | 1440.34 | 1456.88 | 1299.53 | 1327.47 | 800.54 | 588.13 | 606.84 | 639.54 | 692.63 | 1334.95 | 1372.35 | 1815.71 | 1113.07 |
| AVG | 1343.82 | 1282.44 | 1187.03 | 1117.62 | 864.62 | 850.01 | 1025.46 | 962.15 | 1016.87 | 1179.94 | 1353.75 | 1450.32 | 1135.53 |
| STD | 286.71 | 343.72 | 341.49 | 296.47 | 278.89 | 447.14 | 876.98 | 445.00 | 272.71 | 213.10 | 264.17 | 298.47 | 191.37 |
| MIN | 572.63 | 545.31 | 456.54 | 546.47 | 359.25 | 310.25 | 243.50 | 387.07 | 486.72 | 816.08 | 698.98 | 803.53 | 771.21 |
| MAX | 1833.66 | 1760.53 | 1739.66 | 1699.97 | 1433.67 | 2112.62 | 4913.91 | 2576.98 | 1635.37 | 1576.07 | 1742.75 | 1857.40 | 1805.07 |

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PEACE CASCADE - MONTHLY SIMULATION 1972-2001

SEVEN PROJECT DEVELOPMENT

OUTFLOW DISCHARGE FROM THE RIVER LINK # 5005, DOWN_SEVEN_E (m3/s)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | AVG 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 851.83 | 883.11 | 826.14 | 851.37 | 827.62 | 2305.58 | 2375.45 | 1479.57 | 1007.62 | 1007.28 | 1172.22 | 1271.82 | 1240.17 |
| 73/73 | 1353.82 | 1417.11 | 1367.13 | 1233.37 | 1187.62 | 1501.55 | 1381.55 | 1244.57 | 1110.62 | 1143.28 | 1147.22 | 912.83 | 1248.70 |
| 74/74 | 1131.83 | 1117.11 | 1122.14 | 1070.37 | 1161.61 | 1360.55 | 1431.54 | 1616.57 | 1186.62 | 1345.27 | 1484.21 | 1452.82 | 1291.63 |
| 75/75 | 1394.82 | 1527.11 | 1403.13 | 1487.36 | 1133.62 | 1069.55 | 660.55 | 483.57 | 872.62 | 948.28 | 1107.22 | 1091.83 | 1094.39 |
| 76/76 | 1142.83 | 1153.11 | 1289.13 | 1074.37 | 1138.62 | 1443.55 | 1558.54 | 1866.57 | 1307.62 | 1619.27 | 1619.21 | 1620.82 | 1405.31 |
| 77/77 | 1416.82 | 964.11 | 755.14 | 1016.37 | 969.62 | 1247.55 | 1634.54 | 1229.57 | 937.62 | 1268.27 | 1520.21 | 1673.82 | 1222.00 |
| 78/78 | 1558.82 | 1559.11 | 1258.13 | 1071.37 | 971.62 | 1082.55 | 837.55 | 797.57 | 548.62 | 859.28 | 1021.22 | 1548.82 | 1090.83 |
| 79/79 | 1624.82 | 1524.11 | 955.14 | 839.37 | 986.62 | 1370.55 | 1283.55 | 904.57 | 1076.62 | 1029.28 | 1374.21 | 983.83 | 1159.72 |
| 80/80 | 1311.82 | 1016.11 | 775.14 | 579.37 | 499.62 | 598.55 | 492.55 | 740.57 | 986.62 | 1293.27 | 1094.22 | 819.83 | 849.67 |
| 81/81 | 584.83 | 1061.11 | 1443.13 | 1349.36 | 774.62 | 792.55 | 1001.55 | 831.57 | 1247.62 | 1460.27 | 1588.21 | 1460.82 | 1132.34 |
| 82/82 | 1618.82 | 1427.11 | 976.14 | 1136.37 | 758.62 | 738.55 | 597.55 | 939.57 | 1113.62 | 1276.27 | 1475.21 | 1450.82 | 1123.35 |
| 83/83 | 830.83 | 556.11 | 468.14 | 605.37 | 1263.62 | 1069.55 | 2270.60 | 1210.49 | 1535.61 | 1307.27 | 1081.22 | 1359.82 | 1135.23 |
| 84/84 | 1185.14 | 846.34 | 613.70 | 1093.40 | 1415.10 | 1334.73 | 1340.81 | 1373.70 | 1440.56 | 1513.62 | 1469.38 | 1583.31 | 1270.21 |
| 85/85 | 970.44 | 968.40 | 1373.18 | 1419.53 | 896.21 | 1452.28 | 1304.33 | 1064.69 | 1589.09 | 1518.00 | 1570.41 | 1667.19 | 1316.90 |
| 86/86 | 1446.98 | 966.55 | 713.52 | 1124.53 | 1047.07 | 438.38 | 456.50 | 1054.51 | 644.62 | 931.90 | 1195.01 | 1157.24 | 932.00 |
| 87/87 | 1319.53 | 1633.58 | 1702.88 | 1733.57 | 1277.46 | 1581.51 | 1399.15 | 1231.67 | 1303.23 | 1371.48 | 1369.71 | 1698.79 | 1466.88 |
| 88/88 | 1768.41 | 1719.12 | 1701.49 | 1492.75 | 1091.38 | 1378.99 | 1365.29 | 1207.84 | 1249.12 | 1346.82 | 1480.92 | 1083.77 | 1404.67 |
| 89/89 | 1299.31 | 1447.96 | 1239.02 | 855.85 | 806.51 | 938.93 | 1244.76 | 1239.18 | 909.55 | 926.09 | 719.48 | 999.99 | 1051.12 |
| 90/90 | 1405.44 | 1300.58 | 949.74 | 968.02 | 1030.02 | 1319.77 | 859.49 | 734.82 | 1174.37 | 1442.84 | 1404.17 | 1620.04 | 1182.79 |
| 91/91 | 1085.07 | 598.35 | 1164.42 | 914.64 | 809.38 | 748.55 | 481.27 | 494.75 | 760.56 | 1570.85 | 1521.93 | 1616.12 | 983.57 |
| 92/92 | 1567.81 | 1714.35 | 1379.94 | 1683.30 | 1540.67 | 916.48 | 653.36 | 792.34 | 1029.57 | 1138.75 | 1606.76 | 1804.04 | 1315.81 |
| 93/93 | 1841.96 | 1768.23 | 1747.96 | 1410.30 | 600.06 | 577.62 | 700.15 | 1062.03 | 1090.43 | 1092.18 | 1676.34 | 1842.67 | 1281.23 |
| 94/94 | 1700.28 | 1704.94 | 1571.35 | 1005.20 | 588.97 | 641.83 | 761.33 | 891.02 | 989.95 | 1218.98 | 1675.88 | 1736.18 | 1204.48 |
| 95/95 | 1595.17 | 1077.82 | 813.28 | 622.33 | 458.34 | 605.17 | 965.65 | 525.97 | 631.64 | 934.48 | 1122.59 | 1519.48 | 906.34 |
| 96/96 | 1357.61 | 1328.19 | 1350.84 | 1314.46 | 1173.69 | 2696.27 | 5513.24 | 2687.98 | 1696.67 | 1198.68 | 1402.51 | 1552.07 | 1946.15 |
| 97/97 | 1415.82 | 1199.62 | 1377.81 | 1284.18 | 1163.39 | 903.77 | 733.62 | 661.71 | 968.60 | 1090.97 | 1778.25 | 1873.10 | 1203.95 |
| 98/98 | 1592.85 | 1486.38 | 1388.48 | 1443.80 | 910.06 | 613.44 | 755.56 | 966.55 | 1049.53 | 1234.18 | 1675.60 | 1766.28 | 1238.69 |
| 99/99 | 1415.09 | 1709.65 | 1323.12 | 1398.78 | 1351.97 | 996.36 | 769.31 | 668.23 | 1191.03 | 1199.43 | 873.03 | 1428.42 | 1190.32 |
| 00/00 | 1436.44 | 1651.78 | 1597.31 | 1091.87 | 1343.25 | 1148.44 | 1179.17 | 1023.32 | 973.73 | 1044.22 | 1666.53 | 1574.60 | 1309.08 |
| 01/01 | 1456.14 | 1470.68 | 1311.63 | 1343.87 | 895.94 | 1275.12 | 880.84 | 735.34 | 739.53 | 1364.15 | 1387.95 | 1828.01 | 1222.48 |
| AVG | 1356.05 | 1293.26 | 1198.61 | 1150.49 | 1002.43 | 1138.27 | 1229.64 | 1058.68 | 1078.77 | 1223.16 | 1376.03 | 1466.64 | 1214.00 |
| STD | 286.66 | 343.85 | 341.66 | 299.43 | 271.40 | 494.22 | 940.02 | 450.53 | 275.60 | 209.48 | 264.94 | 297.83 | 200.09 |
| MIN | 584.83 | 556.11 | 468.14 | 579.37 | 458.34 | 438.38 | 456.50 | 483.57 | 548.62 | 859.28 | 719.48 | 819.83 | 849.67 |
| MAX | 1841.96 | 1768.23 | 1747.96 | 1733.57 | 1540.67 | 2696.27 | 5513.24 | 2687.98 | 1696.67 | 1619.27 | 1778.25 | 1873.10 | 1946.15 |

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PEACE CASCADE - MONTHLY SIMULATION 1972-2001

SEVEN PROJECT DEVELOPMENT

OUTFLOW DISCHARGE FROM THE RIVER LINK # 5006, DOWN_SEVEN_F (m3/s)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | AVG 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 852.71 | 883.88 | 826.99 | 853.86 | 838.23 | 2326.11 | 2389.79 | 1486.26 | 1011.86 | 1010.31 | 1173.86 | 1273.00 | 1245.79 |
| 73/73 | 1354.70 | 1417.88 | 1367.98 | 1235.86 | 1198.23 | 1522.30 | 1395.67 | 1251.26 | 1114.86 | 1146.31 | 1148.86 | 914.01 | 1254.33 |
| 74/74 | 1132.71 | 1117.88 | 1122.99 | 1072.86 | 1172.22 | 1381.30 | 1445.66 | 1623.26 | 1190.86 | 1348.30 | 1485.85 | 1454.00 | 1297.26 |
| 75/75 | 1395.70 | 1527.88 | 1403.98 | 1489.85 | 1144.23 | 1090.30 | 674.67 | 490.26 | 876.86 | 951.31 | 1108.86 | 1093.01 | 1100.01 |
| 76/76 | 1143.71 | 1153.88 | 1289.98 | 1076.86 | 1149.23 | 1464.30 | 1572.66 | 1873.26 | 1311.86 | 1622.30 | 1620.85 | 1622.00 | 1410.94 |
| 77/77 | 1417.70 | 964.88 | 755.99 | 1018.86 | 980.23 | 1268.30 | 1648.66 | 1236.26 | 941.86 | 1271.30 | 1521.85 | 1675.00 | 1227.62 |
| 78/78 | 1559.70 | 1559.88 | 1258.98 | 1073.86 | 982.23 | 1103.30 | 851.67 | 804.26 | 552.86 | 862.31 | 1022.86 | 1550.00 | 1096.46 |
| 79/79 | 1625.70 | 1524.88 | 955.99 | 841.86 | 997.23 | 1391.30 | 1297.67 | 911.26 | 1080.86 | 1032.31 | 1375.85 | 985.01 | 1165.35 |
| 80/80 | 1312.70 | 1016.88 | 775.99 | 581.86 | 510.23 | 619.30 | 506.67 | 747.26 | 990.86 | 1296.30 | 1095.86 | 821.01 | 855.30 |
| 81/81 | 585.71 | 1061.88 | 1443.98 | 1351.85 | 785.23 | 813.30 | 1015.67 | 838.26 | 1251.86 | 1463.30 | 1589.85 | 1462.00 | 1137.96 |
| 82/82 | 1619.70 | 1427.88 | 976.99 | 1138.86 | 769.23 | 759.30 | 611.67 | 946.26 | 1117.86 | 1279.30 | 1476.85 | 1452.00 | 1128.98 |
| 83/83 | 831.71 | 556.88 | 468.99 | 607.86 | 1274.23 | 1090.30 | 2284.50 | 1217.40 | 1539.85 | 1310.30 | 1082.86 | 1361.00 | 1140.85 |
| 84/84 | 1185.76 | 847.02 | 614.47 | 1094.70 | 1424.14 | 1363.31 | 1349.42 | 1376.90 | 1445.25 | 1517.70 | 1471.31 | 1584.62 | 1275.61 |
| 85/85 | 971.39 | 969.10 | 1373.88 | 1421.31 | 901.35 | 1465.04 | 1313.11 | 1067.62 | 1596.79 | 1521.64 | 1571.75 | 1668.36 | 1320.87 |
| 86/86 | 1447.98 | 967.30 | 714.23 | 1126.14 | 1055.43 | 448.84 | 471.00 | 1060.88 | 647.66 | 936.07 | 1197.18 | 1158.69 | 936.58 |
| 87/87 | 1320.58 | 1634.44 | 1703.58 | 1736.23 | 1288.95 | 1598.35 | 1413.87 | 1254.56 | 1309.44 | 1374.88 | 1371.65 | 1700.06 | 1473.93 |
| 88/88 | 1769.22 | 1719.86 | 1702.26 | 1496.37 | 1105.51 | 1395.32 | 1373.06 | 1211.42 | 1251.26 | 1348.90 | 1482.43 | 1085.03 | 1409.25 |
| 89/89 | 1300.12 | 1448.58 | 1239.70 | 858.10 | 821.35 | 953.24 | 1255.35 | 1247.24 | 913.80 | 929.29 | 721.14 | 1001.49 | 1056.38 |
| 90/90 | 1406.46 | 1301.24 | 950.49 | 970.36 | 1046.03 | 1356.03 | 871.99 | 737.76 | 1176.06 | 1444.16 | 1405.13 | 1620.86 | 1189.24 |
| 91/91 | 1085.73 | 599.10 | 1165.13 | 916.22 | 819.51 | 763.40 | 489.03 | 496.80 | 762.98 | 1573.04 | 1523.31 | 1617.20 | 987.37 |
| 92/92 | 1568.62 | 1715.10 | 1381.36 | 1687.57 | 1548.90 | 932.64 | 659.15 | 794.12 | 1031.16 | 1141.67 | 1608.15 | 1804.86 | 1319.64 |
| 93/93 | 1842.52 | 1768.74 | 1748.52 | 1411.77 | 607.75 | 595.16 | 720.87 | 1080.04 | 1098.24 | 1095.21 | 1677.99 | 1843.90 | 1288.01 |
| 94/94 | 1701.28 | 1705.82 | 1572.44 | 1010.40 | 601.63 | 659.44 | 777.11 | 897.46 | 993.60 | 1221.48 | 1677.41 | 1737.58 | 1210.32 |
| 95/95 | 1596.00 | 1078.56 | 814.11 | 623.84 | 467.09 | 619.56 | 986.87 | 534.96 | 636.42 | 936.91 | 1124.32 | 1520.98 | 912.02 |
| 96/96 | 1358.72 | 1329.12 | 1351.86 | 1317.18 | 1185.26 | 2736.13 | 5552.59 | 2695.50 | 1700.93 | 1202.41 | 1404.75 | 1553.50 | 1955.84 |
| 97/97 | 1417.00 | 1200.56 | 1378.62 | 1287.14 | 1182.19 | 926.36 | 747.83 | 668.08 | 976.80 | 1098.63 | 1781.17 | 1874.24 | 1211.30 |
| 98/98 | 1593.74 | 1487.34 | 1389.88 | 1448.27 | 927.75 | 623.92 | 761.15 | 969.20 | 1051.24 | 1236.08 | 1676.77 | 1767.28 | 1242.87 |
| 99/99 | 1415.96 | 1710.50 | 1324.00 | 1401.81 | 1358.50 | 1014.48 | 777.75 | 671.24 | 1192.54 | 1200.48 | 873.84 | 1429.10 | 1194.14 |
| 00/00 | 1436.96 | 1652.34 | 1597.92 | 1092.96 | 1346.34 | 1167.92 | 1197.23 | 1029.86 | 981.14 | 1047.43 | 1668.61 | 1575.84 | 1314.42 |
| 01/01 | 1457.26 | 1471.64 | 1312.48 | 1345.03 | 902.79 | 1321.83 | 900.79 | 742.52 | 742.74 | 1366.14 | 1389.07 | 1828.92 | 1230.15 |
| AVG | 1356.92 | 1294.03 | 1199.46 | 1152.99 | 1013.04 | 1159.01 | 1243.77 | 1065.38 | 1083.01 | 1226.19 | 1377.67 | 1467.82 | 1219.63 |
| STD | 286.65 | 343.85 | 341.66 | 299.68 | 271.06 | 498.17 | 944.23 | 451.21 | 275.88 | 209.28 | 265.02 | 297.77 | 200.71 |
| MIN | 585.71 | 556.88 | 468.99 | 581.86 | 467.09 | 448.84 | 471.00 | 490.26 | 552.86 | 862.31 | 721.14 | 821.01 | 855.30 |
| MAX | 1842.52 | 1768.74 | 1748.52 | 1736.23 | 1548.90 | 2736.13 | 5552.59 | 2695.50 | 1700.93 | 1622.30 | 1781.17 | 1874.24 | 1955.84 |

ESOLIN -->  X:\014942~1\ENGINE~1\PROSPER\PCN_MTH.res  --> 2002/11/13   (10:26:12)

PEACE CASCADE - MONTHLY SIMULATION 1972-2001

SEVEN PROJECT DEVELOPMENT

OUTFLOW DISCHARGE FROM THE RIVER LINK # 5007, DOWN_SEVEN_G (m3/s)

| YEAR | JAN 31.0 | FEB 28.0 | MAR 31.0 | APR 30.0 | MAY 31.0 | JUN 30.0 | JUL 31.0 | AUG 31.0 | SEP 30.0 | OCT 31.0 | NOV 30.0 | DEC 31.0 | AVG 365.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72/72 | 854.57 | 885.36 | 828.87 | 860.50 | 869.88 | 2369.64 | 2413.72 | 1497.29 | 1017.96 | 1015.74 | 1178.16 | 1275.69 | 1257.55 |
| 73/73 | 1356.56 | 1419.36 | 1369.86 | 1242.50 | 1229.88 | 1566.01 | 1419.43 | 1262.29 | 1120.96 | 1151.74 | 1153.16 | 916.70 | 1266.08 |
| 74/74 | 1134.57 | 1119.36 | 1124.87 | 1079.50 | 1203.87 | 1425.01 | 1469.42 | 1634.29 | 1196.96 | 1353.73 | 1490.15 | 1456.69 | 1309.02 |
| 75/75 | 1397.56 | 1529.36 | 1405.86 | 1496.49 | 1175.88 | 1134.01 | 698.43 | 501.29 | 882.96 | 956.74 | 1113.16 | 1095.70 | 1111.77 |
| 76/76 | 1145.57 | 1155.36 | 1291.86 | 1083.50 | 1180.88 | 1508.01 | 1596.42 | 1884.29 | 1317.96 | 1627.73 | 1625.15 | 1624.69 | 1422.69 |
| 77/77 | 1419.56 | 966.36 | 757.87 | 1025.50 | 1011.88 | 1312.01 | 1672.42 | 1247.29 | 947.96 | 1276.73 | 1526.15 | 1677.69 | 1239.38 |
| 78/78 | 1561.56 | 1561.36 | 1260.86 | 1080.50 | 1013.88 | 1147.01 | 875.43 | 815.29 | 558.96 | 867.74 | 1027.16 | 1552.69 | 1108.21 |
| 79/79 | 1627.56 | 1526.36 | 957.87 | 848.50 | 1028.88 | 1435.01 | 1321.43 | 922.29 | 1086.96 | 1037.74 | 1380.15 | 987.70 | 1177.11 |
| 80/80 | 1313.30 | 1017.36 | 776.49 | 583.65 | 523.53 | 661.00 | 531.17 | 757.86 | 1004.36 | 1309.80 | 1103.03 | 825.84 | 866.37 |
| 81/81 | 589.34 | 1064.59 | 1446.59 | 1360.31 | 847.03 | 864.80 | 1027.07 | 841.64 | 1253.27 | 1464.70 | 1592.12 | 1463.71 | 1150.70 |
| 82/82 | 1620.92 | 1428.86 | 977.85 | 1141.10 | 788.03 | 802.80 | 650.87 | 969.86 | 1126.83 | 1285.79 | 1486.95 | 1457.30 | 1142.49 |
| 83/83 | 834.68 | 558.80 | 470.61 | 615.30 | 1301.73 | 1127.80 | 2341.03 | 1232.47 | 1544.34 | 1314.77 | 1086.35 | 1363.07 | 1154.71 |
| 84/84 | 1187.41 | 848.57 | 616.41 | 1097.96 | 1448.74 | 1421.61 | 1371.12 | 1382.06 | 1452.80 | 1530.50 | 1478.61 | 1588.25 | 1288.08 |
| 85/85 | 974.01 | 971.08 | 1375.92 | 1426.63 | 927.75 | 1501.14 | 1323.61 | 1070.66 | 1601.99 | 1528.75 | 1574.76 | 1670.43 | 1329.67 |
| 86/86 | 1450.01 | 968.99 | 716.10 | 1129.23 | 1075.13 | 493.14 | 490.00 | 1069.44 | 650.78 | 942.33 | 1201.41 | 1161.91 | 946.36 |
| 87/87 | 1322.95 | 1636.27 | 1704.93 | 1745.12 | 1329.75 | 1638.75 | 1438.37 | 1309.86 | 1321.14 | 1378.94 | 1376.76 | 1704.41 | 1490.78 |
| 88/88 | 1771.12 | 1720.77 | 1703.35 | 1503.46 | 1138.51 | 1438.62 | 1384.36 | 1215.57 | 1253.87 | 1351.54 | 1484.16 | 1086.22 | 1418.51 |
| 89/89 | 1301.11 | 1449.40 | 1240.56 | 860.94 | 852.75 | 984.14 | 1275.75 | 1260.14 | 925.00 | 934.93 | 727.27 | 1007.06 | 1067.24 |
| 90/90 | 1410.37 | 1303.11 | 953.04 | 978.82 | 1084.23 | 1439.23 | 888.99 | 741.79 | 1177.83 | 1445.31 | 1406.16 | 1622.30 | 1202.95 |
| 91/91 | 1087.21 | 600.98 | 1167.17 | 921.63 | 851.51 | 803.00 | 503.23 | 499.92 | 765.38 | 1576.84 | 1527.51 | 1620.54 | 996.85 |
| 92/92 | 1571.13 | 1717.06 | 1389.44 | 1702.37 | 1573.60 | 963.24 | 668.82 | 796.64 | 1031.77 | 1147.34 | 1611.81 | 1806.36 | 1328.51 |
| 93/93 | 1843.22 | 1769.21 | 1749.13 | 1413.31 | 630.75 | 613.86 | 746.37 | 1102.14 | 1111.24 | 1100.62 | 1680.91 | 1845.52 | 1297.72 |
| 94/94 | 1702.99 | 1707.58 | 1574.85 | 1026.10 | 649.23 | 708.14 | 796.61 | 903.78 | 997.04 | 1225.04 | 1681.63 | 1739.99 | 1223.47 |
| 95/95 | 1597.63 | 1079.85 | 815.60 | 627.25 | 507.99 | 655.86 | 1030.37 | 543.72 | 640.64 | 939.60 | 1126.55 | 1522.91 | 924.48 |
| 96/96 | 1360.19 | 1330.56 | 1353.41 | 1330.38 | 1221.36 | 2793.15 | 5579.76 | 2704.63 | 1707.92 | 1209.66 | 1407.84 | 1555.63 | 1969.75 |
| 97/97 | 1418.50 | 1201.88 | 1380.24 | 1304.24 | 1250.98 | 987.86 | 777.13 | 676.47 | 981.96 | 1111.23 | 1792.37 | 1876.85 | 1229.80 |
| 98/98 | 1595.82 | 1489.26 | 1391.94 | 1454.44 | 971.75 | 648.52 | 768.81 | 971.99 | 1052.19 | 1237.05 | 1678.39 | 1768.93 | 1250.96 |
| 99/99 | 1417.43 | 1711.92 | 1325.54 | 1407.55 | 1383.50 | 1053.38 | 794.75 | 676.12 | 1194.15 | 1201.02 | 874.25 | 1429.51 | 1202.40 |
| 00/00 | 1437.44 | 1653.15 | 1599.21 | 1094.87 | 1350.85 | 1202.52 | 1225.22 | 1039.73 | 1001.24 | 1056.25 | 1675.64 | 1579.85 | 1324.55 |
| 01/01 | 1459.35 | 1473.20 | 1313.95 | 1347.15 | 916.99 | 1382.13 | 945.99 | 761.52 | 747.18 | 1368.80 | 1391.43 | 1831.12 | 1243.33 |
| AVG | 1358.79 | 1295.51 | 1201.34 | 1159.63 | 1044.69 | 1202.71 | 1267.54 | 1076.41 | 1089.12 | 1231.62 | 1381.97 | 1470.51 | 1231.38 |
| STD | 286.33 | 343.71 | 341.74 | 300.88 | 269.99 | 502.34 | 946.37 | 452.59 | 276.01 | 209.11 | 265.38 | 297.40 | 201.12 |
| MIN | 589.34 | 558.80 | 470.61 | 583.65 | 507.99 | 493.14 | 490.00 | 499.92 | 558.96 | 867.74 | 727.27 | 825.84 | 866.37 |
| MAX | 1843.22 | 1769.21 | 1749.13 | 1745.12 | 1573.60 | 2793.15 | 5579.76 | 2704.63 | 1707.92 | 1627.73 | 1792.37 | 1876.85 | 1969.75 |

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                 RELATION BETWEEN   RESERVOIR ---> STRUCTURE ---> LINK ---> RESERVOIR
                 ====================================================================

 SEVEN_A (1001) --->          SEVEN_A (2001) --->       DOWN_SEVEN_A (5001) --->          SEVEN_B (1002)
 SEVEN_A (1001) --->    SEVEN_A_SPILLWA (3001) --->       DOWN_SEVEN_A (5001) --->          SEVEN_B (1002)

 SEVEN_B (1002) --->          SEVEN_B (2002) --->       DOWN_SEVEN_B (5002) --->          SEVEN_C (1003)
 SEVEN_B (1002) --->    SEVEN_B_SPILLWA (3002) --->       DOWN_SEVEN_B (5002) --->          SEVEN_C (1003)

 SEVEN_C (1003) --->          SEVEN_C (2003) --->       DOWN_SEVEN_C (5003) --->          SEVEN_D (1004)
 SEVEN_C (1003) --->    SEVEN_C_SPILLWA (3003) --->       DOWN_SEVEN_C (5003) --->          SEVEN_D (1004)

 SEVEN_D (1004) --->          SEVEN_D (2004) --->       DOWN_SEVEN_D (5004) --->          SEVEN_E (1005)
 SEVEN_D (1004) --->    SEVEN_D_SPILLWA (3004) --->       DOWN_SEVEN_D (5004) --->          SEVEN_E (1005)

 SEVEN_E (1005) --->          SEVEN_E (2005) --->       DOWN_SEVEN_E (5005) --->          SEVEN_F (1006)
 SEVEN_E (1005) --->    SEVEN_E_SPILLWA (3005) --->       DOWN_SEVEN_E (5005) --->          SEVEN_F (1006)

 SEVEN_F (1006) --->          SEVEN_F (2006) --->       DOWN_SEVEN_F (5006) --->          SEVEN_G (1007)
 SEVEN_F (1006) --->    SEVEN_F_SPILLWA (3006) --->       DOWN_SEVEN_F (5006) --->          SEVEN_G (1007)

 SEVEN_G (1007) --->          SEVEN_G (2007) --->       DOWN_SEVEN_G (5007) --->         ..... END
 SEVEN_G (1007) --->    SEVEN_G_SPILLWA (3007) --->       DOWN_SEVEN_G (5007) --->         ..... END


                 TRANSMISSION LINES SYSTEM      TRANSMISSION NODE ÄÄÄ> RECEIVING NODE
                 ====================================================================

        SEVEN_A 2001    (Hydro   -> PEAK)
        SEVEN_B 2002    (Hydro   -> PEAK)
        SEVEN_C 2003    (Hydro   -> PEAK)
        SEVEN_D 2004    (Hydro   -> PEAK)
        SEVEN_E 2005    (Hydro   -> PEAK)
        SEVEN_F 2006    (Hydro   -> PEAK)
        SEVEN_G 2007    (Hydro   -> PEAK)

>>>>>   No transmission line was defined   <<<<<
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## DEMAND CHARACTERISTICS

| Period | Energy Demand (GWh) | Load Duration Curve for each period Power Demand (MW) 0.0% | 100.0% |
|---|---|---|---|
| JAN | 84.90 | 114.1 | 114.1 |
| FEB | 76.90 | 114.4 | 114.4 |
| MAR | 84.90 | 114.1 | 114.1 |
| APR | 82.20 | 114.2 | 114.2 |
| MAY | 84.90 | 114.1 | 114.1 |
| JUN | 82.20 | 114.2 | 114.2 |
| JUL | 84.90 | 114.1 | 114.1 |
| AUG | 84.90 | 114.1 | 114.1 |
| SEP | 82.20 | 114.2 | 114.2 |
| OCT | 84.90 | 114.1 | 114.1 |
| NOV | 82.20 | 114.2 | 114.2 |
| DEC | 84.90 | 114.1 | 114.1 |

## ANNUAL CORRECTION FACTOR

>>> No annual correction factor <<<

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                    ESOLIN -->  X:\014942~1\ENGINE~1\PROSPER\PCN_MTH.res  --> 2002/11/13   (10:26:12)
                                         PEACE CASCADE - MONTHLY SIMULATION 1972-2001
                                                SEVEN PROJECT DEVELOPMENT

                                                      SEVEN_A (1001)
Maximum level  (m)  :  462.00
Minimum level  (m)  :  458.00
Amount of water required to produce 1 GWh (hm3) :   1.000

Level (m)                 :   454.20  456.00  458.00  460.00  462.00
Surface (km2)             :      1.4     1.6     1.7     1.8     2.0
Storage (hm3)             :      0.0     2.1     4.2     6.3     8.4

                                 JAN     FEB     MAR     APR     MAY     JUN     JUL     AUG     SEP     OCT     NOV     DEC
Evaporation (mm/per)      :     0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
Rule curve #1 (m)         :   459.00  459.00  459.00  459.00  459.00  459.00  459.00  459.00  459.00  459.00  459.00  459.00
Rule curve #2 (m)         :   460.00  460.00  460.00  460.00  460.00  460.00  460.00  460.00  460.00  460.00  460.00  460.00

                                                     SEVEN_A (2001)
Powerhouse type --> PEAK/BASE
Minimum operation level (m):   458.00
Total outflow (m3/s)      :     0.00  300.00  500.00  944.00 1200.00 1500.00 1980.00 3000.00 4000.00 6000.00
Tailwater   (m) [ 454.10]  :   454.10  454.18  454.29  454.69  455.28  455.28  455.75  456.57  457.20  458.17
Total turbined flow (m3/s) :     0.00 2000.00
Headlosses (m)            :     0.00    0.01
TURBINE #1
Max Production (MW)       :    77.00
Availability (%/per)      :    95.00   95.00   95.00   95.00   95.00   95.00   95.00   95.00   95.00   95.00   95.00   95.00
Turbined flow (m3/s)      :     0.00
Headlosses (m)            :     0.00
Net head (m)              :     4.04    5.04    6.04
Max turbined flow (m3/s)   :  1980.00 1980.00 1980.00
                               Efficiency (%)
Opening [  0.000%]        :    88.90   88.90   88.90
Opening [ 90.000%]        :    88.90   88.90   88.90
Opening [100.000%]        :    88.90   88.90   88.90

Downstream link code --> 5001 -->   Minimum turbine flow
Minimum flow         -->       300.00  300.00  300.00  300.00  300.00  248.00  200.00  300.00  300.00  300.00  300.00  300.00
                                                   SEVEN_A_SPILLWAY (3001)
Gated
Reservoir level (m)       :   460.00  462.00
Maximum outflow (m3/s)     :  8000.00 8000.00
Amount of water required to produce 1 GWh (hm3) : 100000000.000
Downstream link code --> 5001
Minimum flow         -->       300.00  300.00  300.00  300.00  300.00  248.00  200.00  300.00  300.00  300.00  300.00  300.00
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                 ESOLIN -->  X:\014942~1\ENGINE~1\PROSPER\PCN_MTH.res  --> 2002/11/13   (10:26:12)
                                  PEACE CASCADE - MONTHLY SIMULATION 1972-2001
                                         SEVEN PROJECT DEVELOPMENT

                                              SEVEN_B (1002)
Maximum level  (m)  :  456.20
Minimum level  (m)  :  452.20
Amount of water required to produce 1 GWh (hm3) :   1.000
Level (m)                  :   446.20  448.90  451.50  454.20  456.20
Surface (km2)              :      3.8     4.6     5.4     6.2     7.1
Storage (hm3)              :     11.2    13.2    15.1    17.1    19.0
                                  JAN     FEB     MAR     APR     MAY     JUN     JUL     AUG     SEP     OCT     NOV     DEC
Evaporation (mm/per)       :     0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
Rule curve #1 (m)          :   453.20  453.20  453.20  453.20  453.20  453.20  453.20  453.20  453.20  453.20  453.20  453.20
Rule curve #2 (m)          :   454.10  454.10  454.10  454.10  454.10  454.10  454.10  454.10  454.10  454.10  454.10  454.10
                                               SEVEN_B (2002)
Powerhouse type --> PEAK/BASE
Minimum operation level (m):   452.20
Total outflow (m3/s)       :     0.00  300.00  500.00  944.00 1200.00 1500.00 1980.00 3000.00 4000.00 6000.00
Tailwater   (m) [ 446.20]  :   446.20  446.25  446.32  446.57  446.74  446.93  447.24  447.89  448.47  449.49
Total turbined flow (m3/s) :     0.00 2000.00
Headlosses (m)             :     0.00    0.01

TURBINE #1
Max Production (MW)        :   118.00
Availability (%/per)       :    95.00   95.00   95.00   95.00   95.00   95.00   95.00   95.00   95.00   95.00   95.00   95.00
Turbined flow (m3/s)       :     0.00
Headlosses (m)             :     0.00
Net head (m)               :     6.35    7.35    8.35
Max turbined flow (m3/s)   :  1980.00 1980.00 1980.00
                                Efficiency (%)
Opening [  0.000%]         :    88.90   88.90   88.90
Opening [ 90.000%]         :    88.90   88.90   88.90
Opening [100.000%]         :    88.00   88.00   88.00

Downstream link code --> 5002 -->   Minimum turbine flow
Minimum flow         -->       300.00  300.00  300.00  300.00  300.00  248.00  200.00  300.00  300.00  300.00  300.00  300.00

                                          SEVEN_B_SPILLWAY (3002)
Gated
Reservoir level (m)        :   454.10  456.10
Maximum outflow (m3/s)     :  8000.00 8000.00
Amount of water required to produce 1 GWh (hm3) : 100000000.000
Downstream link code --> 5002
Minimum flow         -->       300.00  300.00  300.00  300.00  300.00  248.00  200.00  300.00  300.00  300.00  300.00  300.00
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ESOLIN -->  X:\014942~1\ENGINE~1\PROSPER\PCN_MTH.res  --> 2002/11/13   (10:26:12)
                    PEACE CASCADE - MONTHLY SIMULATION 1972-2001
                           SEVEN PROJECT DEVELOPMENT

                                 SEVEN_C (1003)
Maximum level  (m)  :  448.20
Minimum level  (m)  :  444.20
Amount of water required to produce 1 GWh (hm3) :   1.000
Level (m)                  :   438.20  440.20  442.20  444.20  446.20  448.20
Surface (km2)              :      4.2     4.6     4.9     5.2     5.6     5.9
Storage (hm3)              :     16.8    17.4    18.0    18.6    19.1    19.7

                                  JAN     FEB     MAR     APR     MAY     JUN     JUL     AUG     SEP     OCT     NOV     DEC
Evaporation (mm/per)       :     0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
Rule curve #1 (m)          :   445.20  445.20  445.20  445.20  445.20  445.20  445.20  445.20  445.20  445.20  445.20  445.20
Rule curve #2 (m)          :   446.20  446.20  446.20  446.20  446.20  446.20  446.20  446.20  446.20  446.20  446.20  446.20

                                 SEVEN_C (2003)
Powerhouse type --> PEAK/BASE
Minimum operation level (m):   444.20
Total outflow (m3/s)       :     0.00  300.00  500.00  944.00 1200.00 1500.00 1980.00 3000.00 4000.00 6000.00
Tailwater   (m) [ 438.20]  :   438.20  438.31  438.48  438.99  439.27  439.57  439.98  440.76  441.42  442.47
Total turbined flow (m3/s) :     0.00 2000.00
Headlosses (m)             :     0.00    0.01

TURBINE #1
Max Production (MW)        :   107.00
Availability (%/per)       :    95.00   95.00   95.00   95.00   95.00   95.00   95.00   95.00   95.00   95.00   95.00   95.00
Turbined flow (m3/s)       :     0.00
Headlosses (m)             :     0.00
Net head (m)               :     5.93    6.93    7.93
Max turbined flow (m3/s)   :  1980.00 1980.00 1980.00
                                Efficiency (%)
Opening [  0.000%]         :    88.90   88.90   88.90
Opening [ 90.000%]         :    88.90   88.90   88.90
Opening [100.000%]         :    88.00   88.00   88.00

Downstream link code --> 5003 -->   Minimum turbine flow
Minimum flow         -->       300.00  300.00  300.00  300.00  300.00  248.00  200.00  300.00  300.00  300.00  300.00  300.00

                              SEVEN_C_SPILLWAY (3003)
Gated
Reservoir level (m)        :   446.20  448.20
Maximum outflow (m3/s)     :  8000.00 8000.00
Amount of water required to produce 1 GWh (hm3) : 100000000.000
Downstream link code --> 5003
Minimum flow         -->       300.00  300.00  300.00  300.00  300.00  248.00  200.00  300.00  300.00  300.00  300.00  300.00
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                                         PEACE CASCADE - MONTHLY SIMULATION 1972-2001
                                                SEVEN PROJECT DEVELOPMENT

                                                      SEVEN_D (1004)
Maximum level  (m)  :  440.20
Minimum level  (m)  :  436.20
Amount of water required to produce 1 GWh (hm3) :   1.000
Level (m)                  :   431.00  432.70  434.60  436.40  438.20  440.20
Surface (km2)              :      2.8     3.1     3.3     3.6     3.8     4.1
Storage (hm3)              :      8.6     9.7    10.8    11.9    13.0    14.2
                                  JAN     FEB     MAR     APR     MAY     JUN     JUL     AUG     SEP     OCT     NOV     DEC
Evaporation (mm/per)       :     0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
Rule curve #1 (m)          :   437.20  437.20  437.20  437.20  437.20  437.20  437.20  437.20  437.20  437.20  437.20  437.20
Rule curve #2 (m)          :   438.20  438.20  438.20  438.20  438.20  438.20  438.20  438.20  438.20  438.20  438.20  438.20

                                                      SEVEN_D (2004)
Powerhouse type --> PEAK/BASE
Minimum operation level (m):   436.20
Total outflow (m3/s)       :     0.00  300.00  500.00  944.00 1200.00 1500.00 1980.00 3000.00 4000.00 6000.00
Tailwater   (m) [ 431.00]  :   431.00  431.04  431.12  431.40  431.61  431.88  432.35  433.38  434.31  436.64
Total turbined flow (m3/s) :     0.00 2000.00
Headlosses (m)             :     0.00    0.01
TURBINE #1
Max Production (MW)        :   101.00
Availability (%/per)       :    95.00   95.00   95.00   95.00   95.00   95.00   95.00   95.00   95.00   95.00   95.00   95.00
Turbined flow (m3/s)       :     0.00
Headlosses (m)             :     0.00
Net head (m)               :     5.59    6.59    7.59
Max turbined flow (m3/s)   :  1980.00 1980.00 1980.00
                                Efficiency (%)
Opening [  0.000%]         :    88.90   88.90   88.90
Opening [ 90.000%]         :    88.90   88.90   88.90
Opening [100.000%]         :    88.00   88.00   88.00
Downstream link code --> 5004 -->   Minimum turbine flow
Minimum flow         -->       300.00  300.00  300.00  300.00  300.00  248.00  200.00  300.00  300.00  300.00  300.00  300.00

                                                 SEVEN_D_SPILLWAY (3004)
Gated
Reservoir level (m)        :   438.20  440.20
Maximum outflow (m3/s)     :  8000.00 8000.00
Amount of water required to produce 1 GWh (hm3) : 100000000.000
Downstream link code --> 5004
Minimum flow         -->       300.00  300.00  300.00  300.00  300.00  248.00  200.00  300.00  300.00  300.00  300.00  300.00
```

ESOLIN -->  X:\014942~1\ENGINE~1\PROSPER\PCN_MTH.res  --> 2002/11/13   (10:26:12)

PEACE CASCADE - MONTHLY SIMULATION 1972-2001

SEVEN PROJECT DEVELOPMENT

SEVEN_E (1005)

```
Maximum level  (m)  :  433.00
Minimum level  (m)  :  429.00
Amount of water required to produce 1 GWh (hm3) :   1.000
Level (m)                 :   425.00  427.00  429.00  431.00  433.00
Surface (km2)             :      5.4     5.8     6.3     6.8     7.2
Storage (hm3)             :     16.2    18.5    20.8    23.0    25.3

                               JAN     FEB     MAR     APR     MAY     JUN     JUL     AUG     SEP     OCT     NOV     DEC
Evaporation (mm/per)      :     0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
Rule curve #1 (m)         :   430.00  430.00  430.00  430.00  430.00  430.00  430.00  430.00  430.00  430.00  430.00  430.00
Rule curve #2 (m)         :   431.00  431.00  431.00  431.00  431.00  431.00  431.00  431.00  431.00  431.00  431.00  431.00
```

SEVEN_E (2005)

```
Powerhouse type --> PEAK/BASE
Minimum operation level (m):   429.00
Total outflow (m3/s)      :     0.00  300.00  500.00  944.00 1200.00 1500.00 1980.00 3000.00 4000.00 6000.00
Tailwater   (m) [ 425.00]  :   425.00  425.03  425.08  425.25  425.39  425.57  425.88  426.57  427.12  428.07
Total turbined flow (m3/s) :     0.00 2100.00
Headlosses (m)            :     0.00    0.01
TURBINE #1
Max Production (MW)       :    94.00
Availability (%/per)      :    95.00   95.00   95.00   95.00   95.00   95.00   95.00   95.00   95.00   95.00   95.00   95.00
Turbined flow (m3/s)      :     0.00
Headlosses (m)            :     0.00
Net head (m)              :     4.61    5.61    6.61
Max turbined flow (m3/s)   :  2100.00 2100.00 2100.00
                               Efficiency (%)
Opening [  0.000%]        :    88.90   88.90   88.90
Opening [ 90.000%]        :    88.90   88.90   88.90
Opening [100.000%]        :    88.00   88.00   88.00
Downstream link code --> 5005 -->   Minimum turbine flow
Minimum flow         -->       300.00  300.00  300.00  300.00  300.00  300.00  300.00  300.00  300.00  300.00  300.00  300.00
```

SEVEN_E_SPILLWAY (3005)

```
Gated
Reservoir level (m)       :   431.00  433.00
Maximum outflow (m3/s)     :  8000.00 8000.00
Amount of water required to produce 1 GWh (hm3) : 100000000.000
Downstream link code --> 5005
Minimum flow         -->       300.00  300.00  300.00  300.00  300.00  300.00  300.00  300.00  300.00  300.00  300.00  300.00
```

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                   ESOLIN -->  X:\014942~1\ENGINE~1\PROSPER\PCN_MTH.res  --> 2002/11/13   (10:26:12)
                                        PEACE CASCADE - MONTHLY SIMULATION 1972-2001
                                               SEVEN PROJECT DEVELOPMENT

                                                    SEVEN_F (1006)
Maximum level  (m)  :  427.00
Minimum level  (m)  :  423.00
Amount of water required to produce 1 GWh (hm3) :   1.000
Level (m)                  :   417.00  419.00  421.00  423.00  425.00  427.00
Surface (km2)              :      3.8     4.2     4.7     5.2     5.6     6.1
Storage (hm3)              :     11.2    12.7    14.2    15.6    17.1    18.6

                                  JAN     FEB     MAR     APR     MAY     JUN     JUL     AUG     SEP     OCT     NOV     DEC
Evaporation (mm/per)       :     0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
Rule curve #1 (m)          :   424.00  424.00  424.00  424.00  424.00  424.00  424.00  424.00  424.00  424.00  424.00  424.00
Rule curve #2 (m)          :   425.00  425.00  425.00  425.00  425.00  425.00  425.00  425.00  425.00  425.00  425.00  425.00

                                                     SEVEN_F (2006)
Powerhouse type --> PEAK/BASE
Minimum operation level (m):   423.00
Total outflow (m3/s)       :     0.00  300.00  500.00  944.00 1200.00 1500.00 1980.00 3000.00 4000.00 6000.00
Tailwater   (m) [ 417.00]  :   417.00  417.03  417.09  417.28  417.42  417.60  417.89  418.55  419.14  420.20
Total turbined flow (m3/s) :     0.00 2000.00
Headlosses (m)             :     0.00    0.01
TURBINE #1
Max Production (MW)        :   130.00
Availability (%/per)       :    95.00   95.00   95.00   95.00   95.00   95.00   95.00   95.00   95.00   95.00   95.00   95.00
Turbined flow (m3/s)       :     0.00
Headlosses (m)             :     0.00
Net head (m)               :     6.58    7.58    8.58
Max turbined flow (m3/s)   :  2100.00 2100.00 2100.00
                                Efficiency (%)
Opening [  0.000%]         :    88.90   88.90   88.90
Opening [ 90.000%]         :    88.90   88.90   88.90
Opening [100.000%]         :    88.00   88.00   88.00
Downstream link code --> 5006 -->   Minimum turbine flow
Minimum flow         -->       300.00  300.00  300.00  300.00  300.00  300.00  300.00  300.00  300.00  300.00  300.00  300.00

                                                 SEVEN_F_SPILLWAY (3006)
Gated
Reservoir level (m)        :   425.00  427.00
Maximum outflow (m3/s)     :  8000.00 8000.00
Amount of water required to produce 1 GWh (hm3) : 100000000.000
Downstream link code --> 5006
Minimum flow         -->       300.00  300.00  300.00  300.00  300.00  300.00  300.00  300.00  300.00  300.00  300.00  300.00
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                    ESOLIN -->  X:\014942~1\ENGINE~1\PROSPER\PCN_MTH.res  --> 2002/11/13   (10:26:12)
                                         PEACE CASCADE - MONTHLY SIMULATION 1972-2001
                                                SEVEN PROJECT DEVELOPMENT

                                                      SEVEN_G (1007)
Maximum level  (m)  :  419.00
Minimum level  (m)  :  415.00
Amount of water required to produce 1 GWh (hm3) :   1.000
Level (m)                  :   410.00  411.75  413.50  415.25  417.00  419.00
Surface (km2)              :      3.5     4.0     4.6     5.2     5.8     6.2
Storage (hm3)              :     10.4    11.7    13.0    14.4    15.7    16.5

                                  JAN     FEB     MAR     APR     MAY     JUN     JUL     AUG     SEP     OCT     NOV     DEC
Evaporation (mm/per)       :     0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
Rule curve #1 (m)          :   416.00  416.00  416.00  416.00  416.00  416.00  416.00  416.00  416.00  416.00  416.00  416.00
Rule curve #2 (m)          :   417.00  417.00  417.00  417.00  417.00  417.00  417.00  417.00  417.00  417.00  417.00  417.00

                                                      SEVEN_G (2007)
Powerhouse type --> PEAK/BASE
Minimum operation level (m):   415.00
Total outflow (m3/s)       :     0.00  300.00  500.00  944.00 1200.00 1500.00 1980.00 3000.00 4000.00 6000.00
Tailwater   (m) [ 408.49]  :   408.49  408.49  408.85  409.57  409.77  410.02  410.41  411.39  411.92  412.83
Total turbined flow (m3/s) :     0.00 2000.00
Headlosses (m)             :     0.00    0.01
TURBINE #1
Max Production (MW)        :   121.00
Availability (%/per)       :    95.00   95.00   95.00   95.00   95.00   95.00   95.00   95.00   95.00   95.00   95.00   95.00
Turbined flow (m3/s)       :     0.00
Headlosses (m)             :     0.00
Net head (m)               :     6.23    7.23    8.23
Max turbined flow (m3/s)   :  2100.00 2100.00 2100.00
                                Efficiency (%)
Opening [  0.000%]         :    88.90   88.90   88.90
Opening [ 90.000%]         :    88.90   88.90   88.90
Opening [100.000%]         :    88.00   88.00   88.00
Downstream link code --> 5007 -->   Minimum turbine flow
Minimum flow         -->       300.00  300.00  300.00  300.00  300.00  300.00  300.00  300.00  300.00  300.00  300.00  300.00

                                                 SEVEN_G_SPILLWAY (3007)
Gated
Reservoir level (m)        :   417.00  419.00
Maximum outflow (m3/s)     :  8000.00 8000.00
Amount of water required to produce 1 GWh (hm3) : 100000000.000
Downstream link code --> 5007
Minimum flow         -->       300.00  300.00  300.00  300.00  300.00  300.00  300.00  300.00  300.00  300.00  300.00  300.00
```

# APPENDIX B
# ICE STUDIES

**BChydro**

THE POWER IS YOURS

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Resource Management
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17 December 2002

Garry W. Stevenson, P. Eng.
Principal Geotechnical Engineer
Klohn Crippen Consultants Ltd.
Suite 500 - 2955 Virtual Way
Vancouver, BC
V5M 4X6

**Re: Peace Cascade Hydroelectric Project – Ice Effects**

Dear Mr. Stevenson:

I am pleased to present my evaluation on the effects of ice formation at the various plants for the 7 dam option as presented in Klohn Crippen and SNC Lavalin September 2002.

**Effects of Ice on the available head for generation**
To estimate the stage-up and duration of ice effected backwater at the tailraces at each site, the RICE Model (Lal and Shen 1991, BC Hydro 2002) was used. Since the effect of the proposed Dunvegan project downstream of the site increases the frequency of the ice cover in the lower Peace Cascade reach and the construction of the Dunvegan Dam appears likely, the effect of the Dunvegan Project was incorporated into the modelling.

*The RICE Model*
"The RICE model (Lal and Shen, 1991) is a coupled ice-hydraulic one-dimensional river ice model. The flow condition is determined by a finite-difference solution of one-dimensional unsteady flow equations. Distributions of water temperature and ice concentration are determined by equations of transport of thermal energy and ice. These equations are solved by a Lagrangian-Eularian scheme. The effects of surface ice, skim ice, and shore ice formations on ice production are considered. The formation of ice cover is formulated according to the existing equilibrium ice jam theories (Pariset and Hausser, 1961). The undercover ice accumulation is formulated according to the critical velocity criteria. The growth and decay of the ice cover are simulated using a finite-difference formulation applicable to composite ice covers consisting of snow, ice and frazil layers." In this study a daily time step was used.

The RICE model does not allow for internal boundary conditions (such as those imposed by dams); to allow for these conditions, the model would have had to be configured by the developers at Clarkson University, NY for each reach between the projects. The various segments would then be run sequentially starting from upstream to downstream. This option proved to be too costly and the Clarkson Team did not have the resources to perform this work to meet the project deadline. However, a suitable method of getting around this problem was found. BC Hydro already had in its possession a version of the RICE Model that simulated three river segments; Peace Canyon to Site C, Site C to Dunvegan, and Dunvegan

The Dunvegan Dam was not considered, but since that project is also run-of-river it would not have a significant damping effect on the flood peak. The hydrograph was routed downstream to determine the peak discharge at three communities of interest, The Old Fort of Ft. St. Johns, the Village of Taylor and the Town of Peace River. Two simulations were performed, one for an average annual discharge of 1170 $m^3$/s and one for a high winter discharge of 1980 $m^3$/s. The second part of the analysis consisted of applying a steady state ice jam rating curve or historical ice jam elevations to estimate the severity of flooding if the ice cover did break-up and jam as a result of the dam breach.

*The Old Fort of Ft. St. Johns*
This location is only 4 km downstream of Dam 7g and so there would be very little attenuation from a dam breach. The resulting DAMBRK peak discharges for the average and high initial flows were 4550 $m^3$/s and 4800 $m^3$/s respectively. Break-up jams do not occur naturally in this reach and therefore no studies are available that would give a relationship between the discharge and the peak break-up water level. Steady-state ice jams for these discharges could be modeled using HEC-RAS. However, we know from freeze-up ice jams in the area that minor freeze-up ice jam flooding can occur at moderate discharges around 1500 $m^3$/s (Keenhan et al 1982). Thus a rapid tripling of the discharge to the values above is certain to fracture the ice cover (if one exists) near Old Fort and produce flooding. The levels would likely be overbank by several meters and would push blocks of ice onto the floodplain and produce high velocities, causing danger to life and property. The odds of this occurring are related to the frequency and duration of an ice cover in the Old Fort area, which from BC Hydro 2002 can be conservatively estimated to be about 1 in 5 years with a duration of 60 days.

*The Village of Taylor*
This location is about 15 km downstream of Dam 7g and so there would be some attenuation from a dam breach. The resulting DAMBRK peak discharges for the average and high initial flows were 2600 $m^3$/s and 3270 $m^3$/s respectively. Again, break-up jams do not occur naturally in this reach and therefore no studies are available that would give a relationship between the discharge and the peak break-up water level. However, freeze-up ice jams can cause minor flooding in the area at discharges also around 1500 $m^3$/s. Thus a rapid increase of the discharge as above would likely fracture the ice cover (if one exists) near Taylor and produce flooding. The levels would likely be overbank by several meters and would push blocks of ice onto the floodplain and produce high velocities. The odds of this occurring are related to the frequency and duration of an ice cover in the Village of Taylor area, which from BC Hydro 2002 can be conservatively estimated to be about 1 in 3 years with a duration of 60 days. However, all residential properties on the floodplain in the Village of Taylor were purchased by BC Hydro, so the consequences of such flooding would be lessened but would still be hazardous for anyone traveling in the area.

*The Town of Peace River*
This location is about 290 km downstream of Dam 7g. The resulting DAMBRK peak discharges for the average and high initial flows were 1410 $m^3$/s and 2180 $m^3$/s respectively. This is only about 200 to 240 $m^3$/s above the base discharge indicating that the flood peak attenuates substantially by the time one reaches the Town of Peace River. This disturbance is unlikely to fracture a competent ice cover. Even if it did so the levels produced would not be enough to overtop the town dykes. Trillium 1996 performed an analysis of three break-up events and determined that the town dykes are high enough to contain an ice jam under a discharge of 3200 $m^3$/s with 0.5 m of freeboard. However, should the dam breach occur

during the period when the ice front is advancing upstream of the Town of Peace River, (when it is less competent) a secondary consolidation event (or a mid-winter break-up) could occur and cause high water levels at the Town of Peace River. The small 200 $m^3/s$ surge is enough to trigger such an event. A secondary consolidation consists of the collapse of the order of 100 km of ice or more that releases water from channel storage causing discharges that are much greater than the original base flow in the river. This could potentially trigger an event that would overtop the Town of Peace River dykes. This sensitive period occurs every year and lasts on average for about 40 days.

**Frazil Problem Potential at the Cascade Dams**

There is the potential for frazil particles to block trash racks that can cause sudden plant shut downs. The removal and cleaning of the racks can last for several days and be expensive in terms of lost generation and O&M. Divers maybe required. The spillways need to be fully operational on short notice throughout the winter to pass 100% of the discharge. These problems should not be prohibitive, as there are more severe climates in other provinces where low head structures operate. The final design of the intakes and trashracks should consider means to minimize these problems. Firms and Hydroelectric companies in central and eastern Canada familiar with these problems should be consulted prior to the development of the final design.

It was a pleasure to be involved in this interesting project. Please give me a call at (604-528-2580) if you have any questions.

Sincerely

Martin Jasek, M. Sc., P. Eng.

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