

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY

HAT CREEK PROJECT

PROGRESS REPORT

SYSTEM ENGINEERING DIVISION

AUGUST 1975

GEOLOGICAL BRANCH  
ASSESSMENT REPORT

00 129

OPEN FILE

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## SECTION 1

### INTRODUCTION

Since the summer of 1974, planning for a thermal electric generating plant at Hat Creek has proceeded concurrently with an exploratory drilling program to determine the extent of the coal deposits.

First power from the Hat Creek thermal generating station is currently scheduled for January 1983. Planning studies conducted to date indicate that the level of activity on the many phases of the project will have to be stepped up if this date is to be achieved on the basis of normal Government approval procedures and usual B.C. Hydro purchasing practices.

This report presents a summary of the work completed to date and the proposed actions in respect to future studies that will be required in order that the process of planning approvals proceeds on an orderly basis.

## SECTION 2

### EXPLORATION PROGRESS REPORT

An extensive progress report on the exploration program at Hat Creek has been prepared by B.C. Hydro's coal geologist (Reference 1) as summarized below:

#### 2.1 REGIONAL GEOLOGY

Reconnaissance geological mapping was begun in the fall of 1974 by Dolmage Campbell and Associates, and is continuing to determine the geological structure of the Upper Hat Creek Valley. This information

enables the extent and quality of the coal deposits in the Valley to be determined.

## 2.2 EXPLORATION METHODS

An extensive gravity survey of the Valley has been conducted by C. Ager and Associates. The results of the survey indicate a variation in the acceleration of gravity due to variations in the density of rock material near the surface of the earth. By analysis of this data a model is developed which approximates the shape and location of the coal zones.

A magnetometer survey, which measures variations in the earth's magnetic field due to local rock magnetism, has been conducted by B.C. Hydro geologists and this data, together with the gravity survey data, has been used in formulating the geological model of the Valley and in determining the location of exploratory diamond drilling.

## 2.3 DIAMOND DRILLING PROGRAM AND BOREHOLE GEOPHYSICAL LOGGING

Diamond drilling has been carried out to determine the extent and structure of coal deposits in the more promising areas of the Upper Hat Creek Valley. To date 60 diamond drill holes and 4 rotary drill holes totalling 83,164 feet of drilling have been completed. The direct costs of drilling has ranged from \$15.00 to \$20.00 per foot depending on weather, accessibility, and drilling conditions.

Core samples from the boreholes are studied to determine the rock types and thickness of each zone. Also the boreholes themselves are studied by a number of techniques which are known collectively as borehole geophysical logging. The information provided by these logs enables the geologic structure in the vicinity of the borehole to be determined so that a projection of geologic structure between boreholes can be made.

2.31 Stage 1 Drilling

The 22 diamond drill holes of Stage 1 were restricted to No. 1 Openpit.

2.32 Completion of Stage 2 Drilling

To date Stage 2 has included approximately 57,000 feet of drilling at a cost of \$1,710,000. Approximately 13,000 feet of drilling at a cost of \$390,000 remain to be completed in Stage 2 in order to establish a proper basis for selection of the location for the finalized pit detailed drilling. The Stage 2 program will be completed by the end of October 1975.

2.33 Stage 3 Drilling

Additional drilling and exploration will be required to:

- a) provide detailed information on geological structure of the potential openpit;
- b) ensure continuity of grade and thickness of coal zones and to study the stability of pit margins.

Part a) of this program would require an additional 30,000 feet of drilling which would be accompanied by additional geological mapping, core and borehole logging, and gravity and magnetometer surveys.

Part b) of the program would require as much as 20,000 feet of drilling in order to outline the areas which are best suited to initial openpit mining with regard to accessibility, grade of coal, and thickness of the coal zone. Stage 3 drilling will commence in November 1975 upon completion of Stage 2.

Concurrent with this drilling program, a knowledge of the hydro-geological condition should be obtained by measuring the "in situ" permeability and static piezometric pressures in new drill holes.

Under Stage 3 the conceptual mining studies will be carried out including selection of the initial openpit mine.

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2.4 OPENPIT SITES AND COAL RESOURCES

On the basis of the exploration and drilling programs which have been conducted in the Upper Hat Creek Valley, there are two sites where the majority of the near-surface coal is located. These sites are known as No. 1 Openpit and No. 2 Openpit with locations as shown in Exhibit 5.

The coal zone in No. 1 Openpit extends to a maximum depth of about 1600 feet and contains a total coal reserve of 566,887,000 short tons. The heating value of coal samples taken from this site had a mean value of about 6000 Btu/lb., a moisture content of 20% and a mean ash content of 28%.

The coal outline of No. 2 Openpit as presently known is 18,000 feet in length and possibly 2500 feet in width. It is apparently bounded by south-southeasterly trending faults. The upper surface of the coal measure has been encountered at depths below surface ranging from less than 100 feet in the north to 900 feet in the south. Eight holes drilled into the deposit to date have intersected from 950 feet to 1950 feet of coal although no hole is known to have reached the bottom of the deposit.

Using the above dimensions for the length and width and an average depth of 1000 feet, the coal resource in the No. 2 deposit is in excess of 1.5 billion tons. Characteristics of the coal in No. 2 deposit are not yet available from the testing laboratories.

2.5 EXPLORATION PROGRAM COSTS

The following expenses and estimates are the total stage drilling costs and include the costs of geological mapping, geophysical surveys and borehole geophysical logging, cartography and engineering studies.

Summary of Expenses and Estimates for Hat Creek  
Exploration Program

Stage	Fiscal Year	Feet Drilled or Proposed	Drilling Costs X 10 <sup>3</sup>
1	1974	26,413	\$ 512
<hr/>			
2	1974	32,000	\$ 809
	1975	<u>38,000</u>	<u>1,291</u>
	TOTAL	70,000	\$2,100
<hr/>			
3 <sup>1</sup>	1975	40,000	\$1,200
	1976	<u>10,000</u>	<u>300</u>
	TOTAL	50,000	\$1,500

1 - Stage 3 drilling costs are preliminary estimates only.

SECTION 3

FEASIBILITY REPORT AND COST ESTIMATE

An assignment was issued to the System Design Division to confirm the feasibility of, and to prepare cost estimates for, a conventional thermal generating plant of approximately 2000 MW with possible expansion to 5000 MW. The study considered unit sizes in the range of 375 to 800 MW and various types of closed cooling systems. The report was completed on 8 July 1975.

The report indicated that a large coal-fired thermal plant in the Hat Creek Valley is feasible and economic. The most favourable arrangements for 2000 MW were 4 x 560 MW units, 3 x 750 MW units or a combination of 2 x 375 MW plus 2 x 750 MW units.



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Capital costs vary with the unit size but are in the order of \$740 million for 2000 MW or \$370 per kw based on 1975 costs including interest during construction but not corporate overhead. The energy cost at 75% capacity factor and 10% interest was about 8.5 mills/kwh.

These costs were utilized in the Task Force report and represent an increase of \$65 million over those used in the December 1974 System Plans and Capital Requirements. A significant portion of the increased cost results from an increase in plant size of some 6% and the remainder from preparation of detailed cost estimates.

The report recommends a large scale coal burning test be conducted at an existing utility plant, requiring a minimum of 50,000 tons of coal. Plans are to start mining for the sample by the end of February 1976 with the coal burn taking place some time in July and August 1976. Costs for the coal burning tests have been estimated at \$900,000 for mining the sample and \$950,000 for coal burning in an existing utility plant.

## SECTION 4

### ENVIRONMENTAL STUDIES

#### 4.1 PRELIMINARY ENVIRONMENTAL IMPACT STUDY

This study was assigned to B.C. Research and Dolmage Campbell and Associates in August 1974. After a review with the Environment and Land Use Committee Secretariat and interested Government departments, the terms of reference were finalized and the study proceeded on the basis of a completion date by 31 December 1974.

(B.C. Research was selected for the assignment partly as a result of having conducted environmental studies in the general area but largely because of a proven expertise in the area of social impact studies.)

The schedule for the study was revised when it became evident that the amount of work required was greater than originally anticipated.

The report is expected to be available in its final form in August, at which time it is hoped that approval will be received to forward it to the ELUG Secretariat and other interested Government departments.

Based on estimated completion costs from the consultants, it is anticipated the Preliminary Environmental Impact Report would be completed for approximately \$167,000.

The major recommendations for further study resulting from this preliminary report are as follows:

- a) Studies of slope stability (pit excavation, overburden and waste rock dumps), groundwater intrusion, biological angle of repose, and revegetation and other reclamation procedures. These could be accomplished on a "pilot" scale when the trenches and attendant disposal areas resulting from the mining of the burn sample are available for study and testwork.
- b) More definitive study of trace elements (research, data acquisition, testwork) as they relate to water, soil and rock, plant and animal life, and possible economic recoveries.
- c) Collection of meteorological and air quality data (ongoing) for the establishment of background levels before operation, and use in site evaluation with respect to atmospheric emissions of the generating plant.
- d) Studies associated with the diversion of Hat Creek around the openpit to determine the environmental effects of the various proposed methods of diversion and to select an optimum solution. Included in the study would be effects on, and required remedial actions for, fishery, water quality, irrigation, domestic use and so forth.

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- e) Determination of the groundwater regime in the pit area, the probable effect on it of the pit excavation, and suggestions for possible required remedial action.
- f) Effects of various water intake designs as they relate to fish hazard and fry migration.
- g) Detailed vegetation survey through a minimum one-year period to determine productivity, seasonal use, potential values and timber quantities.
- h) Detailed ecological studies of the effect of the proposed development on the wildlife of the area; acquisition of base-line data and application of other data (air and water quality, greater activity, etc.) with respect to its effect on fish, animals, birds and man.
- i) Sources of project manpower; training programs.
- j) More specific and detailed study of secondary project impacts on trade, income, employment.
- k) Once site or sites for final analysis are selected, then many factors can receive more specific local and regional analysis - housing and construction camp planning, traffic flow increases by route mode and facility, school requirements, municipal services, social services, recreational planning for the camp and principal towns.
- l) The Indian Bands' situation relative to the project - more specific analysis of job opportunities, commercial or development opportunities, means to preserve traditional values and reduce potential friction.

4.2 METEOROLOGICAL STUDY

4.21 Status of Existing Assignment

Meteorological assessment of the Hat Creek region has been under way

since the installation of eight weather stations and five hygro-thermographs in December 1974. The continuous generation of station data coupled with a Minisonde study of the diffusion characteristics of the Hat Creek Valley in the winter of 1975 have provided valuable information about the meteorological patterns in and around the Valley. The Climate and Data Services of the ELUC Secretariat have performed the data reduction requirements for B.C. Hydro. A mathematical simulation of Valley ambient air quality has been useful in evaluating power plant site alternatives with the data available to data although more studies are recommended.

#### 4.22 Hat Creek Air Impact Assessment Program Proposal

A proposal has been prepared by the Environmental Services Section of the Operations Engineering Division suggesting "... a method of evaluating the atmospheric assimilative capacity and economic resource aspect of a thermal generating facility in British Columbia using Hat Creek coal". The proposal recommends a method for site and stack height selection for a thermal power plant. Included in the proposal are recommended methods and time sequence for:

- a) surface and upper level meteorological measurements
- b) gas tracer studies
- c) site elimination in an air quality context
- d) mathematical and wind tunnel modelling
- e) background ambient air quality modelling
- f) vegetation surveys

in addition to twelve detailed recommendations on implementing the proposal. The assessment program is described in detail with a cost/scheduling breakdown of an estimated \$280,000 required over a period of 18 months.

#### 4.3 HAT CREEK TRANSMISSION ENVIRONMENTAL STUDIES

The Hat Creek transmission will consist ultimately of two 500 kV circuits between Kelly Lake Substation and Nicola Substation, looped into the Hat Creek Station. In addition, reinforcement of existing transmission

between Nicola and Vancouver and/or Kelly Lake and Vancouver, on right-of-way mostly already acquired, will be necessary.

Complete environmental studies, similar to that presently being conducted for the Nicola-Selkirk-Cranbrook 500 kV transmission, will be required for the Kelly Lake-Hat Creek-Nicola 500 kV circuits. It is estimated that the cost of such studies, not including the funds necessary for mitigation and compensation, could reach \$125,000. This cost is assumed to be included in the Transmission portion of the Hat Creek Capital Requirements.

## SECTION 5

### GOVERNMENT APPROVALS AND PROJECT SCHEDULES

Government approvals required for the development of a coal mining operation and a coal fired thermal electric plant are as follows:

- Environment and Land Use Committee
- Pollution Control Act Permit
- Water Licences
- Reclamation Permit
- Land Commission Act
- Land Act
- Coal Lease
- Approval of Mining Methods
- Federal Fisheries Act Section 28 Approval
- Treasury Board Approval

The following approval requirements were summarized from an extensive report, Summary and Details of Government Approvals (Reference 2) prepared by B.C. Hydro's Legal Division.

#### 5.1 ENVIRONMENT AND LAND USE COMMITTEE

The Environment and Land Use Committee has set out certain procedures for assessing B.C. Hydro power projects. The Committee will be responsible for selecting potential power projects from the five

alternatives that are currently under study. ELUC agreed that public hearings should be held to aid it in the selection process and that these hearings should be held under the aegis of ELUC. It would appear that this hearing is supposed to occur before any other hearings involving applications for government licences for a specific project like Hat Creek. ELUC states that the project data at the time of the hearing should be sufficiently accurate and complete to allow evaluation and preliminary selection of the generation project or projects to be considered for next development. In the time available it is not possible to gather enough data to allow a choice from five real alternatives. In view of this, no project selection hearing is provided for in the attached planning and activity schedules, Exhibits 1-4.

The following discussion of various Government approvals is based on the assumption the above review has been completed with the ELUC Secretariat and the initial in-service date for the Hat Creek project is January 1983.

#### 5.2 POLLUTION CONTROL ACT PERMITS

After consultation with the Pollution Control Branch it is estimated that 6 months should be allowed in order to obtain an air pollution permit from the Director after a public hearing. However, such a permit could be appealed to the Pollution Control Board which would probably take another 4 months. The Pollution Control Board's decision could, in turn, be appealed to the Cabinet which would entail approximately an additional three months. The total time is 13 months. Other permits for solids and liquids will take approximately the same amount of time.

#### 5.3 WATER LICENCES

- a) Diversion of water from Thompson River.
- b) Realignment of Hat Creek.

Applications must be made for diversion of water from Thompson River

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and realignment of Hat Creek. A minimum of seven to eight months disregarding any possibility of appeals to the Cabinet -- allow three to four months for appeal to Cabinet for a total of eleven months minimum.

5.4 RECLAMATION PERMIT

Department of Mines advises that existing reclamation permit for drilling can be adjusted to cover the 50,000 ton test burn pit.

Section 8 of the Coal Mines Regulation Act provides for notices of an application for a reclamation permit to be published after which the Minister may hear representations within 30 days. Apparently, the Department of Mines has never had a public hearing to hear representations from people affected by a reclamation report, but it is expected that on a project of this size there might be a public hearing probably handled by the Environment and Land Use Committee in conjunction with other hearings. For this reason it is difficult to say how long the process would take, but B.C. Hydro should probably allow six months.

5.5 LAND COMMISSION ACT

Application for excluding the project site from the Agricultural Land Reserve pursuant to Section 9(2) of the Land Commission Act and perhaps Section 9(1) for land B.C. Hydro do not own would require three and one-half months until a hearing and another four months for appeals etc. for a total of 7½ months.

5.6 LAND ACT

Application for Crown lands in the Hat Creek Valley including some which are subject to grazing leases would be required.

The standard form of lease used by the Lands Branch for grazing leases contained a provision which provided for 60 days' notice where it was deemed in the public interest or where the lands were required for a higher economic or other use.

The Branch indicated that a minimum of 6 months was required to obtain Legal tenure. However they would like more time if possible. They also indicated that it was probable that Hydro would not receive fee simple title to the land but a lease probably for 30 years with a right of renewal for an additional 40 years.

#### 5.7 COAL LEASE

A coal lease would follow as a matter of course if a reclamation permit, air pollution permit and other government approvals were obtained. A coal lease could be obtained fairly quickly if it was needed to secure financing for the project. Three and one-half months have been allowed.

#### 5.8 APPROVAL OF MINING METHODS

Approval of mining methods pursuant to Section 7 of the Coal Mines Regulation Act requires Hydro to file with the Chief Inspector of Mines a plan of the system under which it is proposed to work the mine and no work can be commenced without the written approval of the Chief Inspector.

Since there is no involvement of the public in this process the Department of Mines has indicated that the formal application and approval by the Chief Inspector of Mines should only take one month. Consultation with the Department should start as soon as a draft mining plan is available.

#### 5.9 FEDERAL FISHERIES ACT SECTION 28 APPROVAL

Application for approval of fish guards on Thompson River intakes. The fish guards must be built and maintained subject to the approval of the Ministry of Fisheries.

Contact should be made with the Department of Fisheries at the earliest possible date in order to cooperate on the design of the fish guards.



5.10 TREASURY BOARD APPROVAL

1) Preliminary Approval -- 1 January 1977

On this date it would be hoped to obtain approval in principle for major expenditures on the project subject to the satisfactory resolution of any applications for Government approvals. Once preliminary Treasury Board approval is obtained, Hydro would prepare specifications and advertising for tenders on some plant equipment.

2) Final Approval -- 1 August 1977

By this date all Government approvals needed before Treasury Board approval should have been obtained with no possibility of further appeals. Hydro would need Final Approval so that it could place orders for plant equipment on 1 September 1977.

5.11 INDIANS

- a) Management should be aware that some downstream water licences are apparently held on Indian reserve.
- b) Management should be aware that at present the main access road apparently passes through an Indian reservation.
- c) Management should also be aware that the Indians may wish to use their position to force the Provincial Government to bargain on their land claims.
- d) More legal research is required to determine the legal basis of Indian claims including both riparian and territorial rights.

5.12 PROJECT SCHEDULING AND HEARINGS

The planning schedules (Exhibits 1 and 2) show the timing of studies, approvals, design and construction for a first unit in-service date

of January 1983 based on combined and individual hearings for approvals as listed. The time span is sufficient to place the first unit in service with an orderly development. There is no allowance for strikes at the plant site or late delivery of critical equipment. To advance the in-service date would require short-circuiting of normal approval procedures and/or purchasing policies.

Also included are two activity schedules for approvals (Exhibits 3 and 4) based on construction authorization in August 1977. The figures indicate the coordination of planning schedules with the Government approval requirements described for both combined and individual hearing possibilities.

A combined hearing would result in a saving of time and expense for all concerned including Hydro employees, Government agencies and outside groups wishing to oppose the project. Also, comments on the project would be in the proper perspective with regard to the whole project.

A combined hearing would result in the following concerns:

- a) How the legal requirements of the relevant statutes would be satisfied has not been established.
- b) Studies required for certain approvals will have to be completed at an earlier date than would otherwise be the case.

## SECTION 6

### FUTURE STUDIES

#### 6.1 POWER PLANT CONCEPTUAL DESIGN

Draft terms of reference for the conceptual design studies of the

thermal generating station are under preparation. The terms of reference will be sectionalized to facilitate overall coordination by one consultant with subconsultants completing individual components. The studies will provide a preliminary engineering design as a basis for power plant specifications and will include a detailed site selection study to be completed by June 1976 as well as backup information for Approval applications and hearings.

For budget purposes the cost of the conceptual design studies have been assumed at 0.1% of the capital cost of the generating station (without contingency and IDC) as established in the System Design Division's Feasibility Report and Cost Estimate.

#### 6.2 LAB BENCH TESTS

Terms of reference for establishing the characteristics of Hat Creek coal through small scale combustion and laboratory tests are being prepared. An estimated \$40,000 is required to complete the tests.

#### 6.3 POWER PLANT FINAL DESIGN

The final design of the generating station would follow the conceptual design at a cost estimated at 3% of the capital cost.

#### 6.4 MINE CONCEPTUAL DESIGN

A mine conceptual design study is required to provide pit location recommendations, evaluate mining methods and provide direction for the detailed drilling. A report of reclamation methods and pit and waste dump slope stability are considered important aspects of the study. Draft terms of reference have been produced and a proposal from PD-NCB Consultants Limited has been received.

The cost of the studies have been estimated at \$500,000 for budget purposes.

#### 6.5 MINE FINAL DESIGN

Final design of the mine would follow the conceptual design at a cost estimated at \$2,000,000.

#### 6.6 TRANSPORTATION STUDY

A transportation study is required of the road and rail facilities affected by the development of the Hat Creek coal deposits. A technical, economic and environmental evaluation of alternative transportation access routes to the Hat Creek Valley is to be included. It is proposed to assign the study in September 1975 such that draft copies of the report would be available in December 1975. Draft terms of reference have been prepared.

#### 6.7 GROUNDWATER STUDY

An evaluation of present groundwater conditions and the effects of a possible openpit mine is required. The work would be done in conjunction with the detailed drilling Stage 3 and the conceptual design of the mine. The study could at least partially be completed using B.C. Hydro engineering capability.

#### 6.8 WATER SUPPLY STUDY

A study to investigate and evaluate the alternatives available for supplying water to a 2000 MW power development should be initiated. This would include a comparison of pipeline/tunnel routes in technical, economic and environmental terms as well as a detailed evaluation of river water intakes to satisfy Federal Fisheries Act requirements.

#### 6.9 HAT CREEK DIVERSION STUDY

The diversion of Hat Creek around a proposed openpit mine site must be investigated during the early stages of the conceptual design of the mine. This study would include an evaluation of the ecological impact of the diversion.

## 6.10 DETAILED ENVIRONMENTAL STUDIES

Detailed follow-up studies will be required based on the recommendations of the Preliminary Environmental Impact Study. The following is a partial list of possible future studies:

### Description of Study

a) Agricultural-Irrigation Development

Study the use of thermal power plant water supply and waste heat for possible agricultural-irrigation development in the Hat Creek vicinity. This should be carried out in coordination with the Department of Agriculture.

b) Trace Element/Ash Utilization

Initiate a study of trace elements in water, soil, rock, ash, coal, mine wastes, and plant and animal tissue including background levels, effects of the project and possible economic recovery potential. This would include an investigation into the possible uses of ash.

c) Vegetation Survey

Initiate a detailed vegetation survey through all seasons including productivity and growth potential.

d) Wildlife and Fish Survey

Implement a study of wildlife and fish including detailed population and migration studies including effects of proposed development and possible compensation action to counteract detrimental effects.

e) Site-Specific Socio-economic Impact

Socio-economic site specific study of secondary project impacts on trade, income, regional development and employment in areas directly affected by the proposed project. Cost benefit analysis is to be included.

f) Future Studies

Ongoing environmental studies and mitigation (unallocated at this time).

SECTION 7

LAND ACQUISITION

Land acquisition is one of the most sensitive problems associated with new project development inasmuch as it often represents the first point of contact and potential conflict with the public.

Early in 1974 it became evident that B.C. Hydro's exploratory drilling activities in the Hat Creek Valley were giving rise to considerable unrest among the dozen or so ranchers who are landowners in the Hat Creek Valley.

Accordingly the Board of Directors' approval was obtained at a meeting on 9 May 1975 to purchasing the land of any existing landowner in the Hat Creek Valley.

The establishment of this policy did much to defuse a situation that at one stage threatened to halt the progress of the drilling program.

To date, two landowners in the Valley have approached B.C. Hydro with a request that B.C. Hydro purchase their land. A budget allocation of \$3 million has been requested by the Land Division to cover the contingencies of purchasing land offered by the existing landowners. If a decision is made to carry out detailed drilling for the mine in the No. 2 Openpit, it may be necessary to accelerate land purchase from some of the existing landholders.

## SECTION 8

### COMMUNITY RELATIONS

#### 8.1 PROGRAM TO DATE

An Open Planning policy has been followed from the earliest stages of planning. The purpose of the program is to develop public confidence in Hydro's planning process with respect to this project, and to enable those who may be affected by the project to make their concerns known to Hydro while there is still flexibility in planning

Effective contact has been established with:

- a) Residents of the Hat Creek Valley
- b) Local Indian Bands (four) and the Department of Indian Affairs
- c) Local municipal governments (Cache Creek, Ashcroft, Clinton, Lillooet)
- d) The Regional District (Thompson-Nicola)
- e) Provincial Government Resource Departments (via the ELUC Secretariat and the Thompson-Okanagan Regional Resource Management Committee)
- f) MLA (Yale-Lillooet)
- g) "Environmental" organizations

Of considerable interest to the above groups is the Preliminary Environmental Impact Study now being prepared by B.C. Research. This report is being looked upon as the basic discussion document relative to matters of public concern.

#### 8.2 NEXT STEPS

- a) To develop a distribution and discussion program based upon the B.C. Research socio-economic report, expected to be released in late summer.

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- b) To provide residents and others with information on the various Government approvals and permits required by Hydro for the project, and the expected timing of applications for them should there be a decision by Hydro to proceed.
- c) To develop a "Hat Creek Newsletter" for both internal and (if authorized by Management) external information on the progress of studies and other developments of interest.

SECTION 9

BUDGET SUMMARY

Exhibit 6 indicates the 1975 and 1976 capital requirements of \$3,380,000 and \$7,640,000 respectively for Hat Creek 2000 MW generating station as compared with the \$2,166,000 and \$8,855,000 included in the current System Plans and Capital Requirements for the 10 year period 1 April 1975 to 31 March 1985.

The reason for the increased expenditure in the 1975 fiscal year is largely due to increased coal exploration following the increased resources discovered in No. 2 Openpit. Extensive drilling required to evaluate the No. 2 Openpit deposit as potential thermal coal in comparison to No. 1 Openpit accounts for an increase of \$1,341,000. Other increases include expansion of the meteorological program, acceleration of mining of coal for the test burn program, commencement of mine conceptual design and advancement of land acquisition accounting for an additional \$273,000.

A \$400,000 decrease in 1975 costs results from delays in direct engineering and environmental studies caused by the expansion of the exploration program and delayed completion of the Preliminary Environmental Impact Study.



## SECTION 10

### PROPOSED ACTIONS

- 10.1 The Preliminary Environmental Impact Study by B.C. Research is scheduled for completion in August 1975. Discussion with the Environment and Land Use Committee Secretariat is scheduled for the project and the proposed schedule of Government approvals.
- 10.2 Pending a resolution of the form of the hearing, the present plans are to proceed on the basis of a Super Hearing since it requires a longer lead time for certain studies than that required for four individual hearings.
- 10.3 The development of a conceptual mining study is proposed to provide advice on the Stage 3 detailed mine site drilling which is currently scheduled to start by November 1975.
- 10.4 Plans are to have the Air Impact Statement for the proposed project prepared by the Environmental Services Section of the Operations Engineering Division as outlined in their proposal of 27 June 1975.
- 10.5 It is proposed to initiate the following studies in the period September 1975 to January 1977.
  - a) Power Plant Conceptual Design
  - b) Mine Conceptual Design
  - c) Hat Creek Transmission Environmental Study
  - d) Transportation
  - e) Groundwater
  - f) Water Supply
  - g) Hat Creek Diversion
  - h) Agricultural-Irrigation Development
  - i) Trace Element/Ash Utilization

- j) Vegetation Survey
- k) Wildlife and Fisheries Survey
- l) Site-Specific Socio-economic Impact

- 10.6 An immediate investigation by B.C. Hydro's Legal Division of native Indian rights that could relate to the development of the project is proposed; while the proposed mine and plant site will not be located on Indian land, Indian Reservations control all the prime access to the Hat Creek Valley.
- 10.7 It is proposed to have exploratory discussions with the Federal Department of Fisheries in respect to a proposed water intake on the Thompson River. This would be done in conjunction with the assignment of the Water Supply Studies.
- 10.8 It is proposed to adopt the revised project budget estimates as required to meet the January 1983 in-service date.
- 10.9 It is planned to initiate a program for the internal and external release of information on the progress and development of Hat Creek in the form of a "Hat Creek Newsletter".

**HAT CREEK THERMAL GENERATING STATION**  
**PLANNING SCHEDULE TO JANUARY 1983 - FIRST UNIT IN SERVICE**

ACTIVITY GOVERNING CONSTRUCTION SCHEDULE		1975	1976	1977	1978	1979	1980	1981	1982	1983
1	ENVIRONMENTAL STUDIES - PRELIMINARY - METEOROLOGICAL - MAIN	=====	=====							
2	DRILLING PROGRAM - STAGE 2 EXPLORATION - STAGE 3 DETAIL	=====	=====							
3	ENGINEERING STUDIES - RELATED COAL UTILIZATION - TRANSPORTATION - WATER SUPPLY - GROUNDWATER - HAT CREEK DIVERSION	=====	=====							
4	COMMUNITY RELATIONS - INFORMATION PROGRAM - PUBLIC MEETINGS		=====							
5	APPROVALS - POLLUTION CONTROL ACT (PERMIT) - WATER ACT (LICENCE) - COAL MINES REGULATION ACT (RECLAMATION PERMIT) - LAND COMMISSION ACT (APPROVAL) - LAND ACT (TENURE) - COAL ACT (LEASE) - COAL MINES REGULATION ACT (APPROVAL OF MINING METHODS) - FEDERAL FISHERIES ACT (APPROVAL) - TREASURY BOARD (APPROVAL)			-----*						
6	CONSTRUCTION AUTHORIZATION			-----P-----F						
7	COAL TEST BURN - MINING OF SAMPLE - COAL BURN TEST		-----							
8	MINE - CONCEPTUAL DESIGN (SLOPE STABILITY/RECLAMATION) - FINAL DESIGN - CONSTRUCTION		=====	=====						
9	THERMAL GENERATING STATION - FEASIBILITY - CONCEPTUAL DESIGN - SPECIFICATIONS - BIDDING AND AWARD - FINAL DESIGN - CONSTRUCTION	=====	=====	=====	=====	=====				

**EXHIBIT I**  
**COMBINED HEARINGS**

LEGEND  
 \* HEARING  
 P PRELIMINARY  
 F FINAL

24

EXHIBIT I

**HAT CREEK THERMAL GENERATING STATION  
PLANNING SCHEDULE TO JANUARY 1983 - FIRST UNIT IN SERVICE**

ACTIVITY GOVERNING CONSTRUCTION SCHEDULE		1975	1976	1977	1978	1979	1980	1981	1982	1983
1	ENVIRONMENTAL STUDIES - PRELIMINARY - METEOROLOGICAL - MAIN	_____	_____							
2	DRILLING PROGRAM - STAGE 2 EXPLORATION - STAGE 3 DETAIL	_____	_____							
3	ENGINEERING STUDIES - RELATED COAL UTILIZATION - TRANSPORTATION - WATER SUPPLY - GROUNDWATER - HAT CREEK DIVERSION	_____	_____							
4	COMMUNITY RELATIONS - INFORMATION PROGRAM - PUBLIC MEETINGS		_____							
5	APPROVALS - POLLUTION CONTROL ACT (PERMIT) - WATER ACT (LICENCE) - COAL MINES REGULATION ACT (RECLAMATION PERMIT) - LAND COMMISSION ACT (APPROVAL) - LAND ACT (TENURE) - COAL ACT (LEASE) - COAL MINES REGULATION ACT (APPROVAL OF MINING METHODS) - FEDERAL FISHERIES ACT (APPROVAL) - TREASURY BOARD (APPROVAL)			⊗ ⊗ ⊗ ⊗ _____ P P						
6	CONSTRUCTION AUTHORIZATION			P V						
7	COAL TEST BURN - MINING OF SAMPLE - COAL BURN TEST		_____							
8	MINE - CONCEPTUAL DESIGN (SLOPE STABILITY/RECLAMATION) - FINAL DESIGN - CONSTRUCTION		_____	_____					_____	
9	THERMAL GENERATING STATION - FEASIBILITY - CONCEPTUAL DESIGN - SPECIFICATIONS - BIDDING AND AWARD - FINAL DESIGN - CONSTRUCTION	_____	_____	_____	_____	_____				

**EXHIBIT 2**  
**SEPARATE HEARINGS**

**LEGEND**  
 ⊗ HEARING  
 P PRELIMINARY  
 F FINAL

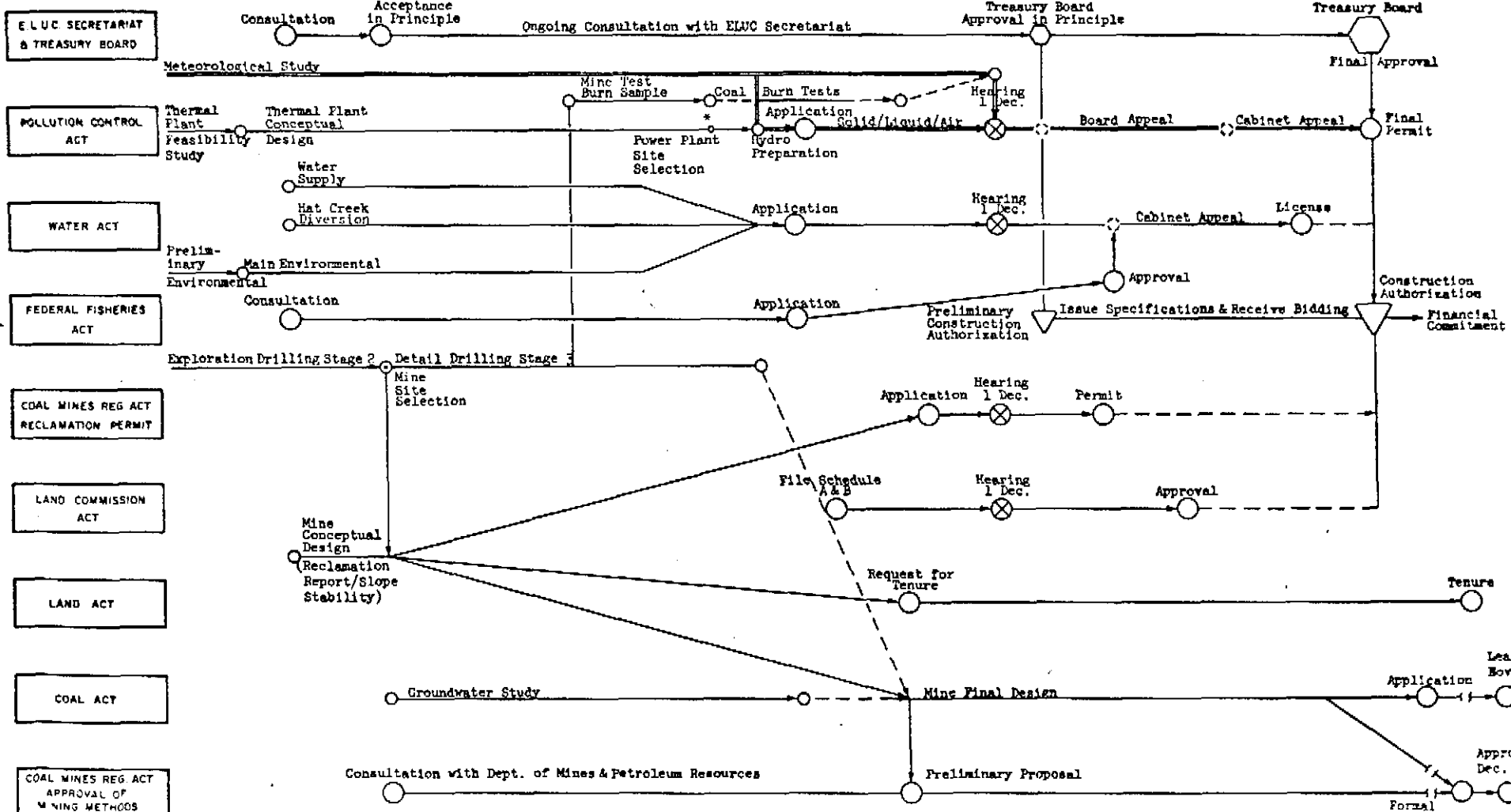
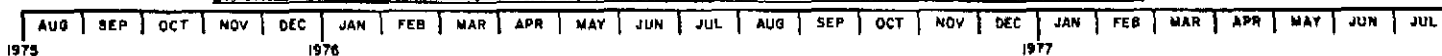
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EXHIBIT 2

# HAT CREEK THERMAL GENERATING STATION

## ACTIVITY SCHEDULE FOR APPROVALS - TO CONSTRUCTION AUTHORIZATION

COMBINED HEARINGS



• POWER PLANT SITE SELECTION requires input from studies including Plant Conceptual Design, Preliminary Environmental, Mine Site Selection, Met. Study, Water Supply & Transportation.

**LEGEND**  
 FLOAT TIME - - - - -  
 POSSIBLE APPROVAL WITHOUT APPEAL (X)  
 NON-CRITICAL ACTIVITIES ———  
 CRITICAL ACTIVITIES ———

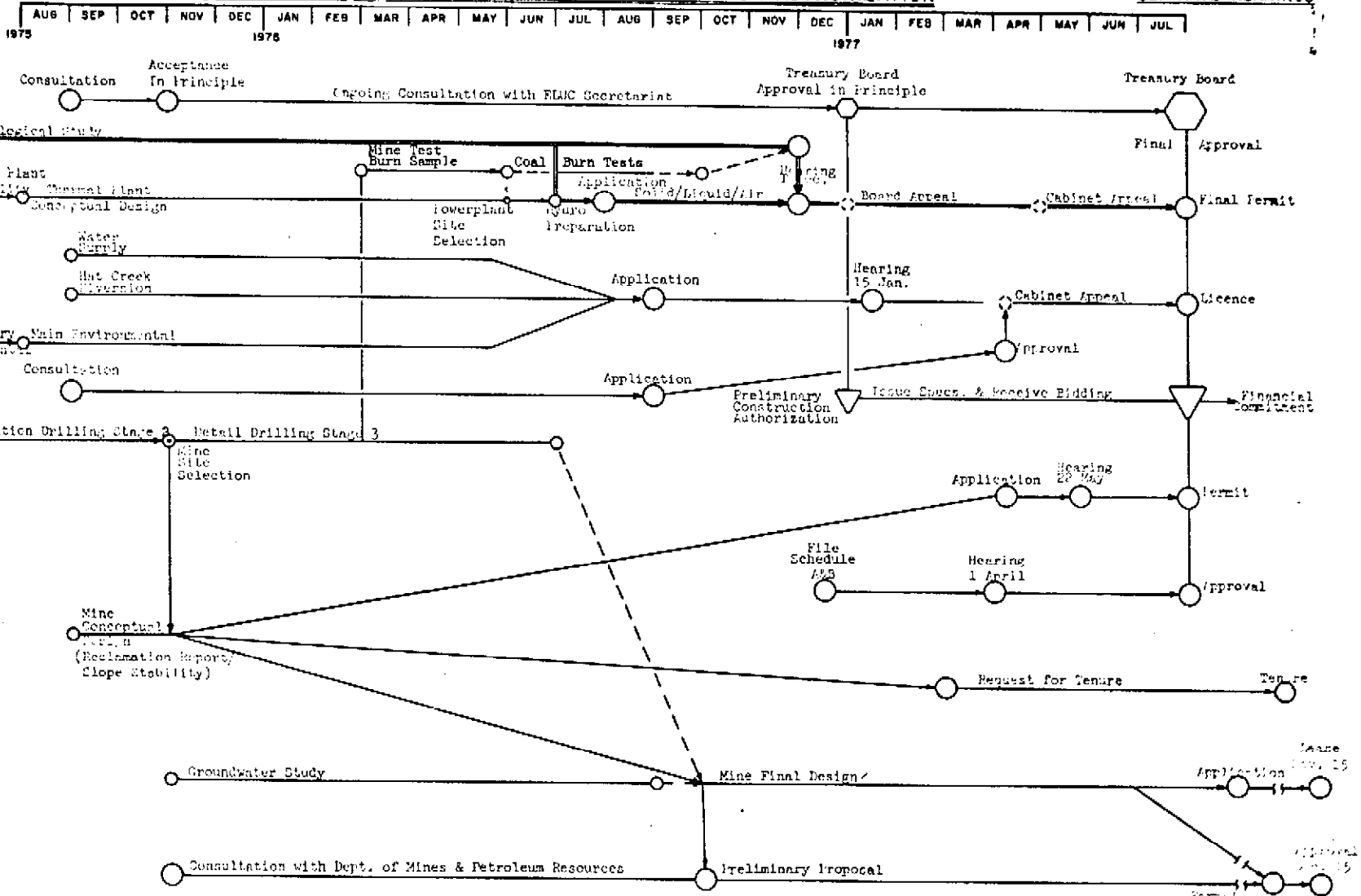
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EXHIBIT 3

# HAT CREEK THERMAL GENERATING STATION

## ACTIVITY SCHEDULE FOR APPROVALS - TO CONSTRUCTION AUTHORIZATION

SEPARATE HEARINGS



\* POWER PLANT DESIGN AND CONSTRUCTION COSTS FROM STUDIES INCLUDING Plant Conceptual Design, Preliminary Environmental, Mine Site Selection, Water Study, Water Supply & Transportation.

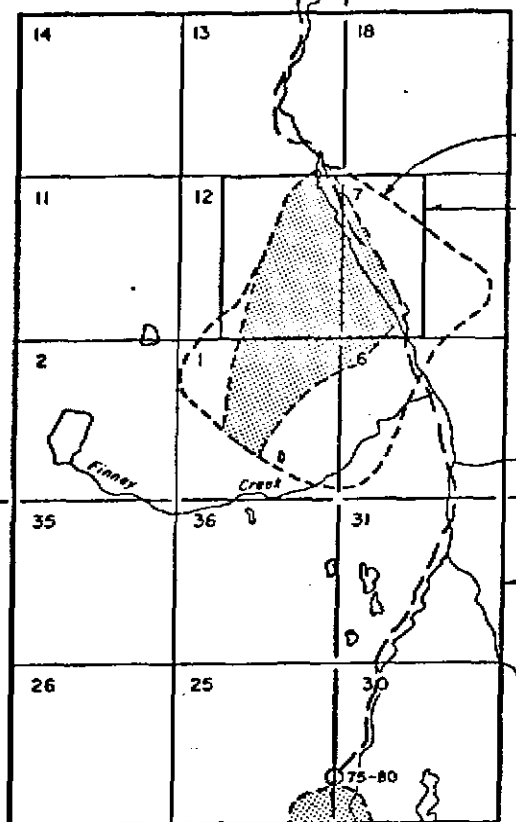
**LEGEND**  
 FLOAT TIME - - - - -  
 POSSIBLE APPROVAL WITHOUT APPEAL (O)  
 NON-CRITICAL ACTIVITIES - - - - -  
 CRITICAL ACTIVITIES ———

TO PAVILION  
13 MI.

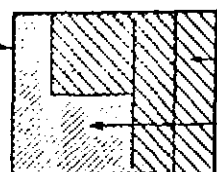
TO CACHE CREEK  
18 MI.

Tp 21 R27 W6

Tp 21 R26 W6



OPENPIT NO. 1



SURFACE OWNED  
IN FEE  
CROWN GRANT  
OF COAL

Medicine  
Creek

LICENCES HELD

Ambustan  
Creek

Tp 20 R26 W6

Tp 20 R27 W6

**LEGEND**

- DRILL HOLES
- NO COAL
- MAJOR COAL
- ◐ LOWER COAL NEAR SURFACE OR MINOR COAL
- ▨ COAL DEPOSIT
- ROAD

0 1 2  
MILES

COAL OUTLINE OF  
NO. 2 OPENPIT

LICENCE BEING  
APPLIED FOR

Phil  
Creek

Tp 19 R27 W6

Tp 19 R26 W6

TO ASHCROFT  
18 MI.

**HAT CREEK PROJECT**  
**OPENPIT COAL DEPOSITS**  
**UPPER HAT CREEK VALLEY**

HAT CREEK 2000 MW THERMAL GENERATING STATION  
CAPITAL REQUIREMENTS FOR FISCAL YEARS 1975 AND 1976

STUDY - ACTIVITY	PROPOSED BUDGET *			CURRENT SYSTEM PLAN**			VARIANCE			SOURCE OF ESTIMATE FOR PROPOSED BUDGET	
	Prior to 1975	1975	1976	Prior to 1975	1975	1976	Prior to 1975	1975	1976		
Environmental Studies	Preliminary Meteorological Main	100 45	67 150 100	175 1300	90 75	69 173	114	+10 -30	+67 +81 -73	+175 +1186	Actual/B.C. Research Est. 22 May 1975 Actual/Previous Budget/PGS Proposal Gen. Plng. Approx. 30% of Plant Design
Drilling Program	Stage 2 Exploration Stage 3 Detail	1321	1291 1200	300	} 1129	1150	229	+192	+1341	+71	Actual/Dolmage Campbell Dolmage Campbell Approx.
Engineering Studies	Transportation Water Supply Groundwater Hat Creek Div. Lab Bench Tests		30 50 20 25 30	10 75 10 75 10		} 135	716	4727	-17	-394	-2685
Thermal Generating Station	Feasibility Conceptual Design Final Design Construction	118	17 150	440 1422	} 58		2070		+42	-42	
Coal Test Burn	Mining Sample Coal Burn		100	928 1100		} 1000					
Land Acquisition (non-inflatable)			50	550					+50	-450	
Mining	Conceptual Design Final Design Construction		100	400 200				+100	+400	+200	Generation Planning Generation Planning
	Sub-total	1584	3380	6995	1429	2166	8140	+155	+1214	-1145	
	Inflation	-	-	645	-	-	715	-	-	-70	
	Inflated Total	1584	3380	7640	1429	2166	8855	+155	+1214	-1215	
	Cumulative Total		4964	12604		3595	12450	+1369	+154		

\* Excluding Transmission Costs  
 \*\* Source: System Plans and Capital Requirements, System Engineering Division  
 Published December 1974 - Revised June 1975



## REFERENCES

1. Memorandum on Hat Creek Exploration Program Progress Report; Hydro-electric Design Division, Civil Department McCullough, P.T. July 1975
2. Summary and Details of Government Approvals required for the Hat Creek Project; Legal Division Marshall, I.E. July 1975
3. Hat Creek Air Impact Assessment Program Proposal; Environmental Services Section, Structure Department, Operations Engineering Division Sagert, P.G. 27 June 1975
4. Hat Creek Coal Fired Thermal Power Plant Feasibility Report and Cost Estimate; System Design Division Report No. 104 July 1975
5. Preliminary Environmental Impact Study of the Proposed Hat Creek Openpit Mine and Thermal Generating Station; B.C. Research - scheduled for completion August 1975

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Copies of the listed references may be obtained by calling Miss S. O'Dwyer at 689-9412, extension 286.

**HAT CREEK THERMAL GENERATING STATION  
PLANNING SCHEDULE TO JANUARY 1983 - FIRST UNIT IN SERVICE**

ACTIVITY GOVERNING CONSTRUCTION SCHEDULE		1975	1976	1977	1978	1979	1980	1981	1982	1983
1	ENVIRONMENTAL STUDIES - PRELIMINARY - METEOROLOGICAL - MAIN	—	—							
2	DRILLING PROGRAM - STAGE 2 EXPLORATION - STAGE 3 DETAIL	—	—							
3	ENGINEERING STUDIES - RELATED COAL UTILIZATION - TRANSPORTATION - WATER SUPPLY - GROUNDWATER - HAT CREEK DIVERSION	—	—							
4	COMMUNITY RELATIONS - INFORMATION PROGRAM - PUBLIC MEETINGS		—							
5	APPROVALS - POLLUTION CONTROL ACT (PERMIT) - WATER ACT (LICENCE) - COAL MINES REGULATION ACT (RECLAMATION PERMIT) - LAND COMMISSION ACT (APPROVAL) - LAND ACT (TENURE) - COAL ACT (LEASE) - COAL MINES REGULATION ACT (APPROVAL OF MINING METHODS) - FEDERAL FISHERIES ACT (APPROVAL) - TREASURY BOARD (APPROVAL)		—	—						
6	CONSTRUCTION AUTHORIZATION			—						
7	COAL TEST BURN - MINING OF SAMPLE - COAL BURN TEST		—							
8	MINE - CONCEPTUAL DESIGN (SLOPE STABILITY/RECLAMATION) - FINAL DESIGN - CONSTRUCTION		—	—						
9	THERMAL GENERATING STATION - FEASIBILITY - CONCEPTUAL DESIGN - SPECIFICATIONS - BIDDING AND AWARD - FINAL DESIGN - CONSTRUCTION	—	—	—	—	—				

**EXHIBIT 1**  
**COMBINED HEARINGS**

**LEGEND**  
 \* HEARING  
 P PRELIMINARY  
 F FINAL

24

EXHIBIT 1

**HAT CREEK THERMAL GENERATING STATION**  
**PLANNING SCHEDULE TO JANUARY 1983 - FIRST UNIT IN SERVICE**

ACTIVITY GOVERNING CONSTRUCTION SCHEDULE		1975	1976	1977	1978	1979	1980	1981	1982	1983
1	ENVIRONMENTAL STUDIES - PRELIMINARY - METEOROLOGICAL - MAIN	—	—							
2	DRILLING PROGRAM - STAGE 2 EXPLORATION - STAGE 3 DETAIL	—	—							
3	ENGINEERING STUDIES - RELATED COAL UTILIZATION - TRANSPORTATION - WATER SUPPLY - GROUNDWATER - HAT CREEK DIVERSION	—	—							
4	COMMUNITY RELATIONS - INFORMATION PROGRAM - PUBLIC MEETINGS		—							
5	APPROVALS - POLLUTION CONTROL ACT (PERMIT) - WATER ACT (LICENCE) - COAL MINES REGULATION ACT (RECLAMATION PERMIT) - LAND COMMISSION ACT (APPROVAL) - LAND ACT (TENURE) - COAL ACT (LEASE) - COAL MINES REGULATION ACT (APPROVAL OF MINING METHODS) - FEDERAL FISHERIES ACT (APPROVAL) - TREASURY BOARD (APPROVAL)			⊗						
6	CONSTRUCTION AUTHORIZATION			⊗						
7	COAL TEST BURN - MINING OF SAMPLE - COAL BURN TEST		—							
8	MINE - CONCEPTUAL DESIGN (SLOPE STABILITY/RECLAMATION) - FINAL DESIGN - CONSTRUCTION		—							
9	THERMAL GENERATING STATION - FEASIBILITY - CONCEPTUAL DESIGN - SPECIFICATIONS - BIDDING AND AWARD - FINAL DESIGN - CONSTRUCTION	—	—							

**EXHIBIT 2**  
**SEPARATE HEARINGS**

LEGEND  
 ⊗ HEARING  
 P PRELIMINARY  
 F FINAL

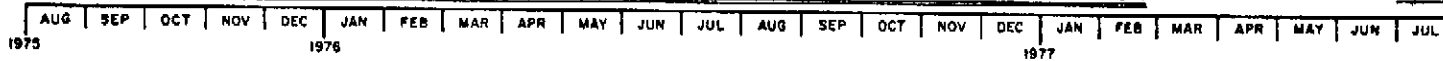
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EXHIBIT 2

# HAT CREEK THERMAL GENERATING STATION

## ACTIVITY SCHEDULE FOR APPROVALS - TO CONSTRUCTION AUTHORIZATION

COMBINED HEARINGS



E.L.U.C. SECRETARIAT & TREASURY BOARD

POLLUTION CONTROL ACT

WATER ACT

FEDERAL FISHERIES ACT

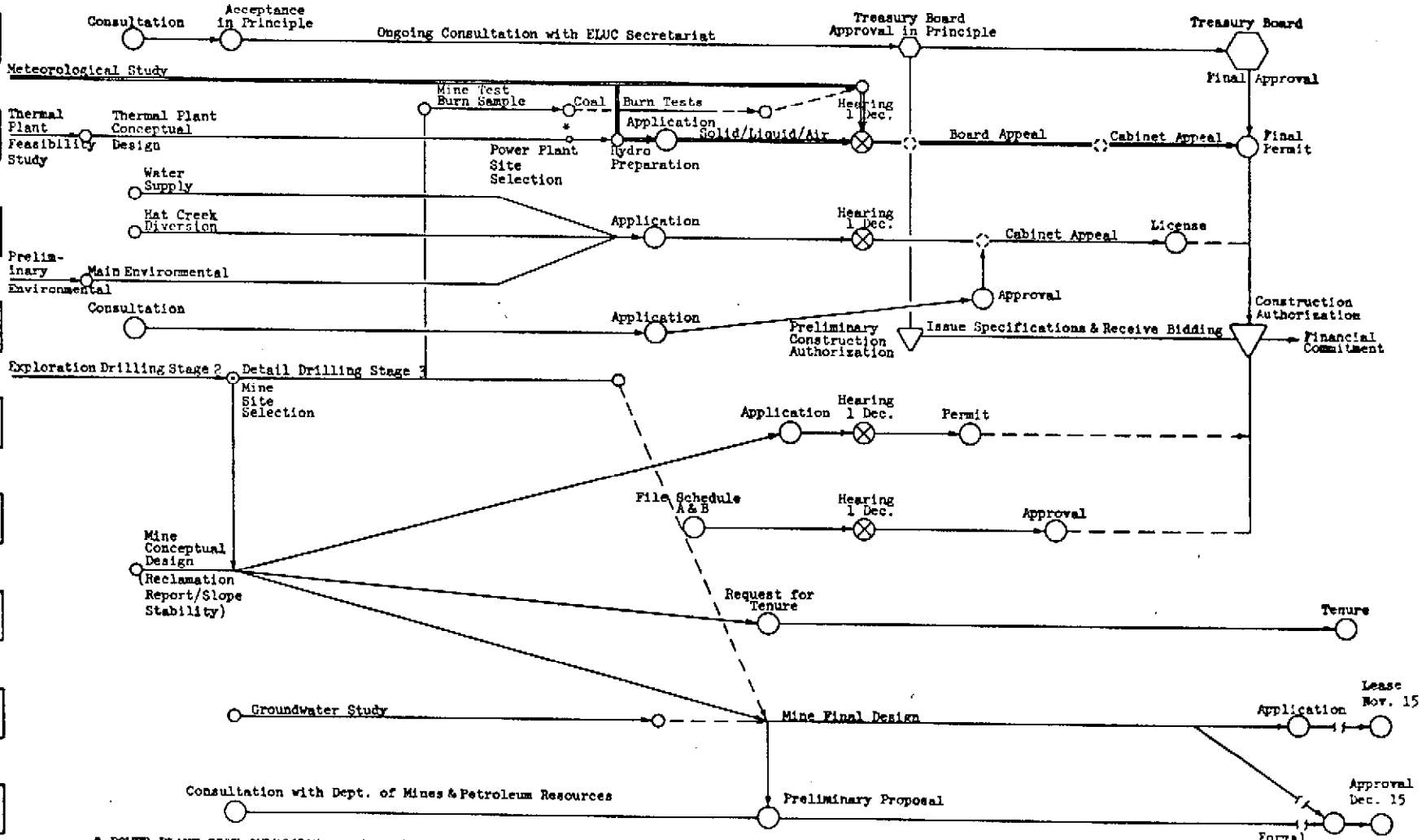
COAL MINES REG ACT RECLAMATION PERMIT

LAND COMMISSION ACT

LAND ACT

COAL ACT

COAL MINES REG ACT APPROVAL OF MINING METHODS



\* POWER PLANT SITE SELECTION requires input from studies including Plant Conceptual Design, Preliminary Environmental, Mine Site Selection, Met. Study, Water Supply & Transportation.

**LEGEND**  
 FLOAT TIME - - - - -  
 POSSIBLE APPROVAL WITHOUT APPEAL (X)  
 NON-CRITICAL ACTIVITIES - - - - -  
 CRITICAL ACTIVITIES ———

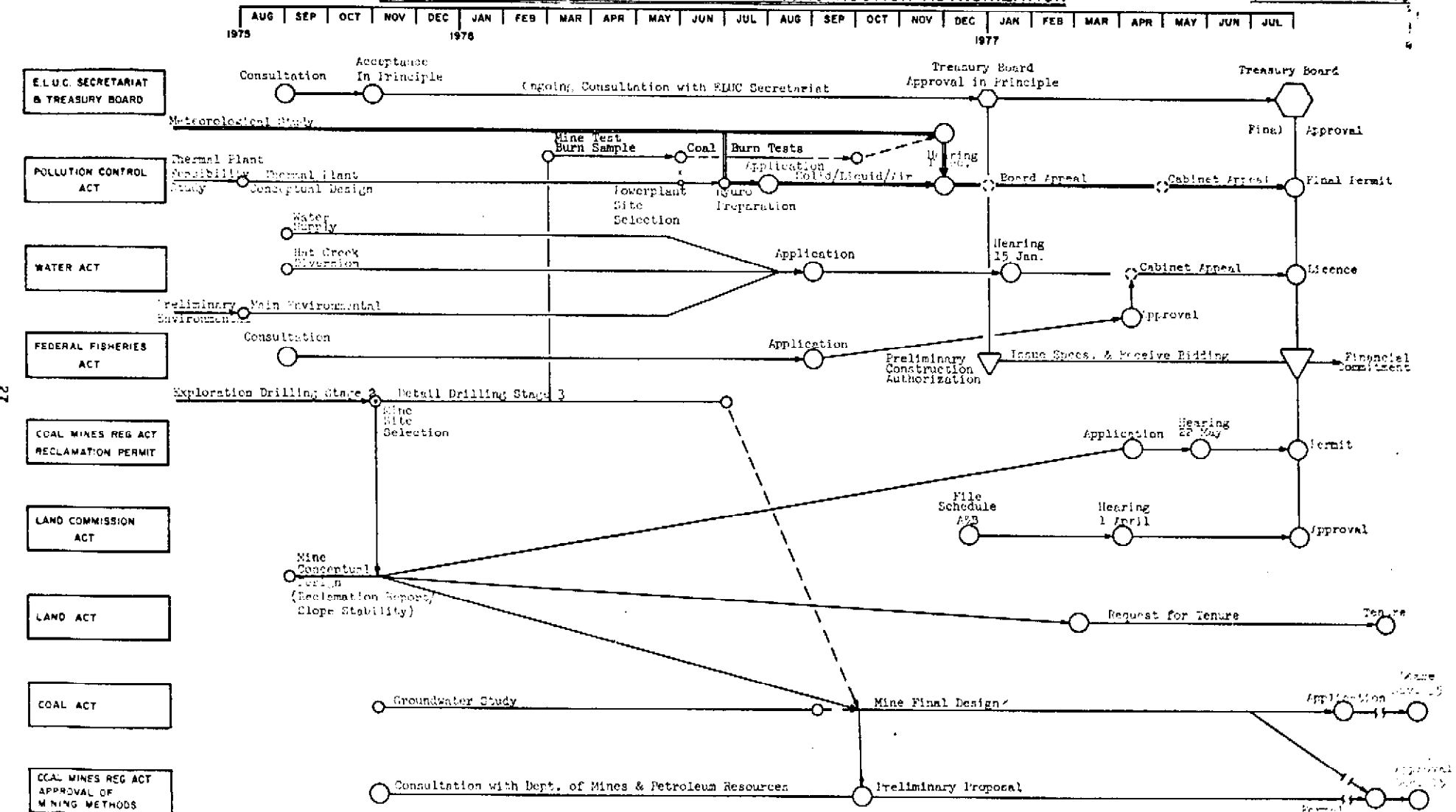
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EXHIBIT 3

# HAT CREEK THERMAL GENERATING STATION

## ACTIVITY SCHEDULE FOR APPROVALS - TO CONSTRUCTION AUTHORIZATION

SEPARATE HEARINGS



\* LOWER PLANT SITE DESIGN requires final design including Plant Conceptual Design, Preliminary Environmental, Mine Site Selection, Water Study, Water Supply & Transportation.

**LEGEND**  
 FLOAT TIME - - - - -  
 POSSIBLE APPROVAL WITHOUT APPEAL (O)  
 NON-CRITICAL ACTIVITIES ———  
 CRITICAL ACTIVITIES ———

27

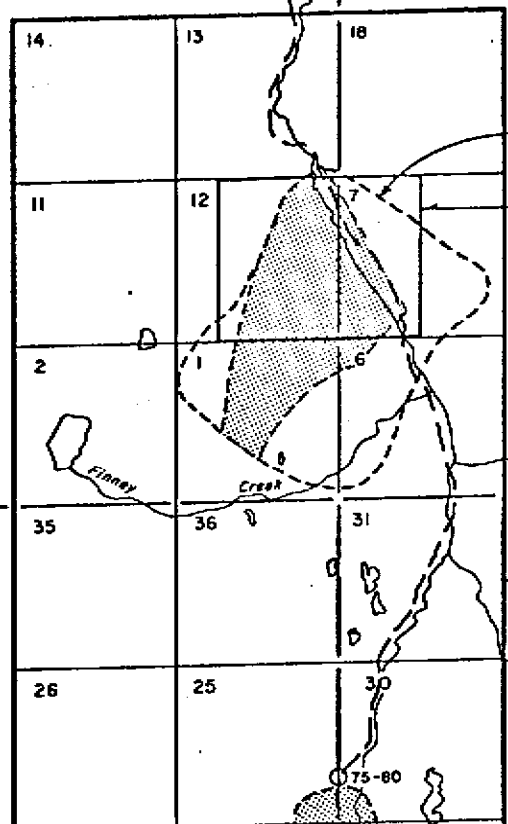
EXHIBIT 4

TO PAVILION 13 MI.

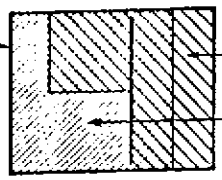
TO CACHE CREEK 19 MI.

Tp 21 R27 W6

Tp 21 R26 W6



OPENPIT NO. 1



SURFACE OWNED IN FEE  
CROWN GRANT OF COAL

LICENCES HELD

Tp 20 R26 W6

Tp 20 R27 W6

**LEGEND**

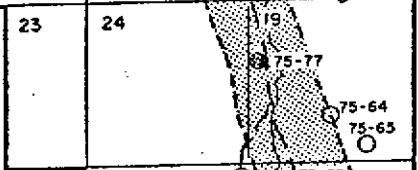
DRILL HOLES

- NO COAL
- MAJOR COAL
- ◐ LOWER COAL NEAR SURFACE OR MINOR COAL

▨ COAL DEPOSIT

— ROAD

MILES



COAL OUTLINE OF NO. 2 OPENPIT

LICENCE BEING APPLIED FOR

Tp 19 R27 W6

Tp 19 R26 W6

TO ASHCROFT 18 MI.

**HAT CREEK PROJECT**  
**OPENPIT COAL DEPOSITS**  
**UPPER HAT CREEK VALLEY**

HAT CREEK 2000 MW THERMAL GENERATING STATION  
CAPITAL REQUIREMENTS FOR FISCAL YEARS 1975 AND 1976

STUDY - ACTIVITY	PROPOSED BUDGET *			CURRENT SYSTEM PLAN**			VARIANCE			SOURCE OF ESTIMATE FOR PROPOSED BUDGET
	Prior to 1975	1975	1976	Prior to 1975	1975	1976	Prior to 1975	1975	1976	
Environmental Studies	Preliminary Meteorological Main	100 45 100	67 150 1300	90 75	69 173	114	+10 -30	+67 +81 -73	+175 +1186	Actual/B.C. Research Est. 22 May 1975 Actual/Previous Budget/PGS Proposal Gen. Plng. Approx. 30% of Plant Design
Drilling Program	Stage 2 Exploration Stage 3 Detail	1321 1200	1291 300	1129	1150	229	+192	+1341	+71	Actual/Dolmage Campbell Dolmage Campbell Approx.
Engineering Studies	Transportation Water Supply Groundwater Hat Creek Div. Lab Bench Tests		30 50 20 25 30	10 75 10	135	716 4727	-17	-394	-2685	Generation Planning Generation Planning Generation Planning/P. T. McCullough Generation Planning Generation Planning
Thermal Generating Station	Feasibility Conceptual Design Final Design Construction	118	17 150 440 1422							Actual/Previous Budget Gen. Plng. Approx. 0.1% of Capital Cost Gen. Plng. Approx. 3% of Capital Cost 96.9% of System Design Feas. Report Fig. No. 5.2.2
Coal Test Burn	Mining Sample Coal Burn		100 928 1100		58	2070		+42	-42	Previous Budget Previous Budget
Land Acquisition (non-inflatable)			50 550			1000		+50	-450	Land Division/J.M. Lawson
Mining	Conceptual Design Final Design Construction		100 400 200					+100	+400 +200	Generation Planning Generation Planning
	Sub-total	1584	3380	6995	1429	2166	8140	+155	+1214	-1145
	Inflation	-	-	645	-	-	715	-	-	-70
	Inflated Total	1584	3380	7640	1429	2166	8855	+155	+1214	-1215
	Cumulative Total		4964	12604		3595	12450		+1369	+154

\* Excluding Transmission Costs  
 \*\* Source: System Plans and Capital Requirements, System Engineering Division  
 Published December 1974 - Revised June 1975

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McCullough, P.T. July 1975
2. Summary and Details of Government Approvals required for the Hat Creek Project; Legal Division  
Marshall, I.E. July 1975
3. Hat Creek Air Impact Assessment Program Proposal;  
Environmental Services Section, Structure Department,  
Operations Engineering Division  
Sagert, P.G. 27 June 1975
4. Hat Creek Coal Fired Thermal Power Plant Feasibility Report and Cost Estimate; System Design Division Report No. 104  
July 1975
5. Preliminary Environmental Impact Study of the Proposed Hat Creek Openpit Mine and Thermal Generating Station;  
B.C. Research - scheduled for completion August 1975

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