

BY THE COMPTROLLER GENERAL

# Report To The Congress

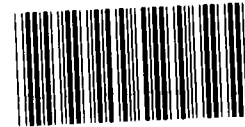
OF THE UNITED STATES

## Clear Federal Policy Guidelines Needed For Future Canadian Power Imports

United States imports of Canadian electricity have been rapidly increasing for the last 10 years and are expected to continue for the next decade. Canadian utilities will have excess capacity equivalent to the output of 10 to 20 large nuclear powerplants available for export through 1996.

The Department of Energy exercises control over imports of Canadian electricity by issuing permits for the construction of electrical transmission facilities at international borders. To date such permit applications have been appraised on a case-by-case basis. But anticipated increases in Canadian imports clearly signify the need for clear policy guidelines on the role of Canadian power to guide DOE's permit approval program and as part of its overall electricity planning efforts.

GAO recommends that the Secretary of Energy work with the executive subcommittee working group on Regulation, Competition, and Efficiency in the Electric Utility Industry to establish clear Federal policy guidelines towards Canadian power imports.



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COMPTROLLER GENERAL OF THE UNITED STATES  
WASHINGTON D.C. 20548

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To the President of the Senate and the  
Speaker of the House of Representatives

This report discusses increasing Canadian electricity imports to the United States and highlights the need to determine an appropriate role for this power in the U.S. electric power supply system.

The review was conducted in order to determine the effect Canadian power imports have had on U.S. utility systems, and how Federal regulatory programs for these imports and Federal electricity planning responsibilities are being carried out under the current Federal guidance. Because imports of Canadian electricity have been steadily increasing and are expected to continue, we wanted to determine if the current practices are keeping pace with the dynamic nature of these electricity imports.

This report is also being sent today to the Speaker of the House of Representatives. Copies of this report are being sent to the Director, Office of Management and Budget; the Secretaries of Energy, State, and Defense; the Chairman, Federal Energy Regulatory Commission; and the House and Senate committees and subcommittees having oversight responsibilities for the matters discussed in the report.

A handwritten signature in cursive script that reads "Milton J. Fowler".

Acting Comptroller General  
of the United States



D I G E S T

United States and Canadian utilities have been exchanging power since 1901. However, since the Middle East oil embargo of 1973-74, oil-dependent U.S. utilities began purchasing large amounts of surplus Canadian power. As a result, net imports of Canadian power to the United States increased sharply--going from about 4 billion kilowatt-hours in 1971 to an estimated 34 billion kilowatt-hours in 1981. (See p. 1.)

Imports of Canadian power should continue to increase because proposed new interconnections will allow U.S. utilities to increase their purchases, Canadian utilities have 10,000 to 20,000 megawatts of reserve power available for export through 1996, and the provincial governments are interested in marketing any power excess to their own needs. In addition, Canadian provinces and utilities have expressed interest in constructing additional generating projects for export. (See p. 4.)

Canadian power purchases have affected both U.S. utilities and consumers. They have

- lowered electricity prices,
- increased the dependence on Canadian power,
- reduced domestic oil use, and
- affected the environment.

Additional purchases can be expected to have these same effects in the future and could cause some utilities to forego construction or expansion of their domestic generating capacity.

The Department of Energy (DOE) is the Federal focal point for international electricity exchanges. Its responsibilities include issuing Presidential Permits to utilities which want to construct electrical transmission facilities at international borders, and undertaking a unified and coordinated electricity planning role.

To date, permit applications have been approved on a case-by-case basis without clear Federal policy guidelines. In the past this posed no problem because the size of the interconnections were small and power was

exchanged, but in the future the impact of this power should increase. Anticipated increases in Canadian imports clearly signify the need for clear policy guidelines on the role for Canadian power to guide DOE's permit approval program and its overall electricity planning efforts. GAO believes the lack of clear policy guidance contributes to the following:

- The appropriate role for Canadian power within the United States remains undetermined.
- The Department has no direction on how to fulfill its permitting responsibilities and thus has no specific set of criteria to conduct a permit review process.
- The utility industry is without a clear understanding of the Federal Government's position on importing power and what is required in the permitting process. (See p. 23.)

Clear policy guidance would better define DOE's role in these transactions and provide the direction needed to make DOE's permitting process more efficient. However, as long as no policy guidelines exist, the availability of surplus Canadian power may become more uncertain.

Lack of policy guidelines may be part of a larger problem--no formal electricity policy. In addition, the Department has not fulfilled its electricity planning responsibilities which could provide an informational basis for making permitting decisions. An effort now underway by a subcabinet group to develop a national electricity policy could include the policy guidance needed for Canadian electricity. (See p. 22.)

#### RECOMMENDATIONS

The Department of Energy can provide assistance and support to the States and utilities by improving its issuance of Presidential permits and in its electricity planning responsibilities. GAO recommends that the Secretary of Energy

- work with the executive subcabinet working group on Regulation, Competition, and Efficiency in the Electric Utility Industry to establish clear Federal policy guidelines on the role for future Canadian electricity

in the United States. This could be done as part of this group's total effort in looking at a national electricity policy.

If the subcabinet group is unable to develop policy guidelines, the Secretary, after obtaining input from the utility industry and the Department of State, should establish policy guidelines on its own. After development, the Secretary should inform utilities of the Department's requirements.

During the interim period before policy guidelines are developed, the Secretary should expedite the permitting process by working closely with utilities during the technical and economic reviews to assure utilities are aware of the purpose for submitting the data, how these data will be used, and the circumstances in which a permit could be issued with conditions.

#### AGENCY COMMENTS

Copies of the draft of this report were furnished to the Departments of Energy, State, and Defense. Pertinent sections of the draft were sent to the Power Authority of the State of New York, General Public Utilities Service Corporation, and the North American Electric Reliability Council; and in Canada to Ontario Hydro, Hydro-Quebec, the National Energy Board, the Federal Department of Energy, Mines and Resources, and the Provincial Ministries of Energy in Ontario and Quebec to verify factual information. Written responses are included in appendices VI to XV. Oral comments were obtained from both Provinces. The Department of Defense had no substantive comments. The agency comments along with GAO's response to them are discussed in chapter 4. In general, these major points were made by the agencies:

--The Department of State pointed out that while no formal electricity import policy statement has been made, utility companies, state energy offices, and Canadian energy authorities are fully cognizant of the United States' favorable view toward Canadian imports and their useful role in helping meet our energy needs. The Department also recognizes, however, that in the not-too-distant future, developments may require DOE policy attention--the prospects of Canada's building surplus nuclear reactors for exporting electricity to the United States.

--DOE stated it does have a policy on Canadian imports--it places no limits on them. In view of recent and anticipated increases in Canadian imports, GAO believes this approach does not provide clear policy guidance on the future role for Canadian electricity in the United States nor does it provide clear direction on the criteria and approach taken by DOE in carrying out its permitting process. GAO found this has led to utility frustration which could magnify as the level of Canadian reserves increases. GAO believes clearly defined Federal policy guidelines are needed, and as also recognized by the Department of State, there is increasing interest in Canada in electricity exports which could require DOE policy attention in the not-too-distant future. DOE acknowledges this issue, by necessity, will be a part of the considerations of the subcabinet group.

--The North American Electric Reliability Council acknowledges that since the electricity transfers are like any other international trade transaction, it is reasonable to expect the Federal Government to have some control. The Council further points out that with this Federal role, the utilities should be able to reasonably expect certain treatment from the Government, including promptness, consistency, and fairness.

--The Power Authority of the State of New York notes the lack of guidelines for evaluating applications and issuing permits, and supported the implementation of a systematic and efficient permitting process. General Public Utilities Service Corporation felt the report adequately reflected its views.

--Canadian Federal and provincial officials and the Canadian utilities provided comments which allowed GAO to clarify certain statements in its report and update the factual data on the amounts of imports and the latest load and capacity forecasts. Canadian officials also reaffirmed their intent to market more of their surplus power to U.S. markets.



# C o n t e n t s

		<u>Page</u>
DIGEST		i
CHAPTER		
1	INTRODUCTION AND BACKGROUND	1
	History of electricity exchanges with Canada	1
	Canadian imports should continue to increase	3
	More power may be available from Canada	4
	The Federal role in electricity exchanges	6
	Objectives, scope, and methodology	8
2	THE EFFECTS OF INCREASED CANADIAN ELECTRICITY IMPORTS ON U.S. UTILITY SYSTEMS	9
	Electricity prices should be lower	9
	Reliability of U.S. power systems may be impacted	10
	U.S. utility capital investment plans can be altered	11
	U.S. utilities will use less oil	13
	Environmental effects could limit imports	13
3	NO CLEAR POLICY GUIDELINES EXIST CONCERNING THE ROLE FOR CANADIAN ELECTRICITY	15
	The presidential permit process	15
	National electricity policy would clarify DOE's permitting and planning responsibilities	21
4	CONCLUSIONS AND RECOMMENDATIONS	23
	Conclusions	23
	Recommendations	24
	Agency comments and our evaluation	24
APPENDIX		
I	Explanation of forecasted electricity surplus capacity in Ontario and Quebec	30
II	Organizations contacted during review	32
III	Details of DOE's Presidential Permit application review	33
IV	Technical and operating capabilities and require- ments of the electric utility industry	36
V	North American Electric Reliability Council	37
VI	Letter dated June 21, 1982, from the Department of State	38

VII	Letter dated July 8, 1982, from the Department of Energy	41
VIII	Letter dated June 15, 1982, from the North American Electric Reliability Council	47
IX	Letter dated June 17, 1982, from General Public Utilities Service Corporation	49
X	Letter dated June 25, 1982, from the Power Authority State of New York	50
XI	Letter dated June 22, 1982, from Hydro Quebec	53
XII	Letter dated June 21, 1982, from Ontario Hydro	55
XIII	Letter dated June 15, 1982, from the National Energy Board	59
XIV	Letter dated June 18, 1982, from the Department of Energy, Mines and Resources, Ontario	65
XV	Letter dated July 8, 1982, from the Department of Defense	67

## APPREVIATIONS

DCE	Department of Energy
ECAR	East Central Area Reliability Council
EIS	Environmental Impact Statement
FERC	Federal Energy Regulatory Commission
GAC	General Accounting Office
GPU	General Public Utilities
KV	Kilovolt
kWh	Kilowatt Hour
MAAC	Middle Atlantic Area Coordinating Council
MW	Megawatt
NEPOOL	New England Power Pool
NERC	North American Electric Reliability Council
NPCC	Northeast Power Coordinating Council
PASNY	Power Authority of the State of New York

## GLOSSARY

Adequacy	An electric system having sufficient generating capability to be able to at all times meet the aggregate electric peak loads of all customers and supply all their electric energy requirements.
Baseload	The minimum load in a power system over a given period of time.
Capability	The maximum load which a generating unit, generating station, or other electrical apparatus can carry under specified conditions for a given period of time, without exceeding approved limits of temperature and stress.
Capacity	Maximum power output, expressed in kilowatts or megawatts. Equivalent terms: peak capacity, peak generation, firm peakload, and carrying capability.
Demand	In a utility context, the rate at which electric energy is delivered to or by a system, expressed in kilowatts, megawatts, or kilovolt amperes over any designated period.
Demand forecast	Projection of the future demand for electricity (industrial, commercial, and residential loads).
Diversity exchanges	Non-coincident peak loads which allow utilities to "share" generation and realize economic benefits.
Economy interchange	The interchange of electricity between two utilities which takes place when the exchange will result in a reduction in costs to the consumer in both utilities' areas.
Electric utility industry or electric utilities	All enterprises engaged in the production and/or distribution of electricity for use by the public, including investor-owned electric utility companies; cooperatively owned electric utilities; government-owned electric utilities (municipal systems, Federal agencies, State projects, and public power districts); and those industrial plants contributing to the public supply.
Electricity planning	Procedures used to develop electricity plans. Procedures include forecasting, analyzing supply/demand options, and public participation.
Electricity plans	Determination of the supply sources (e.g., nuclear, coal, alternatives) and the demand management options (conservation, load management, rate reforms) which will balance power supply and demand at some future time.

Energy	The ability to do work; the average power production over a stated interval of time; expressed in kilowatt-hours, average kilowatts, or average megawatts for a specific time period. Equivalent terms: energy capacity, average generation, and firm energy load carrying capability.
Fossil fuels	Coal, oil, natural gas, and other fuels originating from fossilized geologic deposits that depend on oxidation for release of energy.
Hydropower	A term used to identify a type of generating station, or power, or energy output in which the prime mover is driven by water power.
Investor-owned utility	A utility which is organized under State laws as a corporation for the purpose of earning a profit for its stockholders.
Kilovolt	The electrical unit of pressure which equals 1,000 volts.
Kilowatt	The electrical unit of power which equals 1,000 watts.
Kilowatt-hour	A basic unit of electrical energy, which equals 1 kilowatt of power applied for 1 hour.
Load	The amount of electric power delivered to a given point on a system.
Megawatt (MW)	The electrical unit of power which equals 1 million watts or 1,000 kilowatts.
Off-peak	A period of relatively low system demand for electrical energy as specified by the supplier, such as in the middle of the night.
Peaking	Operation of generating facilities to meet maximum, instantaneous electrical demands.
Peakload	The maximum electrical load consumed or produced in a stated period of time. It may be the maximum instantaneous load (or the maximum average load) within a designated interval of the stated period of time.
Power	The time rate of transferring or transforming energy; for electricity, power is expressed in watts. Power, in contrast to energy, always designates a definite quantity at a given time.

Power, firm	Power or power-producing capacity intended to be available at all times during the period covered by a commitment, even under adverse conditions.
Power, interruptible	Power made available under agreements which permit curtailment or cessation of delivery by the supplier.
Power pool	Two or more electrical systems interconnected and coordinated to supply power in the most economical manner for their combined load requirements and maintenance programs.
Rates (electricity)	The prices charged to consumers for using electricity.
Reliability	Generally the ability of a system to perform a required function under stated conditions for a stated period of time. In a power system, the ability of the system to continue operation while some lines or generators are out of service.
Reserve capacity	Extra generating capacity available to meet unanticipated demands for power or to generate power in the event of loss of generation resulting from scheduled or unscheduled outages of regularly used generating capacity. Reserve capacity provided to meet the latter is also known as forced outage reserve.
Reserve, spinning	Generating units connected to the bus (or electrical conductor which serves as a common connection for two or more electrical circuits) and ready to take a load.
Surplus (electricity or energy)	Energy generated that is beyond the immediate needs of the producing system. This energy is frequently obtained from spinning reserve and sold on an interruptible basis.
System interconnection	A connection between two electric systems permitting the transfer of electric energy in either direction.
Wheeling service	The use of the transmission facilities of one system to transmit power of and for another system.

## CHAPTER 1

### INTRODUCTION AND BACKGROUND

Mutual benefits accrue to electric utility systems when they interconnect with other systems. Such benefits include

- reducing reserve requirements by sharing capacity available in both systems,
- taking economic advantage of differences in the seasonal electricity needs of interconnected systems through energy interchanges or firm power agreements.
- enhancing the ability to render and receive emergency aid during temporary generation deficiencies, and
- improving system performance in the event of major transmission disturbances.

In short, such interconnections can result in greater reliability and greater economy of operations within the interconnected systems.

### HISTORY OF ELECTRICITY EXCHANGES WITH CANADA

Utility systems in the United States and Canada have been exchanging electric power since 1901 when a 12 kilovolt (kV) transmission line was built across the border of New York at Niagara Falls. Additional interconnections followed, and by 1968 about four billion kilowatt hours (kWh) of electricity were flowing each way over the border. However, since 1969 there has been a strong trend away from the balanced nature of these exchanges toward increased imports of Canadian electricity by the United States.

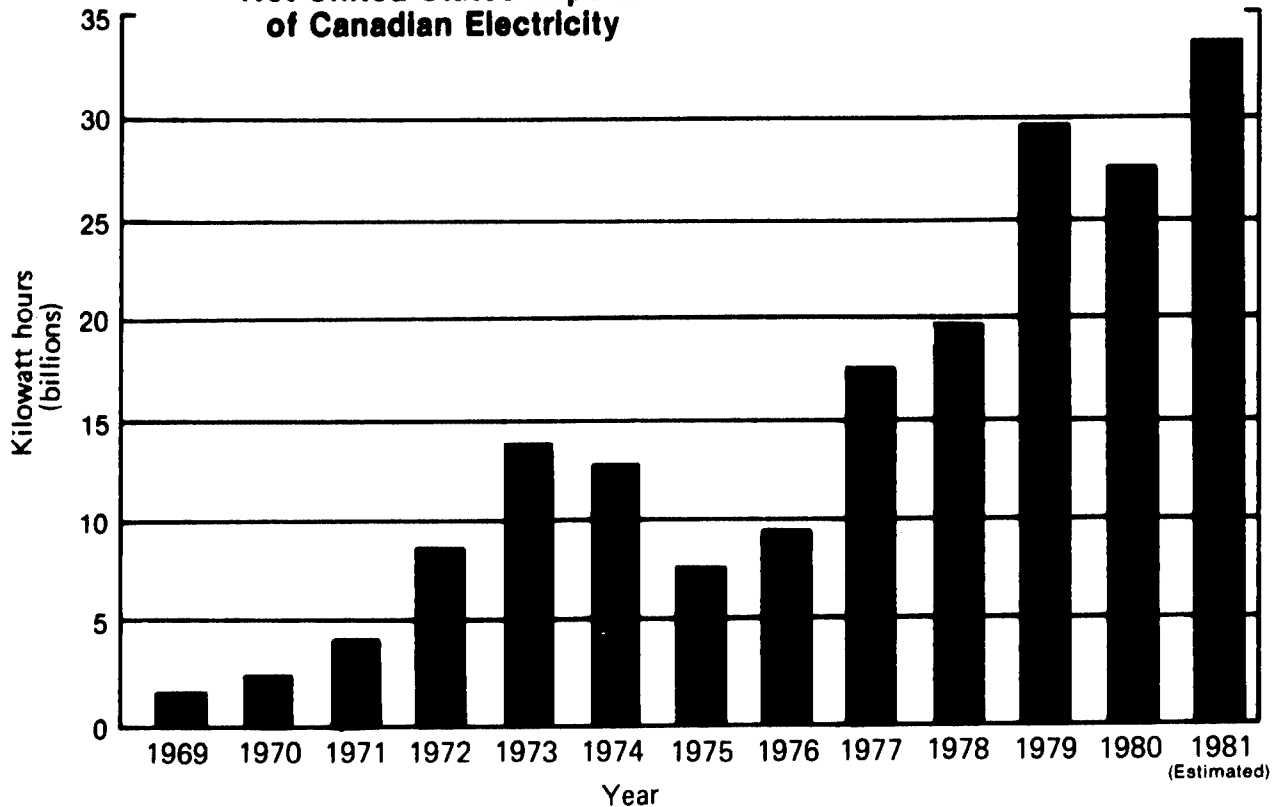
Rising oil prices were a major factor leading to increased imports of Canadian power. Since the Middle East oil embargo of 1973-74, oil dependent utilities in the United States, started purchasing large amounts of surplus Canadian hydropower and coal generated power because it was less expensive than using their oil-fired powerplants. Figure 1 shows the net United States imports (imports minus exports) of Canadian electricity since 1969.

As shown in figure 1, preliminary estimates indicate that net imports for 1981 are about 34 billion kWh. To put this figure in perspective, 34 billion kWh would more than supply the annual electric needs of the approximate 4.5 million residential customers in the six New England States. 1/

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1/Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont.

**Figure 1**  
**Net United States Imports**  
**of Canadian Electricity**



Canadian imports have affected United States' utility systems in several ways

- electric rates to U.S. consumers are lower than they would be without the imports,
- domestic transmission systems have been expanded and/or reinforced to receive and distribute the Canadian power, and
- U.S. utilities are burning less oil because the Canadian power displaces their more expensive oil-fired generation.



CANADIAN IMPORTS SHOULD  
CONTINUE TO INCREASE

Since many U.S. utility systems (especially in the Northeast) still depend on oil for generation and are planning additional interconnections, United States imports of Canadian power should continue to increase. Table 1 shows the existing interconnections with Canada and those which are planned to be completed in the 1980s.

Table 1

Existing and Planned  
Interconnection Transfer Capabilities a/

<u>Canadian province</u>	<u>U.S. State</u>	<u>Estimated power transfer capability</u>	
		<u>Existing (MW)</u>	<u>Planned (date) (MW)</u>
New Brunswick	Maine	790	
Quebec	Vermont	100	
Quebec	b/ Vermont or New Hampshire		690 (1986) c/1,310 (1990)
Quebec	New York	1,200	d/1,150 (1984)
Quebec	New York	200	
Ontario	New York	1,735	
Ontario	New York		1,300 (1984)
Ontario	Michigan	2,835	
Ontario	Minnesota	35	
Manitoba	Minnesota	1,175	
Manitoba	North Dakota	150	
Manitoba	Nebraska/ Dakotas		1,000-1,500 (1986)
Saskatchewan	North Dakota		e/200 (1981)
British Columbia	Washington	<u>2,050</u>	
Total		<u>10,270</u>	<u>5,650-6,150</u>

a/This table presents the individual transfer capability between systems. The simultaneous transfer capability is much lower than the sum of the above values. For example, the existing simultaneous transfer capability between Ontario and the U.S. is about 2,900 MW, not the 4,605 MW which is the total of the three Ontario/U.S. interconnection capabilities.

b/Exact route not yet determined.

c/Upgrading and extension of 690 MW line.

d/Equipment modification to present 1,200 MW line.

e/Latest estimate available.

The planned interconnections could increase the existing transfer capability between the two countries from the present 10,270 megawatt (MW) to as much as 16,420 MW by 1990, an increase of about 63 percent. The U.S. utilities involved intend to use these new interconnections primarily to import power rather than exchanging or exporting power. For example, two U.S. power systems plan to increase Canadian imports by almost 9.5 billion kWh by 1987, or 28 percent over 1981 levels. Specifically:

--The Power Authority of the State of New York (PASNY) 1/ estimates that its annual imports from Quebec should increase by about 4.3 billion kWh in 1984 and its annual imports from Ontario by 3.2 billion kWh.

--The New England Power Pool (NEPOOL) 2/ conservatively plans to import about 2.0 billion kWh annually over its proposed line in 1987. However, based on the experiences of previous interconnections, the actual imports over the NEPOOL line could be closer to 5.7 billion kWh per year when it first opens, and as much as 16.6 billion kWh when the line is increased to 2,000 MW, scheduled for 1990.

#### MORE POWER MAY BE AVAILABLE FROM CANADA

Even with the planned additional interconnections and expected increase in Canadian imports throughout the 1980s, Canadian provincial utilities in Ontario, Quebec, and New Brunswick 3/ have capacity expansion plans which could provide even more power to the United States through additional interconnections. Figure 2 shows the total estimated reserve generating capacity available for export from selected eastern Canadian provinces through 1996. (See appendix I for more detailed explanation of Ontario's and Quebec's forecasted capacity.) In addition to these estimated

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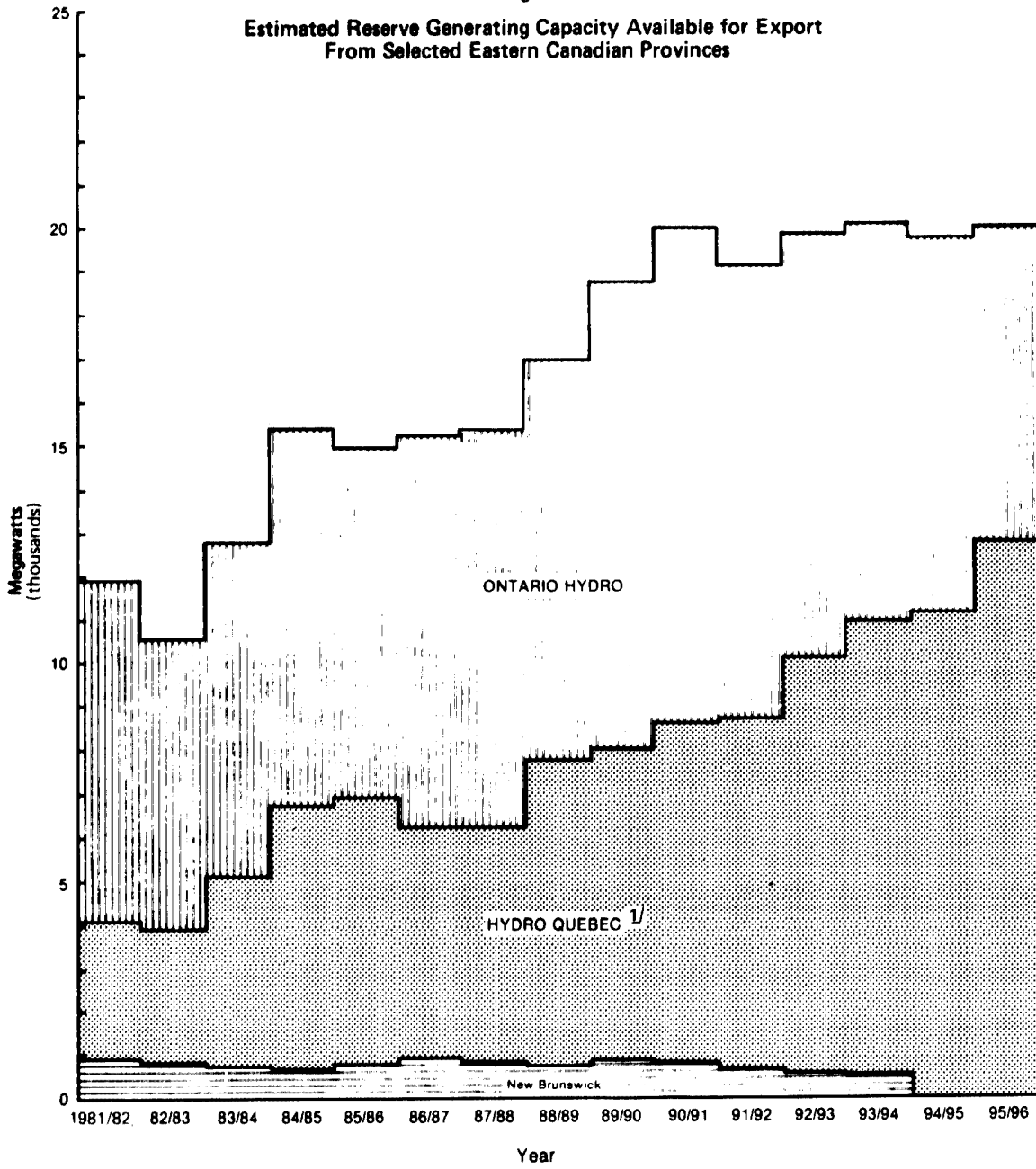
1/PASNY is a non-profit, State-owned public utility established to develop and provide electric power to the citizens of New York State. PASNY sells power through its and other utilities transmission networks to industries, private utilities, municipal electric systems, rural electric cooperatives, and governmental entities in the State.

2/NEPOOL is a consortium of electric utility systems, serving over 98 percent of electricity customers in New England, which have regionalized their generation and transmission operation to coordinate and dispatch power in the region and attain the maximum practicable economy, consistent with the region's reliability standards.

3/See the objective, scope, and methodology section for the locations covered during our review.

Figure 2

Estimated Reserve Generating Capacity Available for Export  
From Selected Eastern Canadian Provinces



1/ Assumes 5.1 percent average annual load growth and current capacity expansion schedule. Hydro-Quebec recently lowered its forecast to 3.6 percent average annual growth and may alter its expansion schedule as a result.

reserves, other generation projects could be developed in Eastern Canada for export purposes. These include hydropower sites in Newfoundland and Quebec and the construction of nuclear plants for export purposes. For example, there is room at the Point LePreau, New Brunswick, site for three additional 630 MW nuclear units, and New Brunswick has built a powerplant dedicated for export in the past. Presently, the Provincial governments in Ontario, Quebec, Newfoundland, and New Brunswick are interested in selling more of their surplus power to U.S. markets.

Despite the existence of Canadian surplus power and the Provincial governments' willingness to market it, a number of economic, political, technical, and regulatory considerations on both sides of the border may affect the amount of power actually available for export to the United States. These considerations are discussed further in chapter 2.

### THE FEDERAL ROLE IN ELECTRICITY EXCHANGES

The Federal Government has had a long history of involvement in international electricity exchanges. The Federal Power Act, passed in 1935, required that utilities obtain an export authorization from the Federal Power Commission (now the Federal Energy Regulatory Commission) to export power; no authorization is required for importing power. In 1939, the Federal role was increased by Executive Order 8202 which required utilities to obtain a permit from the Office of the President (Presidential Permit) before constructing electric power facilities which crossed international borders. In 1953 President Eisenhower gave the Federal Power Commission authority to review applications and issue Presidential Permits as well as export authorizations. Since 1978 the authority to issue export authorizations and Presidential Permits has rested with the Department of Energy (DOE).

DOE has other responsibilities which are pertinent to international electricity exchanges. The DOE Organization Act of 1977 states Congress' objective that DOE promote the interest of consumers by providing an adequate and reliable supply of energy at the lowest reasonable costs, and coordinate policies regarding international energy issues.

### OBJECTIVES, SCOPE, AND METHODOLOGY

The objectives of our review were to (1) assess current United States policy towards Canadian electricity exchanges, (2) determine how DOE has fulfilled its electricity planning and permitting responsibilities in this area, and (3) determine if current national policy guidelines and practices are keeping pace with the dynamic nature of our electricity imports and are leading us toward an appropriate role for Canadian imports in our national power plans. This review was performed in accordance with GAO's current "Standards for Audit of Governmental Organizations, Program, Activities, and Functions."

Our review focused on Ontario, Quebec, New Brunswick, and Newfoundland and that portion of the United States south of these provinces from Michigan to Maine which represent potential markets for Canadian power from these provinces. There are some interconnections in the western part of the two countries. However, most of the existing and planned U.S./Canadian interconnections are located in the east where large Canadian surplus is forecast. Also there is a large U.S. market for Canadian electricity--namely the oil dependent areas served by the Pennsylvania-New Jersey-Maryland Power Pool, the New York Power Pool, and the New England Power Pool. We did not review exchanges with Mexico because of the relatively few number of interconnections and power transfers.

We contacted Federal, Provincial, and utility officials in Canada because of the uncertainty of the data obtained from U.S. sources regarding Canadian expansion plans and electricity transfers. (See appendix II for a list of all the organizations contacted during our review.) We also compared the Canadian permitting process to that of the United States. The Canadian utility representatives of Hydro-Quebec, Ontario Hydro, New Brunswick, and Newfoundland provided us with their load forecasts, capacity expansion plans, and forecasts of surplus power which could possibly be exported to U.S. markets. In addition, we interviewed Federal and Provincial energy representatives from the National Energy Board, Department of Energy, Mines and Resources, and from the Office of the Energy Ministers in Ontario and Quebec. Our purpose was to gain further insight into Canadian national and provincial policy toward electricity exchanges, the regulatory requirements Canadian utilities face in building transmission lines and exporting power, and how utilities fulfill these requirements.

Federal and utility representatives were contacted in the United States to determine our national policy towards power exchanges and the administration of permitting requirements. We reviewed in detail DCE's processing of recent Presidential Permit applications for the Northeast, those for General Public Utilities 1/ (CPU) and the Power Authority of the State of New York. Through discussions with utility groups, we obtained opinions as to the problems and constraints encountered in obtaining a permit; electricity load and capacity data and forecasts, and the likelihood of additional international interconnections; the effects of increased electricity exchanges; interactions in dealing with Canadian utilities; and whether there were any barriers or policies which restrict imports.

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1/CPU is an electric utility holding company, the subsidiaries of which--Jersey Central Power and Light Company, Metropolitan Edison Company, and Pennsylvania Electric Company--provide electricity to approximately 4 million people living in about half the land areas of New Jersey and Pennsylvania.

The history, current use, and applicability of the permitting process were discussed with responsible DCE officials. We discussed the laws which established Federal responsibilities towards international electricity transfers, the policies governing the issuance of permits and electricity exchanges, the procedural steps in the permitting process; and the evaluation process used during the environmental, technical, and economic review of permit applications.

We also reviewed DOE's permit application files for selected projects to provide us with an understanding of the entire permit review process. Thus, we were able to evaluate the length of time required for a permit's issuance, document the history of present international interconnections, determine the type and amount of information required, identify the problems and constraints encountered by utilities and their resolution, and evaluate DOE's capabilities to perform their responsibilities. Our review primarily centered on the permits issued since DOE acquired this responsibility. However, we did review documents pertaining to permits issued before DOE was given this responsibility to determine any changes in the procedures or policy used in carrying out this responsibility. We did not review DOE's practices used when approving a modification to an existing permit or their procedures used in approving electricity export authorization.

This report highlights the many issues and considerations which surround a situation of increasing importance to the United States utility industry and our national interest. Chapter 2 looks at the effects that Canadian electricity imports have had on U.S. utility systems and what can be expected in the future. Chapter 3 discusses the current Federal role in Canadian electricity exchanges, problems in the permitting process, and the need for DCE to change the way it carries out its responsibilities. Chapter 4 draws conclusions and recommendations from the previous chapters.

## CHAPTER 2

### THE EFFECTS OF INCREASED CANADIAN ELECTRICITY IMPORTS

#### ON U.S. UTILITY SYSTEMS

Even with the increased Canadian imports that the United States will receive over planned interconnections, the provincial utilities in Ontario, Quebec, Newfoundland, and New Brunswick are forecasting large amounts of surplus generating capacity available for export well into the 1990s. Increased Canadian power imports will have an effect on

- electricity prices,
- the reliability of U.S. power systems,
- U.S. utility investment plans,
- the use of oil by U.S. utilities, and
- the environment.

The positive and negative aspects of the effects represent the trade-offs that must be considered in the decision to import Canadian power. This chapter discusses these effects and the key issues which must be resolved in determining an appropriate role for Canadian power in the United States.

#### ELECTRICITY PRICES SHOULD BE LOWER

Canadian imports have been increasing because Canadian power has been cheaper than U.S. utility oil-fired generation. As long as this situation exists increased imports should help keep power rates lower than they would be without the imports.

Canadian utilities negotiate the price of the power they export to the United States in accordance with the National Energy Board of Canada pricing policies. The Board regulates the price of Canadian power through its export licensing process. The Board requires that the export price (1) recover all costs incurred in Canada, (2) is not less than the price in Canada for equivalent electric service, and (3) is not materially less than the buyer's least-cost alternative.

U.S. utilities are most interested in the cost of the Canadian power delivered to their market area, i.e., the Canadian price plus all transmission, wheeling, and other costs. This delivered price must be less than their other supply options to make increased Canadian purchases economical.

While pricing agreements can become very complicated, Board officials told us that if a U.S. utility can save two-tenths of a cent per kWh, and the price meets the Board's pricing tests, then a sale will usually result. Otherwise, no sufficient incentive exists for U.S. utilities to enter a sale agreement. As long as U.S. and Canadian utilities are able to negotiate mutually beneficial prices within these constraints, Canadian imports will increase and this should result in lower U.S. power costs.

Pricing regulations may discourage Canadian imports

Investor-owned utilities would like to earn a profit on purchased Canadian power. However, State public utility commissions generally permit investor-owned utilities to earn a profit only on capital invested in generating plants and equipment. Power purchased from Canada and other systems is a cost which must be passed through to consumers and no profit is allowed on such purchases. Without a profit incentive, investor-owned utilities are less motivated to actively pursue Canadian interconnections and power purchases.

This can be demonstrated by looking at the Northeast. With the exception of New York State, the northeastern States are mainly served by regulated investor-owned utilities. New York is served by PASNY, a non-regulated public utility, which purchases power from Canada then sells bulk amounts of the power to seven regulated utilities in the State. The aggressive manner in which PASNY has been trying to increase its purchases of Canadian power indicates that the increased Canadian purchases at a lower cost is a good investment. Therefore, State utility commission rate setting policies are apparently a factor in explaining why PASNY has been so active in increasing Canadian electricity imports.

RELIABILITY OF U.S. POWER SYSTEMS MAY BE IMPACTED

Some U.S. utilities are concerned about over dependence on Canadian power. As the amount of Canadian power imported increases each year, U.S. utility companies must plan for replacing this power in emergency situations when its availability might be interrupted. Such situations could occur during winter months when transmission lines from Canada are removed from service by severe weather conditions, or in times of low streamflow in Canada.

Utility officials in New England told us that it is important to have direct control over their generation sources. A degree of uncertainty inherent in purchasing Canadian power makes utility officials reluctant to place any more dependence on it than called for in their present plans. They cited periodic shutdowns in Quebec's system, usually caused by severe winter, as one reason to limit Canadian imports.

Political considerations also add to the perceived uncertainty of Canadian power. The continuing controversy between Quebec and Newfoundland over electricity issues, headlines about Quebec separatism, and the residual hard feelings that still exist after Canadian utilities allegedly reneged on long-term energy contracts during the 1973-74 Middle East oil embargo all contribute to a reluctance on the part of U.S. utilities to pursue long-term power contracts with Canadian utilities. However, these political considerations now seem to be less of a deterrent to increased Canadian imports based on the recent progress being made in negotiations between Quebec and U.S. utilities to increase their Canadian purchases.



At the time of our review in late 1981, three area reliability councils--the Middle Atlantic Area Coordinating Council (MAAC), the East Central Area Reliability Council (ECAR), and the Northeast Power Coordinating Council (NPCC)--were jointly studying the reliability of Canadian power and the effects of a disruption of imported Canadian power on the United States system. These three councils are members, along with six other area councils, of the North American Electric Reliability Council (NERC). 1/

The preliminary results of this interregional study indicates that those systems could withstand losses of imported Canadian power up to 2,400 MW, and possibly up to a 3,700 MW loss during light load periods. The west to east transmission capability within the area of the United States covered by the three councils is limited, however, and may not be capable of withstanding a 3,700 MW loss during heavy load periods.

While participating in the study mentioned above, NEPOOL as part of NPCC was also trying to determine how much Canadian power it could reliably import into its pool area--the six New England States. NEPOOL officials felt that the region could compensate for a loss of 1,000 MW of Canadian power without a severe strain on their system. However, a loss of 2,000 MW would put a strain on the spinning reserves available within the region and the ability of neighboring systems to help during NEPOOL's shortfall.

#### U.S. UTILITY CAPITAL INVESTMENT PLANS CAN BE ALTERED

Utilities can alter their investment plans with purchases of Canadian power. For example, such purchases can substitute for building additional generating facilities. Further, purchases of Canadian power will require investments by U.S. utilities in the construction of new interconnections and upgrading existing facilities in order to receive and distribute power. These facilities can cost less than a utility's investment in new generation facilities. The cost justification for these investments will depend on the positive and negative financial implications contributing to utility's investment decisions.

#### Impact of power purchases

In the past, U.S. utilities have been purchasing large amounts of "interruptible" power from Canadian utilities, accounting for about 84 percent of our Canadian imports in 1981. Under an interruptible contract, the Canadian utility can stop exporting the power at any time to meet its own needs or the needs of its Canadian

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1/NERC was formed by the electric utility industry in 1968 to promote the reliability and adequacy of the bulk power supply of the North American utility systems. Virtually all U.S. utilities are members of NERC, as are many Canadian utilities including Ontario Hydro, Hydro Quebec, and the New Brunswick Electric Power Company.

neighbors. When interruptible power is available, U.S. utilities have been purchasing it to displace their more costly oil-fired generation.

The availability of long-term firm power from Canada could have another effect on U.S. power system plans--the substitution of firm Canadian power for new U.S. generating plants. "Firm" power represents a greater commitment on the part of the seller because the power must be available at all specified times during the period of the agreement. When a Canadian utility obtains a firm power export license from the National Energy Board, it's firm power sales take precedence over any of its interruptible sales--even interruptible sales to other Canadian utilities. For this reason, the exporting utility must demonstrate to the National Energy Board that the energy to be exported on a firm basis is surplus to Canadian needs over the term of the export license.

Because a firm sales contract represents such a strong commitment from the seller, the purchasing utility shows capacity expected under firm power contracts as part of their own capacity. As such, firm purchases can represent an alternative to a utility's own capacity expansion plans.

For example, prior to its cancellation in June 1982 <sup>1/</sup>, GPU's proposed 1,000 MW interconnection with Ontario Hydro under Lake Erie was to provide base load electric power to the Jersey Central Power and Light Company (Jersey Central) through a firm power supply contract to run from late 1984 through October 1991. GPU's need for firm power was created when the accident at Three Mile Island removed about 1,650 MW of baseload capability for an indefinite period of time, and the subsequent cancellation of the 1,168 MW Forked River, New Jersey, nuclear plant. The predominately coal-fired Ontario surplus power would have replaced mostly expensive oil-fired sources which GPU would have purchased from the Pennsylvania-New Jersey-Maryland power pool.

The proposed interconnection offered GPU an opportunity to add 1,000 MW of firm capacity in a relatively short timeframe at a relatively modest capital investment. The interconnection was scheduled to open in 1984, about 6 years after the Three Mile Island accident. The preliminary estimated capital cost of the 1,000 MW interconnection was \$557 million of which \$285 million would be GPU's share. While this is a substantial investment, it is much less expensive than a 1,000 MW baseload nuclear plant, which presently costs about \$2.0 billion or a 1,000 MW baseload coal-fired plant at \$1.5 billion, and GPU would have found it very difficult to raise this kind of capital in today's financial markets.

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<sup>1/</sup>In June 1982, while our report was being processed, GPU announced the cancellation of the Lake Erie project. GPU cited rising project cost estimates as well as financing and regulatory uncertainties have made other power supply alternatives more attractive to GPU at this time.

In New England, several utilities are close to negotiating firm purchase contracts with New Brunswick Electric Power Co., and some NEPOOL members are expected to seek firm power over the proposed interconnection with Quebec. The availability of firm power from Canada, coupled with the regulatory and financial problems U.S. utilities are experiencing in completing their own expansion plans, could lead to more firm power imports. More firm imports could eventually result in less domestic powerplant construction.

#### U.S. UTILITIES WILL USE LESS OIL

As in the past, increased Canadian electricity purchases will largely displace less economical oil-fired generation in the north-eastern United States. For example:

- PASNY's 765 kV interconnection with Quebec has been saving about 12 million barrels of oil per year since it opened in 1979. The capacity of this line will be upgraded and should save an additional 6.5 million barrels of oil annually beginning in 1984.
- PASNY's proposed 345 kV interconnection with Ontario should save an additional 5 million barrels of oil per year beginning in the mid-1980s.
- NEPOOL's 690 MW interconnection with Quebec should save about 3 million barrels of oil annually.

Therefore, by the end of the 1980s the interconnections planned by NEPOOL and PASNY alone could decrease U.S. oil consumption by over 14 million barrels per year.

#### ENVIRONMENTAL EFFECTS COULD LIMIT IMPORTS

Building new interconnections and increasing purchases of Canadian power will have significant environmental impacts on both sides of the border. These impacts can effect the land, water, air, and aesthetics. The GPU interconnection under Lake Erie and NEPOOL's interconnection through either New Hampshire or Vermont provide examples of the types of environmental concerns which could be addressed by U.S. and Canadian regulators. The issues raised on both sides of the border, and their resolution, will be very important in determining just how much Canadian power is available for U.S. markets, and the ability of U.S. utilities to obtain this power.

In the GPU interconnection, the major issues on the U.S. side included the environmental effects of laying the cable under Lake Erie and the effects that the interconnection will have on the

load flows in neighboring systems. Additional issues on the Canadian side include the acid rain 1/ effects of producing the coal-generated power sold over the interconnection would have in the Province of Ontario. Ontario planned to export mostly coal-fired power over the line. Despite a recently implemented Ontario Hydro program to reduce acid rain emissions, there is a growing concern about acid rain in Canada. For the first time ever, Environment Canada (Canada's environmental ministry) intervened in the National Energy Board Hearings on Ontario Hydro's export license and raised its concern about the acid rain issue. Should public concern over acid rain in Ontario continue to increase, then the availability of coal-fired surplus in Ontario for export purposes could be in jeopardy. Ontario Hydro has an acid gas control program in place and the National Energy Board will require the utility to demonstrate that it can meet its emission regulations before approving any increased exports.

NEPOOL filed for a Presidential Permit in December of 1981, even though it is not yet known if the interconnection will come through Vermont (56 miles) or New Hampshire (83 miles). Either line will impact on the environment through the projects' siting requirements. While both States want to host the interconnection, there is significant opposition to the line at the local level. Any significant delays in the project could put added pressure on Hydro-Quebec to delay some of their expansion plans.

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1/A solution of water and sulfuric and nitric acids formed when sulfur oxides and nitrogen oxides are emitted into the air (primarily from the combustion of fossil fuels in powerplants, industrial processor, cars, and trucks) and combines with atmospheric moisture. This solution returns to earth as acid rain.

## CHAPTER 3

### NO CLEAR POLICY GUIDELINES EXIST CONCERNING

#### THE ROLE FOR CANADIAN ELECTRICITY

Since it was established in 1977, DOE has been the focal point of Federal activities related to international electricity exchanges. DOE has two responsibilities which are becoming increasingly important as U.S. utilities increase their inter-connection capabilities with Canada:

- (1) DOE issues Presidential Permits which must be obtained by utilities before constructing electrical facilities at international borders, and
- (2) DOE has the authority to assume a coordinated electricity planning role to assure that the Nation's needs for electric power are met at the lowest economic, environmental, and social cost and in a manner consistent with national energy policy.

The primary means of monitoring and controlling Canadian power imports is through the Presidential Permitting process. Obtaining a Presidential Permit is a major regulatory milestone which utilities must pass before constructing a new interconnection with Canada. DOE has had to implement a permit application review process without the benefit of a national policy toward electricity supply in general or clear policy guidelines on the role for Canadian electricity imports in particular. As a result of the lack of policy guidelines, a permit application review process has evolved at DOE which has recently caused concern among utilities.

In addition, DOE has not placed a high priority on its electricity planning role and takes the position that electricity planning is principally a State and utility function. However, purchases of Canadian power imported over an interconnected utility system can affect neighboring utilities and often require a planning effort involving several States and utilities.

In this chapter, we point out how a national electricity policy and greater emphasis by DOE on its electricity planning responsibilities would facilitate DOE's review of Presidential Permit applications.

#### THE PRESIDENTIAL PERMIT PROCESS

Since 1939 utilities have been required to obtain a Presidential Permit for the construction, interconnection, operation, and maintenance of electrical transmission facilities at international

borders. The purpose of this requirement is to provide a systematic method for issuing permits for the exporting or importing of electric energy in order to carry out the provisions of the 1935 Federal Power Act (49 Stat. 838). As of June 1982, no applicant has ever been denied a permit.

#### DOE's review of permit applications

Since 1977, DOE has been the lead agency in the review of permit applications. As such, DOE is responsible for assuring that Federal agencies--such as the Corps of Engineers, the Environmental Protection Agency, and others--are involved in reviewing applications when required. Also, DOE must obtain the concurrence of the Departments of State and Defense before issuing a permit.

Issuance of a permit is conditioned on a finding by DOE that the proposed project is "consistent with the public interest." DOE fulfills this requirement by reviewing the (1) environmental, (2) technical, and (3) economic impact of the proposed interconnection as determined from the information submitted with the application, from required public hearings and subsequent submissions.

DOE officials often meet with utility officials before the utility applies for a permit. Such meetings are to (1) answer questions, (2) explain the procedures of the permitting process, and (3) provide information on the length of time required to process a permit application -- 18 to 24 months if an environmental impact statement (EIS) is required and 6 months if an EIS is not required.

There are no clear national policy guidelines towards Canadian imports and DOE does not have a specific set of criteria to evaluate permit applications. DOE reviews the applications on a case-by-case-basis. DOE told us that each application has unique characteristics and conditions and, in reviewing the applications, these officials try to assure themselves that

- the project complies with the National Environmental Policy Act;
- the reliability of domestic electricity transmission will not be adversely affected;
- oil consumption will decrease or remain constant;
- utilities will not consume any more fuel as a result of the interconnection than would have occurred without the interconnection;
- dependence on foreign oil supplies will not increase;  
and
- utility system coordination and communication will increase.

More detail about DOE's environmental, technical, and economic review of permit applications may be found in appendix III.

In the past, concurrence from the State and Defense Departments has been a routine matter and neither department has ever withheld their concurrence. The State Department has generally determined that new interconnections with Canada have a favorable impact on our foreign relations and has been in favor of increasing Canadian electricity exchanges. The Defense Department looks at the proposed facility in terms of defense implications and delegates its review to the particular service branch that may be affected.

Status of DOE's permitting process

Since acquiring the Presidential Permitting responsibility in 1977, DOE has received 13 permit applications and issued 8 permits with 4 permits still in process and one suspended. The overall length of time for the applicant to comply with the permit's regulatory requirements and for DOE's review of the application through the permit's issuance has ranged from 3 to 23 months (see table 2).

Of the five applications which required the preparation of an EIS, three permits have been issued by DOE, one is pending and one was suspended. These permits were issued in a period of 16 to 23 months. Of the six applications which did not require an EIS, five permits have been issued and one is pending. These permits were issued in a timeframe ranging from 3 to 17 months.

Table 2

Length of Time for Permit Issuance by DOE

	<u>Permit number</u>	<u>Application filed</u>	<u>Permit issued</u>	<u>Length of time (approx. months)</u>
EIS required	PP-63	4/18/77	3/06/79	23
	PP-64	7/24/78	11/30/79	16
	PP-68	4/02/79	1/12/81	21
	PP-71	12/21/79	Pending	
	PP-72	6/25/80	Suspended <u>a/</u>	
EIS not required	PP-66	3/08/79	6/21/79	3
	PP-67	3/13/79	6/27/79	3
	PP-69	4/26/79	10/09/80	16
	PP-70	6/13/79	11/10/80	17
	PP-74	12/16/80	9/04/81	10
	<u>b/</u> PP-75	6/05/81	Pending	
EIS undetermined	PP-76	12/81	Pending	
	PP-77	12/81	Pending	

a/DOE suspended the permit as a result of GPU's project cancellation.

b/PP-73 refiled as PP-75.

Also, two applications were submitted to DOE in December 1981, and it has not been determined if they will require the preparation of an EIS.

DOE's technical reviews  
are unclear

The one element of DOE's review process which is causing increasing concern among utilities is DOE's technical review of permit applications. Generally, we found that the type of technical scrutiny to which DOE subjects permit applications seems unnecessary in light of the checks and balances within the utility industry to assure that new interconnections are brought on-line in a reliable manner. Also, DOE has no instructions on what specific information is required for a technical review, and the criteria or tests which must be met by the applicant, and no policy guidelines for conducting their review. As a result, after the initial technical review of an application, DOE often requests voluminous additional data and utilities are uncertain about when they have fulfilled DOE's requirements. This situation has led to delays in approving permits and strained relations between DOE and the utilities involved. Two recent Presidential Permit applications--PASNY's Presidential Permit (PP-74) and GPU's PP-72--illustrate the above situation.

PASNY applied for PP-74 in December 1980. The proposed interconnection which is about 700 feet long and crosses the Niagara River, will supply about 1,250 MW of power from Ontario to New York. In April 1981, DOE had determined that an EIS would not be necessary--a decision which greatly reduces the permits' processing time.

To assess the technical aspects of the application, DOE engaged a consulting firm. The consultant's report raised questions on the effect that the new 1,250-MW interconnection would have on neighboring utility systems and proposed that DOE place a special condition on PASNY's permit. Using the exact wording from the consultant's recommendation, DOE proposed a special condition to the permit that PASNY sponsor and coordinate a power system technical analysis of the MAAC, ECAR, and NPCC system area. This is a 17-State area from Indiana to Maine. (See map in appendix V.) If PASNY had agreed to these terms, a permit may have been immediately issued. But even if the utilities performed this study, DOE could still negate the permit.

PASNY objected to this condition on the grounds that it did not have authority to sponsor such a broad study nor was such a broad study needed as a result of its proposed interconnection. PASNY also felt that the timing of the study suggested by DOE was premature and that it had always intended to conduct appropriate testing of the new interconnection before the new line was energized in December 1983. PASNY officials told us that they would not have been able to commit funds to the project if their permit contained the proposed special condition. PASNY's policy is to commit funds only after all permits are in hand, and its management



would not consider the Presidential Permit "in hand" until this condition was satisfied by DOE's acceptance of the study.

After 3 months of correspondence, DOE and PASNY agreed on the wording for the special condition. The new wording was basically that proposed by PASNY in June of 1981, and stated that the facilities would at all times be operated to meet NPCC criteria and that appropriate testing would be conducted before placing the line inservice. If restrictions were necessary as a result of this testing, they would be treated as a permit limitation until modified or canceled. The permit was issued to PASNY in September 1981, some 3 months behind schedule, and PASNY officials estimate that if this results in a corresponding delay in the inservice date of these facilities, it could cost their customers about \$12 million in potential savings.

A similar situation arose in DOE's technical review of the proposed GPU interconnection under Lake Erie. Once again, DOE engaged a consulting firm for the technical review. The consultants raised questions about the effect of the new interconnection on GPU's neighboring system, especially in Cleveland, Ohio. GPU officials told us they had already been working on the problem with Cleveland utility officials and were able to answer all of DOE's questions. However, GPU officials had heard about the proposed PASNY special condition and were concerned that a similar condition would be placed upon their permit. Like PASNY, GPU will not commit substantial funds to the project until after all permits are in hand.

As a result of these concerns, GPU is participating in a joint study with other utilities in the MAAC, ECAR, and NPCC reliability areas. This study addresses many of the concerns raised by DOE and its consultants in their technical review of the PASNY and GPU permits. GPU officials were hopeful that this study would have avoided any restrictive conditions on their permit.

#### DOE technical review could be streamlined

We feel it is appropriate for DOE to assure itself that proposed interconnection projects are technically sound and will not adversely affect the reliability of domestic power systems. Also, DOE should require that adequate testing be done before new interconnections are placed in service. However, DOE can obtain these technical assurances more quickly and efficiently by relying more on the affected utilities to identify and solve technical problems. However, the technical data and studies requested by DOE during its review of the PANSY permit application are an inappropriate prerequisite for a permit and can unnecessarily delay the granting of a permit. Our review of relationships of utilities to their various industry groups (see appendix IV) indicates that many checks and balances are in place within the industry to prevent a utility from using a new interconnection if it were to jeopardize the reliability of neighboring systems.

DOE's role in this technical review should be that of a coordinator and not that of a power system analyst. As a coordinator, DOE should make sure that all utilities which will be affected by a new interconnection are notified and their comments and concerns made known. DOE should then make sure these concerns are worked out among the utilities, document the resolution of these concerns, and deal with issues which remain unresolved. The judicious use of special conditions can assure that major concerns are addressed and that DOE has the assurances it needs as to the project's technical soundness.

In carrying out this technical review, there should be little need for DOE to request and analyze, either in-house or through consultants, large amounts of technical data and studies.

#### DOE's economic review is minimal

Although DOE believes an economic review is needed before a permit is issued, it does not require financial data to be filed with the permit application. In fact, minimal economic review of the application is done by DOE because agency officials feel that the economic justification of the line is best determined at the State level. While interconnections have been economically justifiable in the past, the magnitude of future interconnections should have a greater economic impact with increases in the size of the line, the amount of power transferred, and the size of the area affected by this power.

DOE's position to leave this responsibility to the States does not assure that permits are issued consistently with the public interest and that the Nation's needs for electric power are met at the lowest economic cost consistently with environmental and social goals. DOE can only assure this if the proposed interconnection is proven to be the utility's least cost-supply option.

In a previous GAO report <sup>1/</sup> we pointed out that electricity planning capabilities varied considerably from State to State. Therefore, leaving the economic review of new interconnections up to the States does not assure that the public interest is always met.

#### DOE's procedures allow inaccurately reported data

All Presidential Permits require that utilities file an annual report detailing transactions with foreign countries using facilities covered by the permit. DOE gathers and summarizes this information, which includes the amount of electricity imports and exports, and the dollar amounts of the transactions. However, DOE is unable to accurately determine the power exchanged through this process.

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<sup>1/</sup>"Electricity Planning: Today's Improvements Can Alter Tomorrow's Investment Decisions," EMD-80-112, Sept. 30, 1980.

For example, DOE reported net imports of Canadian electricity in 1979 of 20.4 billion kWh, while Canada's National Energy Board reported 29.6 billion kWh of net exports to the United States. While we did not determine the accuracy of the Canadian figures, National Energy Board officials were quite confident in their numbers. On the other hand, DOE officials admit that their net imports are understated for the following reasons:

- Border utilities which are wheeling power to other utilities are not reporting these transactions. Since utilities ultimately receiving the power do not hold the permit, they are not reporting the transactions either.
- DOE suspects that some lines in operation do not have a valid permit and are not reporting transactions. For example, one utility had purchased lines from another utility. It did not realize that the permit is non-transferable and actually constructed additional facilities without obtaining a permit. DOE eventually identified the facilities and issued the proper permits.
- Some utilities are reporting net imports instead of gross imports and exports.

DOE inherited these problems and has been working to identify and eliminate them. In the past, when electricity exchanges were relatively small and equal, this type of reporting deficiency could be considered insignificant. However, with the net imports from Canada soaring past 30 billion kWh and the \$1 billion mark, accurate information on these exchanges is essential for those administering the permitting and licensing functions and for those forming our energy policies.

#### NATIONAL ELECTRICITY POLICY WOULD CLARIFY DOE'S PERMITTING AND PLANNING RESPONSIBILITIES

DOE has not developed clear policy guidelines on the role for Canadian electricity in the United States which may be part of a larger problem--no formal policy towards electricity in general. Without clear policy guidelines, DOE lacks the direction on how to implement its permitting and electricity planning responsibilities. While this situation in the past posed no problems because the size of the interconnections were small and the power was exchanged, this has changed.

We believe the lack of clear policy guidelines has been a cause for concern in DOE's permitting process. As pointed out earlier, DOE operates on a case-by-case basis, has tried in recent applications to perform more in-depth technical reviews, and contracts out for a technical review. The applicants appear to have become frustrated. They feel DOE is not exactly sure what requirements they are trying to fulfill and the information it necessarily wants from the applicant. Another area of DOE's

responsibility in the electricity area which closely relates to the permitting process is its role in electricity planning.

DOE has the authority to undertake a unified and coordinated electricity planning role so as to assure that the Nation's needs for electric power are met at the lowest economic, environmental, and social cost. However, DOE has not developed a policy and as a result is without guidance on how to implement the function. In addition, DOE has also not assigned a high priority to its electricity planning efforts, and has taken a passive role in dealing with the problems confronting power planners. DOE is hesitant to act because electricity planning is considered a State and utility function. But if this function was performed, it would provide a greater informational basis for generation needs and other supply/demand alternatives for DOE to conduct the technical and economic reviews before issuing a permit. On the other hand, the reason DOE does not get involved in electricity planning, because it is a State and utility function, could also be applied toward the permitting process. Application of this logic could lead to an end of the permitting process.

So, in effect, DOE's activities in these two closely related areas affecting U.S. electricity demand and supply are in conflict. While DOE has not assigned a high priority to its electricity planning efforts, it continues to issue permits which can affect the U.S. bulk power supply system. We attribute this to an overall lack of policy for DOE's involvement in electricity.

In a previous GAO report 1/ we pointed out the many areas of operations within DOE and the Federal Government involved in electricity decisions or programs which affect electricity demand and supply. Programs such as oil displacement through electricity transfers, coal conversion, conservation, alternate resource development, licensing of hydropower and nuclear powerplants, the permitting process and others are located throughout DOE and the Government. We recommended DOE develop a responsibility center within the Department to focus on electricity planning. This has not been done.

A related effort now underway, however, could provide the guidance as to what the Federal role should be in the electricity area and, which also could provide the policy guidance for the permitting process. A subcabinet group has been developed as a result of the electric utility industry's raising concerns about financial problems and regulations. This group, chaired by DOE, has a broad working agenda but has not specifically identified Canadian power as part of its agenda for considering the aspects of developing an electricity policy. Such a policy could provide the guidance needed in DOE's electricity programs, including permitting and planning.

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1/"Electricity Planning: Today's Improvements Can Alter Tomorrow's Investment Decisions," EMD-80-112, Sept. 30, 1980.

## CHAPTER 4

### CONCLUSIONS AND RECOMMENDATIONS

#### CONCLUSIONS

Imports of Canadian electricity have been increasing steadily over the past 10 years and are expected to continue to increase over the next decade. This electricity trade has occurred in the past without clear United States policy guidelines toward Canadian imported power. However, we believe that the nature of this trade is changing dramatically as evidenced by the increasing transfer capabilities of the new interconnections and the prospects of more firm power purchases. Also, many issues are emerging regarding future Canadian electricity imports, such as:

- Should the United States, through firm power purchases, be encouraging the development of Canada's nuclear industry at the expense of our own?
- How much should the United States depend on Canadian sources for its electricity needs?

The Federal Government's role in Canadian electricity imports is issuing permits for international interconnections. However, it carries out this responsibility without the benefit of a national policy on electricity in general or clear policy guidelines on the role for electricity imports in particular. This lack of policy guidelines has contributed to the following:

- The Federal role for Canadian power within the U.S. bulk power supply system remains undetermined.
- DOE has no direction on how to fulfill its permitting responsibilities and thus has no specific set of criteria to conduct its reviews.
- The utility industry is without a clear understanding of the Federal Government's position on importing power and what is required in the permitting process. As a result, utilities have become frustrated because of the uncertainty of what DOE requirements they are expected to fulfill, the type and amount of information needed, and the conditions in which a permit will be issued.
- In addition, DOE has not fulfilled its electricity planning responsibilities which could provide an informational basis for making permitting decisions.

Anticipated increases in Canadian imports clearly signifies the need for clear policy guidelines on the role for Canadian power imports. This could help U.S. utilities and regulators

as they plan for the Nation's future power needs and negotiate for future Canadian power purchase. Policy guidelines would also define DOE's role in these transactions as well as provide the guidance needed in DOE's Presidential Permitting program and its overall electricity planning efforts.

### RECOMMENDATIONS

DOE can provide assistance and support to the States and utilities by improving its issuance of Presidential Permits and in its electricity planning responsibilities. We recommend that the Secretary of Energy:

- Work with the executive subcabinet working group on Regulation, Competition, and Efficiency in the Electric Utility Industry to establish clear Federal policy guidelines on the role for future Canadian electricity in the United States. This could be done as part of this group's total effort in looking at a national electricity policy and could contribute to a better understanding of the problems confronting utilities. This function is appropriate for DOE to undertake since it chairs this group.

If the subcabinet group is unable to develop policy guidelines, the Secretary should obtain input from the utility industry and the Department of State to establish policy guidelines on its own. After development, the Secretary should inform utilities of DOE's requirements.

During the interim period before clear policy guidelines are developed, the Secretary should expedite the permitting process by working more closely with utilities during the technical and economic reviews to assure utilities are aware of the purpose for submitting the data, how these data will be used, and the circumstances under which a permit could be issued with conditions.

### AGENCY COMMENTS AND OUR EVALUATION

Copies of the draft of this report were furnished to the Departments of Energy, State, and Defense. Pertinent sections of the draft were sent to the Power Authority of the State of New York, General Public Utilities Service Corporation, and the North American Electric Reliability Council; and in Canada to Ontario Hydro, Hydro-Quebec, the National Energy Board, the Federal Department of Energy, Mines and Resources, and the Provincial Ministries of Energy in Ontario and Quebec to verify factual information. Written responses are included in appendices VI to XV. Oral comments were obtained from both Provinces. The Department of Defense had no substantive comments. The report was revised in several sections to reflect the remarks of the various organizations. The following sections summarize the overall comments and present our views on these matters.

## Department of State

The Department points out that while no formal electricity imports policy statement has been enunciated, utility companies, State energy offices, and Canadian energy authorities and suppliers are fully cognizant of longstanding U.S. predisposition to view favorable Canadian electricity imports. The Department adds, however, that our report fails to note important developments that could require DOE policy attention in the not-too-distant future. For example, the Department notes that Canada may continue its nuclear construction programs as a solution to the current economic difficulties facing its nuclear reactor industry. These nuclear reactors could be built and dedicated, partially or exclusively, to electricity exports to the United States. The Department believes this raises important strategic questions for U.S. policy makers coping with depression in the U.S. nuclear industry. Also, encouraging Canada to pursue an electricity export policy designed to aid its nuclear industry rather than to develop its natural hydroelectric potential, could have a number of undesirable long-term consequences that the U.S. Government might want to consider carefully.

We agree that these are important issues in U.S.-Canadian electricity trade, and we feel that the State Department comments reinforce our conclusion that clear policy guidelines on the role for Canadian electricity imports is needed. Our draft report acknowledges the magnitude of projected Canadian imports and that they could affect U.S. utilities construction plans and thus, the nuclear industry. This is why we believe the subcommittee group needs to consider these developments in formulating an electricity policy.

The Department also recognized that GAO presents a good case for having DOE officials state more clearly to utilities their concerns with a given project, in focusing on some areas for DOE improvement. However, the Department was concerned why the Federal role should be enhanced or expanded because it could not distinguish the link between frustrations encountered by utilities in the permitting program for electricity trade transactions and a Federal electricity import policy. The Department underscored the need for streamlining the permitting program and to reduce the regulatory "red tape" and delays which have frustrated utilities in obtaining a permit.

We do not feel our recommendation that DOE develop clear policy guidelines on electricity imports would result in an expanded Federal role. On the contrary, we feel that such policy guidelines would help to streamline DOE's permitting program, reduce regulatory "red tape," and help DOE carry out its electricity planning responsibilities.

The Department points out that to date, U.S.-Canada electricity trade is not suffering without a policy, as utilities are aware of the risks of Canadian supplies, and electricity consumers have been satisfied with the benefits of electricity transactions.

While past U.S.-Canada electricity trade may not have suffered without a policy, we feel the main focus of our report recommendation is on future U.S.-Canada electricity trade. There are important issues affecting future trade which we feel require immediate policy consideration and which the Department acknowledged as discussed above.

As discussed in the report, U.S.-Canada electricity transactions have been increasing over the last 10 years and are expected to continue in the future; most Canadian utilities and provincial governments have been fully supportive of increasing its exports to the United States. The extent to which these imports will continue is largely dependent on how easily U.S. utilities will be able to obtain permits from DOE, how DOE will continue to perform its program responsibilities, and the effect the GPU-Ontario Hydro cancellation will have on further utility transactions. However, a policy to address the role for Canadian imports, the amount of power which should be imported, and DOE's role in these transactions would remove some of the uncertainty surrounding the extent of future Canadian imports. Streamlining the regulatory process may be a valid solution to eliminate some utility frustrations, but this may be a futile effort if overall policy guidelines are lacking.

The Department noted that our report does not describe State or regional authorities' viewpoint regarding the lack of a Federal policy. While we did not directly solicit comments from State and regional authorities regarding a Federal policy, we believe our previous work on States' planning capabilities, in addition to the North American Electric Reliability Council's response to this report, continues to support the need for a Federal policy. In our report "Electricity Planning--Today's Improvements Can Alter Tomorrow's Investment Decisions," (EMD-80-112, September 30, 1980), we found that although States have the primary responsibility for regulating electric utilities and overseeing their electric power plans, most States were not well prepared to deal with power planning under changing conditions. In addition, NERC's views which should be representative of regional electric authorities, recognized that the Federal Government should have some control over Canadian imports since it is an international trade transaction.

#### Department of Energy

DOE provided comments in two areas: a policy question relating to the expansion of importing Canadian power and DOE's programmatic responsibilities to approve and permit electricity imports and interconnection facilities.

DOE points out that GAO incorrectly asserted that DOE has no policy towards Canadian electricity imports. DOE feels that there should not be a policy which would limit Canadian imports and points out that its current policy is to place no prescribed aggregate limits on imports but rather to examine each proposal



which could increase Canadian imports on a case-by-case basis. DOE states that the level of Canadian imports is not used as a criterion in approving the permits for proposed interconnections.

In its comments, DOE seems to assume that GAO is advocating DOE to develop a policy which limits Canadian imports. This is not our intention, and we have revised appropriate sections of our report to more clearly state why we think clear policy guidelines on Canadian imports are needed. Further, even if DOE does follow the approach to place no limits on Canadian imports, we do not believe this provides clear direction as to the criteria and approach taken by DOE in carrying out its permitting process, especially in view of recent and anticipated increases in Canadian imports. The level of imports is only one of many factors which could be considered as a guide. Other factors to be considered include the effect of imports on (1) the reliability of U.S. power systems, (2) national security, (3) U.S. utility expansion plans, (4) our domestic nuclear industry, and (5) the environment. In effect, DOE by reviewing each proposal on a case-by-case basis does not assure uniformity in approving permits and, as pointed out in our report, has led to utility frustration which could magnify as the level of Canadian reserves increases. We believe clear policy guidelines are needed when considering, as Department of State points out, there is increasing interest in Canadian electricity exports which could require DOE policy attention in the not-too-distant future. Further, such policy guidelines could provide the direction needed to make the permitting process more efficient.

We do not intend to be overly critical of DOE's permitting process or to make these deficiencies the main focus of our report. We feel that the recent problems with the permitting process are caused by the lack of clear policy guidelines on Canadian imports to guide the permit approval process. These problems should be corrected with a clear policy guidance, especially in light of the size and impact that future interconnections will have on the United States. We believe that our recommendation of developing policy guidelines toward Canadian imports would be useful to DOE in establishing criteria for approving permits and would also be useful to utilities in understanding what is expected of them in applying for permits and could, in general, streamline the permitting process. We believe that policy guidelines are necessary to face the important issues being raised by the increased imports and to help utilities and regulators determine the future role of Canadian imports in U.S. power supply system.

DOE also commented that, within its program responsibilities, utilities should be able to obtain a clear understanding of what DOE requires of them to obtain a permit. DOE stated that any proposal for a permit is reviewed to assure that Canadian imports are safe and consistent with the public interest. DOE stated it has criteria for a permit's review, a specific process for conducting a review and regulations on the components necessary to satisfy a permit request, and is willing to discuss with the applicants the procedural requirements of the application.

We disagree that DOE has made it clear to utilities exactly what is required of them to obtain a permit. While DOE does have regulations and instructions on how to apply for a permit, we found that the criteria and process used to review the applications, especially the technical reviews of the applications, were imprecise and will continue to lack consistency and logic without clear policy guidelines.

North American Electric  
Reliability Council

NERC recognizes the Canadian electricity imports should be treated as any other international trade transaction and, therefore, the Federal Government should have a role for the purpose of guarding national security and welfare, and assuring the relationship between U.S. and Canadian utilities. In recognizing this role for the Federal Government, NERC commented that individual utilities should be able to reasonably expect certain treatment from the Government including promptness, consistency, and fairness.

In addition, NERC agreed with the report's analysis that the utility industry operating within an interconnected environment knows the effects of any new transmission system on its neighboring utilities. Utility systems know the necessity for communication with their neighboring utility systems and a joint effort by all parties involved. NERC felt the Federal Government should only intervene as a referee, moderator, or catalyst only when utility autonomy is impossible to sustain and the permitting process is proceeding in a harmful manner.

While we recognize that NERC's comments are generally supportive of our report, we must take exception to some portions of their comments which slightly overstate our position. Our report does not present an analysis that the utility industry knows the effects that a new transmission system will have on neighboring utilities. We do feel that the structure of the utility industry and the conditions under which interconnected utilities must operate make it incumbent upon them to work out many technical problems with a new interconnection before it is energized. Further, the utilities have the engineers and other technical resources needed to solve such technical problems. Therefore, while the industry is in a position to identify and address technical problems of new interconnections, there is a Federal role on each project to make sure the technical concerns of all neighboring utilities are addressed not necessarily before issuing the permit, but before the line is energized.

General Public Utilities  
Service Corporation

GPU found that our report adequately reflects its views and its factual information. However, GPU questioned if U.S. utilities would use Canadian imports on a long-term basis as a

permanent substitute in lieu of building new U.S. generating plants. We have recognized this concern in our report.

Power Authority of the State  
of New York

PASNY agreed with our report regarding DOE's permitting program. PASNY believed that DOE lacks a systematic and efficient process for issuing permits and such a process should be implemented. PASNY pointed out any prolonged proceedings resulting from the lack of guidelines to evaluate applications and issue permits will result in additional oil consumption and increased costs to electric customers. PASNY also provided additional clarifying material on its segment of the report.

Canadian agencies and utilities

Canada's National Energy Board and the Provincial utilities-- Hydro Quebec, Ontario Hydro--and Quebec's Ministry of Energy provided comments on the pertinent portions of the draft report. Most of their comments concerned updating the data contained in the report regarding the capacity of existing interconnections, planned interconnections, and the extent of Canadian reserve generating capacity available for export. These changes were necessitated by revised utility load and capacity forecasts and the cancellation in June 1982 of the Ontario Hydro-GPU Lake Erie project. We changed the body of the report to accommodate these comments.

Comments were also received from Canada's Departments of Energy, Mines, and Resources and Ontario's Ministry of Energy. They took exception to any references to the inavailability of electricity from Quebec due to power system shutdowns or the political situation and, in general, their comments reaffirm the fact that Canadian utilities would like to market more of their power reserves to U.S. markets.

EXPLANATION OF FORECASTED ELECTRICITY  
SURPLUS CAPACITY IN ONTARIO AND QUEBEC

Ontario - Despite steadily declining long-term load forecasts (currently at 3.0 percent annual growth for next 20 years) the Province's public utility, Ontario Hydro, is committed to an expansion program which will add 8,600 MW of nuclear and 440 MW of fossil generation to its system by 1990. As a result, Ontario Hydro is forecasting winter reserve generating capacity after maintenance (reserves from which exports can be made) of anywhere from 7,300 MW to 11,500 MW <sup>1/</sup> for the period 1983 to 1996. Since Ontario is a winter peaking system, additional capacity could be available for export on a short-term basis from April to October.

Accordingly, in 1978 Ontario's government requested Ontario Hydro to explore the possibility of marketing, on either an interruptible or a firm basis, the electric power which could be produced from this reserve capacity. The proposed interconnections with GPU and PASNY resulted from this effort but Ontario Hydro still has significant planned reserve available.

Ontario's generating capacity is presently about one-fourth nuclear, one-fourth hydro, and one-half fossil fuel--mostly coal. The capacity available for export is primarily coal-fired generation, and over 95 percent of Ontario's 1980 exported power was generated using imported United States coal. Environmental concerns have been raised in Canada about Ontario Hydro's proposed export of coal-fired generation to GPU.

Quebec - Like Ontario, Quebec's provincial utility--Hydro-Quebec--recently lowered its long range demand forecast from an average annual growth rate of about 6.1 percent to 3.6 percent. But unlike Ontario, the provincial government and the utility have not reached a definite conclusion on the effect this lowered demand should have on the utility's generation expansion plan.

Based on the higher forecast, Hydro-Quebec was engaged in a 15-year, \$47-billion (U.S.) expansion program, designed to add over 35,600 MW to Quebec's system. This plan includes about 7,600 MW of thermal capacity and about 28,100 MW of hydropower. If Hydro-Quebec were to continue with the present expansion plan schedule, Quebec could have winter reserve generating capacity <sup>2/</sup> of about 4,000 MW in 1984 climbing to about 12,000 MW in 1996. An additional 2,200 MW to 4,000 MW of power could be available from April to September as Quebec is also a winter peaking system. These reserves would be almost entirely hydropower.

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<sup>1/</sup>Based on dependable streamflow conditions for hydropower capacity.

<sup>2/</sup>Based on average streamflows as Quebec makes use of very large reservoirs which provide multi-year storage.

However, in order to meet its recent lower forecast of internal demand, Hydro-Quebec would have to add only about 11,000 MW of hydropower and 3,600 MW of thermal peaking units during the next fifteen years. In spite of this substantial drop, Hydro-Quebec would still have in the short term winter surplus generating capacity reaching about 4,500 MW in 1984 and declining to about 2,000 MW up to 1988. Additional power would be available from April to October. This surplus would be almost entirely hydropower. According to Hydro-Quebec, this latest expansion plan, could make a total of about 300 billion kWh of surplus energy available during the next fifteen years.

The Quebec Energy Minister has indicated that the provincial government would like to keep the previous expansion plans on schedule and export any surplus to the United States or other Canadian provinces. Hydro-Quebec is actually studying accelerated expansion plans in respect to the actual load forecast in order to make each surplus available.

The official generation expansion schedule is not yet announced, but even if the previous schedule is delayed, Quebec could have winter surpluses available, as mentioned before, into the 1990's. If American utilities are willing to enter into long-term (15-20 years) agreements for power, the Quebec government could be expected to encourage Hydro-Quebec to keep its previous expansion program on schedule.

ORGANIZATIONS CONTACTED DURING REVIEWUTILITY COMPANIESUnited States

General Public Utilities Service Corporation, Reading, PA  
and Parsippany, NJ  
Power Authority of the State of New York, New York, NY

Canada

Hydro-Quebec, Montreal, Quebec  
Ontario Hydro, Toronto, Ontario  
The New Brunswick Electric Power Commission, New Brunswick

STATE OR PROVINCIAL AGENCIESUnited States

Massachusetts Office of Energy Resources, Boston, MA  
Rhode Island Public Utilities Commission, Providence, RI  
Vermont Public Services Board, Montpelier, VT  
Vermont Public Power Supply Authority, South Burlington, VT

Canada

Ontario Ministry of Energy, Toronto, Ontario  
Quebec Ministry of Energy, Quebec City, Quebec

FEDERAL AGENCIESUnited States

Department of Defense, Washington, DC  
Department of Energy, Washington, DC  
Department of State, Washington, DC  
Federal Energy Regulatory Commission, Washington, DC

Canada

The Department of Energy, Mines and Resources, Ottawa, Ontario  
The Department of Industry, Trade Commerce, and Regional Economic Expansion, Ottawa, Ontario  
National Energy Board, Ottawa, Ontario

OTHER ORGANIZATIONSUnited States

North American Electric Reliability Council, Princeton, NJ  
New England Power Pool, West Springfield, MA

Canada

Energy Probe, Toronto, Ontario

DETAILS OF DOE'S PRESIDENTIAL PERMIT  
APPLICATION REVIEW

DOE reviews the environmental, technical, and economic aspects of Presidential Permit applications.

ENVIRONMENTAL REVIEW

When reviewing an application for a permit, DOE reviews the environmental impacts of the line in accordance with the National Environmental Policy Act of 1969 (P.L. 91-190). The act requires the preparation and distribution of an environmental statement and the opportunity for public comment in connection with any major federal action significantly affecting the quality of the environment. If DOE determines the proposed facility could have a significant impact on the environment, an EIS must be prepared. The overall processing time for an application, including the preparation of an EIS could range from 18 to 24 months. If DOE determines that an EIS is not required, the processing time could be reduced to about 6 months.

Each applicant is required to submit information regarding the environmental impacts of the proposed interconnection facilities. Such information includes a description of all practical alternatives and its environmental impact; a list of known historic places; threatened or endangered wildlife or plantlife; and a list of each flood plain, wetland, critical habitat, navigable waterway crossing, and Indian land or historic site which may be impacted. This initial submission is usually characterized as the applicant's environmental report. DOE may subsequently request additional environmental material during its review.

DOE has contracts with the National Laboratories to fulfill its Federal environmental responsibilities. DOE's NEPA Affair Office evaluates the environmental significance of the proposed action and recommends the method to assure compliance. When an EIS is required DOE uses the services of a national laboratory to review the applicants' environmental report, identify supplemental information, conduct appropriate studies, obtain additional data, analyze the characteristics of the affected environment, identify the impacts of the proposed action, and assist in the preparation of an EIS. Generally, DOE incurs all costs associated with the national laboratories; these costs are not reimbursed by the applicant.

The following table shows the costs of work performed by the national laboratories during DOE's environmental review:

Table 2

<u>Permit no.</u>	<u>Utility</u>	<u>Nat'l lab</u>	<u>Cost</u>
PP-63	Northern States Power	Argonne	\$125,000
PP-68	San Diego Gas & Electric	Lawrence- Livermore	<u>a/75,000</u>
PP-71	Nebraska Public Power	Argonne	<u>b/150,000</u>
PP-72	General Public Utilities	Argonne	<u>b/140,000</u>

a/One-half paid by DOE, one-half paid by California Public Utilities Commission.

b/Estimate

### TECHNICAL REVIEW

DCE reviews the impact of proposed interconnection facilities on the United States bulk power system. This review of power system reliability and adequacy focuses on the areas of system planning analysis and the stability of the electric power system. An application for a permit must include specific technical information and clarifying diagrams, such as general information regarding the facility's voltage and frequency; number of circuits; conductor size, type and number of conductors per phase; additional information if the lines are overhead, underground, or submarine; and a map of the facilities' location on the international border. In addition, facilities operated at 138 kv and above must contain information regarding power transfer capabilities, and system power flow plots for different seasons and years.

Under DCE's technical review, an applicant's initial submission is reviewed and evaluated and then additional or clarifying information is often requested. DOE has one engineer who may do this review in-house, but DCE has contracted-out for these services in the past. Following this initial review, additional or clarifying information is often requested, which includes: projected and/or existing peak load energy requirements, generating capabilities by primary fuel source, firm purchase contracts, planning and operating reserve criteria, and reserve margins. Subsequent reviews could lead to the preparation of additional power load flow studies for the affected utility system and surrounding systems under various load and capacity forecasts and transmission; and the system's transient stability studies under various contingency conditions. Depending on the extent to which the applicant can satisfy DOE's technical requirements, the technical review could result in an early resolution of all concerns or, in the extreme instance, unresolved technical concerns are placed conditionally within the permit.



ECONOMIC REVIEW

DOE officials told us that they give only minimal review to the economic consequences of proposed transmission facilities. In fact, no financial data is required on the permit application. DOE has, on occasion, requested utilities to prepare some production cost analysis, such as the total cost of the project considering both the actual construction costs and the resultant expenses or savings in fuel use over time.

DOE officials feel that their economic review has been adequate for the purpose of issuing the permits. DOE contends that the facilities' economic justification should more appropriately be made by the utility to the Public Utility Commission in the affected State. They feel that utilities should decide if building and operating the transmission line is a viable, cost-effective option because it is they who are closest to the negotiations of the financial arrangements made with Canadian utilities. DOE officials told us that individual States should decide the project's economic advisability because their economy will be affected in terms of employment, taxes, and the price of electricity charged to consumers as a result of a new interconnection.

CONCURRENCE FROM DEPARTMENT  
OF STATE AND DEFENSE DEPARTMENT

DOE requests concurrence by sending each Department a transmittal letter which recognizes DOE's findings on the proposed transmission line and outlines the conditions of the permit. A 30-day period is usually granted for concurrence. The State and Defense Departments seem to be well aware of proposed transmission lines even prior to DOE's transmittal letter. Since the proposed facility has been disclosed in Federal Register notices, public hearings, newspaper articles and in correspondence directly with DOE, the Departments have had time to express their concerns prior to the transmitted letter notice.

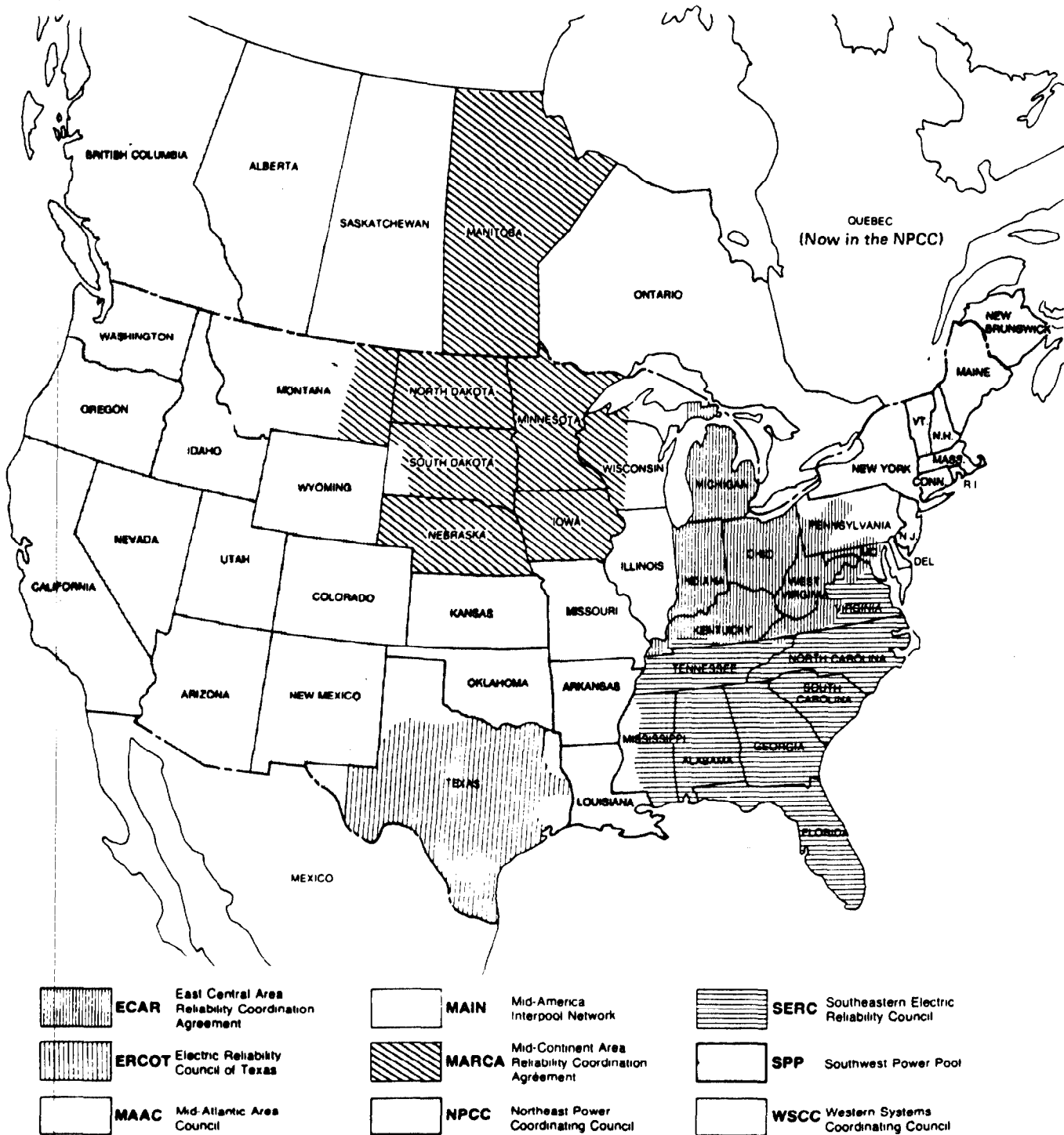
TECHNICAL AND OPERATING  
CAPABILITIES AND REQUIREMENTS  
OF THE ELECTRIC UTILITY INDUSTRY

The overall structure of the electric utility industry and the conditions in which utilities must operate suggest that utilities are aware of the impact that any new transmission facility might have on system reliability and what adjustments and operational restraints are necessary to maintain a reliable operations system. The North American Electric Reliability Council (NERC) and the regional reliability councils have: established reliability criteria to which interconnected utilities are expected to conform, established reliability committees for the continual review of reliability criteria, and evaluated on a continual basis the generation and transmission plans proposed by their own members and those of neighboring councils. On an operating level, as members of power pools or interconnected systems, utilities continually study the impacts of their plans and those of their neighboring utilities.

In addition, some utility systems have established approval procedures for new generation and transmission facilities and inter-regional study groups have been formed for improving utility coordination. In performing these studies, the industry has literally hundreds of engineers and other resources of member utilities to draw on. Utilities are also aware of the legal ramifications which would occur if they do not conform or maintain certain industry standards. In short, utility companies, by virtue of their membership in these industry organizations and knowing the importance of communication in an interconnected environment have ample opportunity to coordinate with neighboring utilities to assure reliable operations.

Generally, utility systems must obtain concurrence from neighboring utilities for all proposed additions to generation or transmission facilities or possibly face legal consequences should reliability problems arise. For example, the Pennsylvania-New Jersey-Maryland Power Pool, whose geographic area coincides with the MAAC Reliability Council, requires that any major generation facility or interconnection proposed by its members be filed for approval. The MAAC member utilities have an opportunity to review and comment on any of their concerns with the proposed project and work out solutions among themselves. The MAAC member utilities have their joint staff review the application for the international interconnection and report back to the MAAC executive board regarding adherence to the reliability criteria and impact on system reliability to the regions. Even if a utility decides to move ahead with their proposed project without concurrence, they may be held liable or negligent if their actions endanger neighboring systems or result in a contingency situation.

# NORTH AMERICAN ELECTRIC RELIABILITY COUNCIL



Source: NERC Annual Report, April 1980.



DEPARTMENT OF STATE  
*Comptroller*  
Washington, D.C. 20520

**JUN 21 1982**

Mr. Frank C. Conahan  
Director  
International Division  
U.S. General Accounting Office  
Washington, D.C.

Dear Frank:

I am replying to your letter of May 21, 1982, which forwarded copies of the draft report: "Imported Canadian Electricity -- What Role Should it Play in the United States Electric Power Plans".

The enclosed comments on this report were prepared by the Deputy Assistant Secretary for International Energy Policy in the Bureau of Economic and Business Affairs.

We appreciate having had the opportunity to review and comment on the draft report. If I may be of further assistance, I trust you will let me know.

Sincerely,

  
Roger B. Feldman

Enclosure:

As Stated.

GAO DRAFT REPORT:

"Imported Canadian Electricity --  
What Role Should it Play in the United States  
Electric Power Plans"

Having read the proposed report Imported Canadian Electricity -- What Role Should it Play in the United States Electric Power Plans, we have a number of observations which bear upon the conclusions and recommendations that it offers.

First, while no formal electricity imports policy statement has been enunciated, utility companies, state energy offices, and Canadian energy authorities and suppliers are fully cognizant of longstanding U.S. predisposition to regard favorably Canadian electricity imports in view of their useful role in helping meet U.S. energy needs. Moreover, they acknowledge the federal government's responsibility to examine a number of the technical and environmental questions new import projects raise, particularly the effects one system or grid may have upon others. This draft report makes a good case for having DOE officials state more clearly to utilities seeking permits what concerns DOE may have about their given project, but is not persuasive in its attempt to link existing minor electricity trade frustrations to a lack of federal electricity imports policy.

Second, our experience in monitoring U.S.-Canadian electricity trade does not suggest that lack of policy is the problem, but rather regulatory "red tape" and delays. Certainly, the report's examples citing utility company frustration with the certification process underscore the need for streamlining the regulatory structure governing electricity trade (domestic or international) rather than a need for new or more "policy". Efforts must be made to speed up the process of regulatory review and certification at the federal and local level, a problem into which we assume the DOE-chaired electricity subcommittee group will be looking.

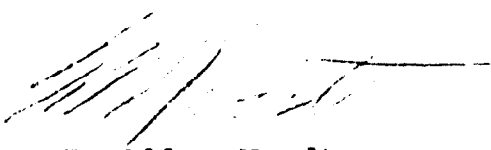
Third, while the report hammers away at the lack of "policy", it is not clear to us that U.S.-Canadian electricity trade is suffering from it. If anything, electricity trade with Canada is our most shining example of mutually beneficial energy trade between our two nations. The Northeast is expanding its electricity connections with eastern Canada as the region's need dictates, the various public utilities commissions are satisfied that fair and reasonable prices are being paid for the electricity, and U.S. electricity consumers are, as a result, benefiting. As the report notes, local utilities appear to be aware of the risks of overdependence upon Canadian supplies, as are the state energy offices. Long term purchases are done on commercial terms, meet the economic needs of both countries and are largely devoid of political rhetoric that has only complicated other areas of our energy relations, particularly natural gas.

- 2 -

Fourth, the report does not describe the state and regional authorities' viewpoint regarding the draft report's perceived dearth of federal policy. For example, do the local authorities endorse the report's recommendation that DOE build up its regional economic impact assessment -- a task DOE believes is done adequately by state and regional bodies? Again, our experience points to widespread interest at the state and local level in reducing federal regulatory delays, rather than in promoting a greater federal role in assessing the impact of electricity trade with Canada on a regional or local basis.

Finally, the report fails to note important developments that could require DOE policy attention in the not-too-distant future. Recent official statements from Ottawa point to increasing interest in Canada in electricity exports as the solution to the current economic difficulties facing Canada's nuclear reactor industry. According to these statements, Canada's CANDU reactors could be built and dedicated, partially or exclusively, to electricity exports to the United States. This could raise important strategic questions for U.S. policy makers also coping with depression in the U.S. nuclear industry. Encouraging Canada to pursue an electricity exports policy designed to aid its nuclear industry, rather than to develop its natural hydroelectric potential, could have a number of undesirable long-term consequences for the U.S. that the U.S. Government might wish to consider carefully. This issue alone may become the most controversial in U.S.-Canadian electricity trade in the years to come.

In sum, the report is helpful in focussing on some areas for DOE improvement, but has not made a strong case for why the federal role should be enhanced or expanded. Moreover, it fails to lay out what dangers threaten U.S. electric power plans if the regional utilities and electrical authorities continue to assess for themselves their own power needs and sources of supply with only a limited involvement from the federal governments on both sides of the border.



E. Allan Wendt  
Deputy Assistant Secretary  
International Energy Policy



Department of Energy  
Washington, D.C. 20585

JUL - 8 1982

Mr. J. Dexter Peach  
Energy and Minerals Division  
U. S. General Accounting Office  
Washington, D.C. 20548

Dear Mr. Peach:

The Department of Energy (DOE) appreciates the opportunity to review and comment on the GAO draft report entitled "Imported Canadian Electricity -- What Role Should it Play in the United States' Electric Power Plans." Enclosed with this letter are detailed comments, referenced to particular parts of the draft report, which we offer for inclusion in the final report.

Our general comments will be separated into two distinct areas:

1. The programmatic responsibilities DOE has to approve and permit electricity imports and interconnection facilities, and
2. The more general policy question relating to the significant current expansion of imported Canadian power.

DOE Programmatic Responsibilities on Exports and Interconnection Facilities

The GAO report criticizes the current DOE permitting process as generally lacking direction and specific criteria for permit approval. This position by GAO seems to reflect a presumption by GAO that Federal policy ought to prescribe the level of Canadian electric power that is allowed into this country. DOE policy does not prescribe such a level, and the legal authority to prescribe such a level through the interconnection permitting program is uncertain.

However, the fact that the level of U.S. imports is not a criterion for this program does not mean that no other criteria are used to assure that importation of Canadian electricity is safe and consistent with the public interest. Criteria used to evaluate applications include:

1. Environmental criteria - DOE requires that a project meet the standards established under the National Environmental Policy Act of 1969 (NEPA). DOE has issued an Environmental Compliance Guide (Volumes 1 and 2) which is available upon request. This document specifically delineates the criteria and steps of the NEPA process.
2. Reliability criteria, both operating and dependency - The standards DOE applies to each case include the regional standards of the North American Reliability Council (NERC) which are formulated by the utilities themselves. DOE considers the effect that the proposed import would have both on the utility's operating reliability (i.e. technical reliability of the utility's equipment) and on its

dependency reliability (i.e. reliability of supply sources upon which the utility depends). Operating reliability has recently become a concern because of the size of exchange envisioned by some of the more recent applications. The PASNY and GPU applications, mentioned in the GAO report, each proposed a much larger exchange than existing permits had previously authorized.

3. Federal Power Act criteria - DOE must also evaluate each application in light of the standards and responsibilities established by the Federal Power Act. Portions of this Act which are pertinent to the DOE permitting process include sections 202(a) and 311.

Further, DOE has developed a specific process for conducting a reliability review. It should be remembered that until recently, reliability was not generally of concern because of the relatively small size of the exchanges contemplated. (DOE has looked at reliability in four cases: PASNY, GPU, Northern States Power Company, and San Diego Gas and Electric.) The process for the reliability analysis is as follows:

1. Review of case by internal DOE staff.
2. Review of case by a qualified power system engineering consultant if staff feels there may be a problem.
3. Request for public input on potential reliability concerns.
4. If required, entry of terms and conditions into the permit assuring that the public interest is protected with respect to reliability issues.

The GAO report further suggests that applicants for permits cannot get a clear understanding of what is required to obtain a permit. However, DOE has issued regulations which specifically explain the components necessary to satisfy a permit request (10 CFR Part 205). Details of the environmental requirements are spelled out in two extensive volumes titled "Environmental Compliance Guide", referred to earlier. Moreover, DOE has always expressed a willingness to meet with applicants or potential applicants to discuss procedural requirements of applications. During meetings with potential applicants, DOE has offered them the opportunity to review files from previous cases. Most recently, this opportunity has been given to representatives of the Vermont Electric Power Company (VELCO) and the New England Electrical Transmission Corporation (NEET).

#### General Policy Question on Canadian Imports

GAO incorrectly asserts that the Department has no policy toward Canadian imports. The current DOE policy is to place no prescribed aggregate limits on imports of Canadian electricity into the U.S. but rather to examine each proposal on a case-by-case basis. Limitation on interconnections will only occur when utilities fail to meet the criteria specified above and DOE determines that issuance of permits would be inconsistent with the public interest.

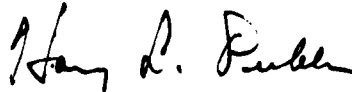


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Much of the criticism GAO levels at the DOE permitting program stems from GAO's conclusion that there needs to be a different Federal energy policy on the level of Canadian electricity imports. The impetus behind this conclusion is the substantial increase in imported electricity which has occurred over the past several years, a trend which will most likely continue through the 1980s. GAO concludes that this change in import level requires the Federal Government to establish a policy to limit these imports in some way. GAO suggests such a policy be developed through the interagency working group which is currently addressing electric power policy issues.

The Canadian import issue is a part of the many issues facing the U.S. electric power industry in the 1980s. As such, it will, by necessity, be an integral part of the considerations of this interagency working group which is addressing a broad range of issues relating to economic efficiency, supply sufficiency, and regulation of electric power. It is anticipated that the output of this interagency effort, which is currently targeted for late 1982, will include a new analysis of Federal policy on Canadian electricity imports.

Sincerely,



for William S. Heffelfinger  
Assistant Secretary  
Management and Administration

Enclosure

Detailed Comments on Draft GAO Report - "Imported Canadian Electricity --  
What Role Should It Play In The United States' Electric Power Plans"

The purpose of this summary is to highlight areas (or statements) of the GAO report which DOE believes to be misleading or incorrectly stated.

Glossary definition of "energy."

The definition states that energy is also expressed in average kilowatts and average megawatts. Since these terms are not widely used, for purposes of simplification, the following language should be used instead:

". . . , average kilowatts or average megawatts for a specific time period. Equivalent . . ."

Digest (ii) and Chapter 3 (p. 16)

- o Permit review process treated on case-by-case basis

The issuance of a Presidential permit or an electricity export authorization is a regulatory action. As such, it is a legal decision based on the merits of the case. Consequently, DOE sees no other fair and practical way of handling applications, and maintains that the case-by-case analyses and decisions should be retained.

Chapter 1

- o Effect of interconnections on reliability (p. 1)

GAO flatly states that interconnections result in greater reliability. This is not always true. System reliability need not be increased through interconnection, and in fact it may be reduced. For example, GPU and Ontario Hydro, Canada, proposed to build jointly an electrical transmission cable from Nanticoke, Ontario, to Erie, Pennsylvania. The line was proposed to have a d.c. voltage rating of 300 kilovolts and the capacity to carry 1000 megawatts of power. On April 30, 1982, DOE issued a Federal Register Notice that requested comments on the reliability issues surrounding the proposed GPU interconnection. Responses to this Federal Register Notice (available upon request) indicate that several neighboring utilities had substantial concerns over potential negative reliability impacts of the proposed interconnection.

- o Electricity imports from Canada in the future (pp. 3-5)

GAO estimates that planned power lines will increase interconnection capability between the U.S. and Canada by as much as 7,100 megawatts, or 71 percent of existing capability by 1990. This is somewhat misleading. The planned power lines mentioned have not been issued permits by DOE. Indeed, GPU's plan for a 1,000-megawatt interconnection between Ontario and New Jersey has recently been abandoned. Moreover, since total generating capability in the United States will also expand substantially before 1990, interconnections with Canada as a percentage of U.S. electric power may not increase greatly even if most plans for interconnections are realized.

Chapter 2

- o West to east transmission "weak" (p. 11)

The reference to the west to east transmission in the U.S. at the in paragraph 2 should be rephrased as "limited".

Chapter 3

- o Time to issue permit (p. 17)

The time it takes to issue a permit often is controlled by the applicant and by circumstances surrounding the proposed project. Certain data are required from the applicant in order to complete elements of the evaluation, such as the Environmental Impact Statement. If the applicant for some reason does not submit the required data, the application process cannot move forward.

The MANDAN case is an example of this type of delay. The applicant (Nebraska Public Power District) has applied to DOE for authorization to construct a transmission line from the U.S. Canadian border through North and South Dakota to Nebraska. North and South Dakota are debating whether or not to allow the line to pass through their States. The applicant has not submitted the required environmental data, and most likely will not submit these data until the issue of construction of the line through the Dakotas has been resolved. Since the time it takes to issue a permit in this case will depend on when the applicant submits required data, GAO's use of the time required to issue a permit as a measure of DOE's efficiency is highly questionable.

- o DOE request for voluminous data (p. 18)

GAO states that DOE "routinely requests voluminous additional data" and cites the PASNY case as one example. GAO also seems to imply that some of the data DOE requests are unnecessary. DOE contends that it does not routinely request voluminous or unnecessary data and requests GAO to substantiate its statement.

- o PASNY Case (p. 18)

The PASNY story, starting on page 18, is one-sided and attempts to shift the blame for project delays to DOE. PASNY knew long before December 1980 that a permit was needed since PASNY had been issued three other Presidential permits prior to PP-74. The length of time to issue PP-56, the permit granted to PASNY prior to PP-74, was one year. Therefore, PASNY knew what to expect and the process was expeditious despite claims to the contrary.

- o Reliability assessments (pp. 21 and 34)

DOE staff is capable of analyzing the reliability material internally. DOE purposely has chosen to contract out part of the reliability analysis in order to obtain an independent opinion.

- o Utility check and balance system - no need for reliability analysis as part of the permit application review (p. 19).

DOE contends that the checks and balances of the utilities industry are not always sufficient to ensure that reliability concerns are eliminated before operation. It is a matter of reality that the interests of individual utility applicants do not always coincide with those of other nearby utilities. DOE is not alone in its contention that a reliability analysis is a very appropriate prerequisite to issuing a permit.

DOE recently received letters from a number of electric utilities which expressed concern over reliability issues involved in the proposed GPU project (these letters are available upon request). Several utilities stated that a permit should be issued to GPU only on a conditional basis so that DOE could continue to monitor the reliability of the GPU's system. At least two utilities stated that they were concerned with the potential reliability impacts that the proposed interconnection might have.

- o DOE's economic review is minimal (p. 20)

Since this section deals with economic reviews and costs only, DOE suggests replacing "the lowest economic, environmental and social cost" with "the lowest possible economic cost consistent with environmental and social goals."

- o Data discrepancies (p. 20)

The GAO account, with the exception of a few errors, essentially reiterates the situation which DOE has explained to GAO. DOE has also explained that it is working to eliminate these data discrepancies and has, in this year's annual staff report, eliminated a large portion of them. DOE is again in the process of documenting the reasons for the remainder of the discrepancies.

- o Condition of DOE import/export program (p. 21).

This statement at the bottom of page 21 is mere innuendo. As such, it is totally inappropriate.

- o DOE role in electric utility planning (p. 21)

DOE has already responded, in detail, to GAO's concerns over the DOE role in the electric utility planning area. Please see Appendix V of GAO Report EMD-80-112.

GAO Note: Page number references in this letter have been changed to correspond with the page numbers in this final report.



**North American  
Electric  
Reliability  
Council**

June 15, 1982

Walter D. Brown  
President

Mr. J. Dexter Peach  
Director, Energy and Minerals Division  
United States General Accounting Office  
Washington, D.C. 20548

Dear Mr. Peach:

Your letter of May 21, 1982 requested comments on a partial draft of your report, "Imported Canadian Electricity—What Role Should it Play in the United States' Electric Power Plans." Specifically, you asked for comments on:

- DOE's Presidential Permitting process;
- the ability of the utility industry to assure an adequate and reliable power supply vis-a-vis the Department's capabilities;
- how Canadian power may affect more than one utility;
- the need for a Federal perspective for utility guidance; and
- the role for Federal programs that affect Canadian power imports

First, let me discuss the third item—the manner in which an import to one utility may affect other utilities. From an adequacy standpoint, looking at load and capacity numbers only, the import can affect only those systems which are contracting for the import and those systems which might have supplied the power should the import not have taken place. That type of analysis may be insufficient, in that all effects on neighboring systems are not considered. Assume that a US system is interconnected by ac transmission directly and indirectly with a Canadian system and other US systems. An additional import will affect the US systems approximately the same as would adding a generator in the exporting system. However, if a dc tie were used for the import, the effect is similar to adding a generator within the importing system. Both situations will cause a redistribution of transmission system flows during normal operation and during emergencies. The redistribution will affect systems neighboring both the exporter and the importer, to varying degrees. The redistribution of flows could cause heavier flows in some lines, lighter flows in others, and voltage changes throughout the region. It could change the margin for stable operation following disturbances for any unit. Such items are routinely examined by all the systems involved, either through interregional organizations or by an ad hoc study organization. It should be noted that the Canadian utility systems are members of the respective NERC regional reliability councils.

Research Park, Terhune Road, Princeton, New Jersey 08540-3573 • 609-924-8050

Mr. J. Dexter Peach  
June 15, 1982  
Page Two

Several of the other points you requested comments on (regarding the permitting process, need for Federal perspective and role for applicable Federal programs) appear to be closely interrelated. When one considers a Canadian import as being the same as any other international trade transaction, it appears reasonable that the Federal government should have some control. This control should not only be for the purposes of guarding national security and welfare, but also to assure consistency in the relationships between the various utilities and the Canadian entities. In recognizing the role of the Federal government, the individual utilities should be able to reasonably expect certain treatment from the government, including promptness, consistency and fairness. Without having thought through all the ramifications, a possible improvement to the permitting process would be to establish a stepping procedure. Such procedures are presently in use in hydroelectric projects, progressing through study approvals to construction approvals. Even more, they are used in nuclear plant approvals for construction, zero power operation, etc. The knowledge of exactly what to expect and when to expect it could lead toward better utility-government planning and rapport.

As to the ability of utilities to assure adequacy and reliability in the face of the DOE methods of operation in this matter, there seems to be little in the DOE's present "capabilities" that would normally interfere with that goal. The effect on lead times, even for state-regulated utilities, will probably not affect a decision by the utility to proceed with the project. There are no US permits to secure for generation, because these are wholly transmission projects from the US utility's view.

All utility systems realize that operating in an interconnected environment brings both many benefits and responsibilities. They realize that a major project within their system can have substantial effects on the transmission system of neighboring utilities. They know that these effects can only be accurately examined through a joint effort by all involved. Knowing this, the prudent utility will communicate its intentions early enough that the joint study work (and subsequent negotiations, if any) can be efficiently melded into the other important phases of the project development. This ideal sequence of events easily leads one to state that the utility systems, and possibly their respective reliability councils, are quite capable of handling these matters themselves without any need for intervention from the Federal government, other than in their mandated lead role in environmental matters. To imply that all projects are consummated ideally would be to assume extreme naivete. Particularly in today's difficult financial climate, one can expect a heightened desire to be assured of a power supply as inexpensively as possible. As long as this desire does not manifest itself in a degree of autonomy impossible to sustain in an interconnected environment, it would appear that little or no intervention or monitoring is required. Only when it becomes clear, through petition or otherwise, that the operation is proceeding in a manner harmful to some parties, should the Federal government step in as a referee, moderator or catalyst.

We look forward to seeing the entire report and the conclusions you draw.

Sincerely,



Walter D. Brown  
President, NERC

/cw



## GPU Service Corporation

Post Office Box 1018  
Reading, Pennsylvania 19603  
215 371-1001  
TELEX 136-482  
Writer's Direct Dial:  
215-371-5361

June 17, 1982

Mr. J. Dexter Peach, Director  
Energy and Minerals Division  
U.S. General Accounting Office  
Washington, DC 20548

Dear Mr. Peach:

In response to your letter of May 21, 1982 regarding GAO's draft report "Imported Canadian Electricity -- What Role Should it Play in the United States' Electric Power Plans," we have reviewed the draft report and find that it adequately reflects the information and views presented during our recent discussions. However, we do have some minor comments that we believe are worthwhile mentioning and they are as follows:

On page 2 of the draft report, it states that "Canadian power is an alternative to constructing new generating plants in the United States"; on page 12 the thrust of that statement is repeated. Although this is a valid statement at least under certain circumstances, it implies that Canadian power is an industry acceptable alternative on a long term basis to building new U.S. generating plants. GPU does not believe that on a long term basis it is an acceptable alternative. There are others in the industry who do not believe that Canadian imports are or should be thought of as a permanent substitute in lieu of building generating plants in the U.S. near load centers. The ability for U.S. utilities to defer construction of new plants on a short term basis is good and they should do it, but we do not think that it would be in the best interests for U.S. utility systems to depend on Canadian power imports for long term commitments. We think that this is a good point and should be made clear in the report.

On page 18 in the last paragraph, it mentions that PASNY's policy is not to commit substantial funds until after all permits are in hand. GPU has the same policy and we think it worthwhile to mention it on page 19, following the second full paragraph.

Enclosed are the two copies of GAO's draft report that were sent to us for comment. We are returning them in accordance with the instructions as set forth in your May 21 letter.

If we can be of further help regarding the proposed report, please call me on (215) 371-5361.

GAO Note: Page number references in this letter have been changed to correspond with the page numbers in this final report.

Sincerely yours,

EDMUND NEWTON, JR.

Vice President-System Operations

ENJr/AJN/rp  
Enclosures: 2

GPU Service Corporation is a subsidiary of General Public Utilities Corporation

## POWER AUTHORITY OF THE STATE OF NEW YORK

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SENIOR VICE PRESIDENT  
& GENERAL COUNSEL

June 25, 1982

Mr. J. Dexter Peach  
Director  
United States General Accounting Office  
Washington D.C. 20548

Dear Mr. Peach:

I have reviewed those portions of the draft report "Imported Canadian Electricity--What Role Should It Play in the United States Electric Power Plans", which you sent to me with your letter dated May 21, 1982 and would like to offer the following comments:

Because of the surplus electric energy presently available in Canada, and the heavy oil dependence in the United States (particularly in the Northeast region), imports of Canadian electricity can provide an economic and reliable source of power to consumers. Additional interconnections will be required in order to make optimum use of Canadian energy. The Power Authority believes a systematic and efficient process for issuing the Presidential Permits for such interconnections should be implemented. Any prolonged proceedings resulting from the lack of guidelines in evaluating applications and issuing such permits will result in additional oil consumption and increased cost to electric consumers.

The report beginning on Page 18 discusses the Power Authority's Presidential Permit application for two 345 KV transmission lines across the Niagara River and the difficulties we encountered in obtaining the permit. Engineering and construction are now progressing smoothly and we expect to have the interconnection in service by February 1984, the original projected in-service date.

On Page 10, the report states that "...New York is served by PASNY, a non-regulated public utility" in contrast to the other northeastern states which are served mainly by regulated investor-



Mr. J. Dexter Peach  
Director  
United States General Accounting Office  
Washington D.C. 20548  
Page 2

owned utilities. It should be noted that there are also seven large regulated investor-owned utilities serving consumers in New York State. These seven utilities and PASNY are the member electric systems of the New York Power Pool. The member systems coordinate and develop plans for the installation of additional generating capability and interconnecting transmission facilities within the Pool. These plans have for several years included imports of energy from Canada. The bulk of the power which we are now purchasing from Canadian suppliers is resold to these seven investor-owned utilities for the benefit of their retail consumers.

Attached for your consideration are additional comments on the draft and suggested language changes. These were provided to Alan Bogus of your staff on June 23, 1982. Thank you for giving us the opportunity to review this draft.

Very truly yours,



Robert A. Hiney  
Senior Vice President  
Planning & Marketing

Att.

Comments to General Accounting Office May 21, 1982 Report on  
"Imported Canadian Electricity--What Role Should it Play in  
the United States Electric Power Plans"

---

- Page 3

Line 28: Existing OH-NY interconnection transfer capability should be reported as 900 MW instead of 1735 MW.

- Page 4

Line 41: ...PASNY sells power through its and other utilities' transmission networks to Industries, private utilities, municipal electric systems, rural electric cooperatives and governmental entities in the state.

- Page 10

2nd Para: State of New York is only partially served by PASNY. There are seven (7) other regulated investor-owned utilities in the State. The language and perhaps context should be modified to reflect this fact.

- Page 16

Line 36: ...DOE told us that...

- Page 18

Line 45: ...such a broad study, nor was such a broad study needed as a result of its interconnection.

Line 52: ...special condition, since PASNY's policy... and its management.

- Page 19

Line 12: ..., and PASNY officials estimate that, if this results in a corresponding delay in the in-service date of these facilities this could cost...

- Page 36

Line 9: ...and what adjustments and operational restraints are necessary.

GAO Note: Page number references in this letter have been changed to correspond with the page numbers in this final report.

6/24/82



Montreal, June 22, 1982

Mr. J. Dexter Peach, Director  
Energy and Minerals Division  
U.S. General Accounting Office, Room 4915  
441 G Street, N.W.,  
WASHINGTON, D.C. 20548

Dear Mr. Dexter,

Enclosed please find Hydro Quebec review of Appendix I (Quebec situation) of the draft report prepared by the United States General Accounting Office entitled "Imported Canadian Electricity - What Role Should it Play in the United States Electric Power Plans". This review has been done according to the present situation of Hydro Quebec.

Should you need any further information, do not hesitate to communicate with us.

We remain,

*Chadia Riad*

Chadia Riad

Planification  
HYDRO QUEBEC

CR/jg

*Tel (514) 289-5604*

Encls.

QUEBEC: The Quebec's provincial utility-Hydro-Quebec recently lowered its long range demand forecast and considers now an average annual growth of 3.6 percent. Others scenarios at this stage are also considered with internal demand growth rate of 4.5 and 2.4 percent.

Hydro-Quebec was previously contemplating a 15 years 47 U.S. billion expansion plan designed to add over 30 000 MW to Quebec's system corresponding to an annual load growth of 6.1%. In order to meet its recent <sup>forecast</sup> of internal demand, Hydro-Quebec would have to add only about 11 000 MW of hydropower and 3 600 MW of thermal peaking units during the next fifteen years. In spite of this substantial drop, Hydro-Quebec would still have in the short term winter surplus generating capacity reaching about 4 500 MW in 1984 and declining to about 2 000 MW up to 1988. Additional power would be available from April to October as Quebec is also a winter peaking system. These surplus would be almost entirely hydropower. With this latest expansion plan, a total surplus energy of about 300 TWh could also be available during the next fifteen years. (X)

The Quebec Energy Minister has indicated that the provincial government would like to keep the previous expansion plans on schedule and export any surplus to the United States or other Canadian provinces. Hydro-Quebec is actually studying accelerated expansion plans in respect to the actual load forecast in order to make such surplus available.

The official generation expansion schedule is not yet announced, but even if the previous schedule is delayed Quebec could have winter surpluses available, as mentioned before, into the 1990's; and if American utilities are willing to enter into long-term (15-20 years) agreement for power, the Quebec government could be expected to encourage Hydro-Quebec to keep its previous expansion program on schedule.

---

1/Based on average streamflows as Quebec makes use of very large reservoirs which provide multi-year storage.



700 University Avenue, Toronto, Ontario M5G 1X6

June 21, 1982

Mr. J. Dexter Peach  
 Director  
 Energy and Minerals Division  
 U.S. General Accounting Office  
 Room 4915  
 441 G Street, N.W.  
 Washington, D.C. 20548  
 U.S.A.

Dear Mr. Peach:

With reference to Mr. Conahan's letter of May 21, 1982, we have the following comments on the portion of the draft report "Imported Canadian Electricity -- What Role Should it Play in the United States' Electric Power Plans" that was sent to us, i.e., Chapter 1 pp 1-6; Chapter 2 pp 9-14 and Appendix I pp 30-31. We appreciate this opportunity to comment because of the importance of interconnections to both the U.S. and Canada.

This report was delayed in reaching Ontario Hydro. Therefore by arrangement with Mr. Allan Bogus of your staff I have passed on these points to Allan by telephone today in order to meet GAO's deadline.

1. Page 1, in addition to the benefits listed, interconnections allow for:
  - the coordinated development of two systems -- i.e., building larger than normal units or multiunit stations and sharing the output; and
  - the economics and energy security that result when two inherently different systems -- i.e., a hydraulic and a coal-fired system -- can interchange with each other.
2. Table 1, under the "Existing" column for Ontario, the 1735 MW, 2520 MW, and 35 MW are the sums of the individual interconnecting circuit capacities; the simultaneous transfer capabilities are considerably lower. Currently, Ontario Hydro estimates that the existing transfer capability to New York is 900 MW and to Michigan, 2000 MW.

Mr. J. Dexter Peach

June 21, 1982

The planned interconnections with New York are two 345 kV circuits at Niagara. Each circuit has a capacity of about 1400 MW; however, the transfer capability to New York will increase from 900 MW to approximately 2200 MW with their addition.

The GPU facility was for a 1200 MW interconnection, but the project has been cancelled.

It is possible that other utilities may have similar comments; however, the top paragraph on page 4 needs to be changed to accommodate the above.

3. General, there are several areas in the report where the Ontario Hydro-GPU sale has been used as an example. This project has recently been cancelled. The illustrations are still valid but the perspective needs to be changed to put it into the current context.
4. Figure 2 and page 4: the title of Figure 2 and the reference to it on page 4 is quite misleading. The capacity shown for Ontario Hydro is the installed margin or reserve, i.e., total generation minus load. A portion of this reserve is required for reliability reason and the remainder could be termed surplus. Exports, firm and interruptible, can be made from all of this capacity, provided it is available and not required for internal load. Long-term firm sales are usually made from capacity which is surplus to that required for reliability purposes. For the Ontario Hydro system, the reserve margin is:

81/82 to 86/87	No Change
87/88	9200 MW
88/89	9300 MW
89/90	10900 MW
90/91	11500 MW
91/92	10400 MW
92/93	9800 MW
93/94	9200 MW
94/95	8500 MW
95/96	7300 MW

Mr. J. Dexter Peach

June 21, 1982

Over this period, approximately 4000 MW to 5000 MW, declining to 1000 MW by 1995, is surplus to Ontario Hydro's reserve requirements and available for firm sale.

5. Page 10, there is discussion of the concern regarding over-dependence on Canadian power, yet no mention is made of the percentage of this dependence or the advantages of diversified energy sources in the event of strikes -- i.e., transportation, coal miners, or oil embargos.
6. Page 11, 2nd paragraph, in discussing the preliminary results of the interregional study, a generalization has been used in referring to "imported Canadian power"; the specific quantities and numbers identified are associated with Hydro-Quebec imports only, not Ontario or others further west. Secondly, no mention has been made of the fact that mitigating measures can be taken to enable the U.S. systems to withstand the losses identified.
7. Page 12, the costs of the 1200 MW Ontario Hydro-GPU interconnection are outdated; however, the points are still valid.
8. Page 14, end of first paragraph, the suggestion that all of Ontario's coal-fired surplus is in jeopardy is extreme. Ontario Hydro has an acid gas control program in place that will enable Hydro to meet the emission regulations and make forecast export sales. If the forecast quantity of export sales changes significantly -- i.e., by a new major export contract -- Hydro will adjust its control program accordingly.
9. Page 30, the data for Ontario in Appendix I of the draft report requires the following changes in light of current forecasts:
  - (a) Ontario Hydro is anticipating a 3.0 percent annual load growth rate over the next 20 years.
  - (b) Between 1982 and 1990, Ontario Hydro expects to put about 8600 MW of nuclear generation and about 440 MW of fossil generation in service.

Mr. J. Dexter Peach

June 21, 1982

(c) Ontario Hydro's winter reserve generating capacity ranges between about 6600 MW and 11500 MW for the period 1983-2000. The lowest values for the reserve pertain to the period after 1995, and are subject to possible further changes.

(d) Use of the word "surplus capacity" is inappropriate.

If you have any questions on this material, please contact Mr. Jerry McIntyre of our System Planning Division at 416-592-4652.

Yours truly,



A.J. Lococo  
Manager  
Government Relations

cc: Mr. G.F. McIntyre

GAO Note: Page number references in this letter have been changed to correspond with the page numbers in this final report.





Government of Canada / Gouvernement du Canada

MEMORANDUM

NOTE DE SERVICE

TO / A

E.S. Bell

FROM / DE

A.N. Karas

SECURITY - CLASSIFICATION - DE SÉCURITÉ
OUR FILE / NOTRE RÉFÉRENCE 1000-2
YOUR FILE / VOTRE RÉFÉRENCE
DATE 15 June 1982

SUBJECT / OBJET: GAO Draft of Proposed Report on "Imported Canadian Electricity . . . What Role Should It Play in the United States' Electric Power Plans"

A review of the above-noted GAO draft report was undertaken by the Planning Group. This review has been subdivided into the following sections:

Attachment #1 - Details any actual errors which appear in the report

Attachment #2 - Details comments which might enable information used to be better clarified in the report

If desired, both attachments could be used in our final response to Mr. Frank C. Conahan.

A.N. Karas (handwritten signature)

A.N. Karas (typed name)

ANK/bls Attach.

NATIONAL ENERGY BOARD  
OTTAWA, ONTARIO  
K1A 0E5



OFFICE NATIONAL DE L'ÉNERGIE  
OTTAWA, ONTARIO  
K1A 0E5

L1000-2

1982-06-16

Mr. J. Dexter Peach,  
Director, Energy & Minerals Div.,  
U.S. General Accounting Office,  
Room 4915 - 441 G Street N.W.,  
WASHINGTON, D.C. 20548

Dear Mr. Peach:

Enclosed are comments on the GAO draft report on imported  
Canadian electricity prepared by my staff.

If you have any questions please telephone me at (613)996-2320.

Yours truly,

A handwritten signature in cursive script, appearing to read "E. S. Bell".

E. S. Bell,  
Director, Electric Power Branch

Encl.

## Attachment #1

Draft GAO Report on "Imported Canadian Electricity . . . What Role Should  
It Play in the United States' Electric Power Plans"

(1) Factual Errors

- Figure #1 on page 2 - The net United States Imports of Canadian Electricity in 1978 was about 19,510 GW.h. The value shown in Figure #1 appears too low.
- Table #1 on page 3 - (1) The New Brunswick-Maine transfer capability is about 790 MW and not 865 MW as shown in the table.
- (2) Ontario-New York transfer of 1735 MW appears to be the winter nominal line capacity; Ontario-Michigan transfer of 2520 MW appears to be the summer nominal capacity. For consistency the winter value is 2835 MW. It should be noted that the table refers to transfer capability between systems. The estimated Ontario to U.S. transfer capability is much lower than the sum of the two above values. A reasonable value is about 2400-2500 MW.
- (3) Note C. There will be no upgrading of the 765 kV international tie line. Rather, there will be an installation of a 1000 MW HVDC back-to-back facility at Hydro-Quebec's Chateauguay station which then would allow a total of about 2400 MW to be transmitted to the U.S. System via the 765 kV tie line and the HQ-Ontario Hydro-U.S. interconnections
- (4) Note d, may no longer be applicable since indications are that the contract has been cancelled.
- Page 9, paragraph 5 - With reference to the NEB's third price test, it should be reworded to read (3) it should not be materially less than the buyer's least cost alternative.
- Page 9, paragraph 7 The Board does not have any rule of thumb on pricing. I believe the 2 mills/Kwh may be referring to some agreed-upon minimum savings value for economy energy transactions between U.S./Canadian utilities. For such transactions the Board would approve only the formula for interruptible energy sales.
- Page 14 line 7 The Canadian Environmental Ministry should read Environment Canada.

## Attachment #2

(2) Other Additional Comments

Page 1, line 5           The main economic benefits of interconnected systems were not addressed. Namely, it allows systems to enter into firm (system-to-system or unit participation) power agreements as well as day-to-day economy energy interchanges to minimize operation costs.

Page 2, point #2       With respect to expansion or reinforcement of domestic transmission systems, it should be noted that about 80% of all imports of electricity by the U.S. have been of an interruptible nature. It is doubtful whether U.S. domestic transmission systems have been expanded to receive and distribute this Canadian power. It is also true, however, where firm power exports, including diversity transactions, have been made, transmission systems on both sides of the border have been reinforced

Page 11, paragraph 4   With respect to Canadian power as an alternative to constructing new generation plants in the U.S., it should be reiterated that the predominant portion of exports has been of an interruptible nature. Only in those cases where long-term firm sales or diversity transactions are made is Canadian power an alternative to constructing new generating plants in the U.S. In fact, some firm power exports (i.e. the Lepreau I nuclear power export to New England) were rationalized on the basis of displacing high cost fuel oil in New England.

The U.S. systems at present generally are not short of capacity. However, a significant amount of this capacity in the U.S. Northeast is oil fired. The mix of Canadian generation, on the other hand, is predominantly hydro and coal, as well as some nuclear. The incremental generating costs in Canada are on average less than those in the U.S. and this results in significant exports by Canadian utilities for mutual economic benefits.

Page 5, Figure #2      Figure #2 shows estimates of Surplus Generating Capacity available for export from selected Eastern Canadian Provinces. An examination of this figure for Ontario Hydro based on the last Ontario Hydro application before the NEB in respect to the GPU export proposal indicates the quantities on the figure appear to be the difference between the total capacity of the Ontario Hydro system and its firm loads. This is not representative of surplus capacity available for export.

## Attachment #2 (continued)

Page 5, Figure #2  
(continued)

Generation reserve requirements have not been accounted for. Neither has the fact that some 2500 MW of generation on the Ontario Hydro system are oil fired and are planned to be mothballed. The following tabulation for the Ontario Hydro East system identifies more clearly the reasonable amounts of surplus capacity for export for the years 1985 and 1995.

All values in MW

<u>Item</u>	<u>1985</u>	<u>1995</u>
Total Capacity	26,846	34,450
Firm Demand	18,135	24,227
Difference <sup>(1)</sup>	8,711	10,223
Required Reserve	4,534	6,057
Gross Surplus	4,177	4,166
Mothballed Capacity	3,076	2,488
Net Surplus	1,071	1,678

Note (1) This corresponds with Figure #1.

With regard to the surplus capacity for Hydro-Quebec, it is noted that Appendix 1 indicates this is based on continuing the present expansion schedule (based on a 6% yearly growth rate) with a new lower load forecast growth rate of 5%/yr. Implicit in this assumption, therefore, is a long-term deliberate creation of surplus capacity equivalent to 1% of Hydro-Quebec system load per year with no firm export commitments to dispose of this surplus.

It is understandable, therefore, that Figure #2 shows an ever-increasing surplus capacity available for export from Hydro-Quebec over the review period. It should also be noted that on page 6, line 1, the statement is made that "In addition to this estimated surplus, there are other generation projects which could be developed in Eastern Canada for export purposes. These include hydro power sites in Newfoundland and Quebec and the construction of nuclear plants for export purposes. The assumption that firstly a generation expansion program would deliberately have a built-in surplus capacity and that, secondly, additional generation could be available does not appear to be reasonable. Also, as in the case with surplus capacity shown for Ontario Hydro, the method used to calculate the surplus Hydro-Quebec capacity does not appear to take into account required generation reserve margins. This, therefore, over-estimates the expected estimated surplus available for export.

Attachment #2  
(continued)

- Page 12, 3rd paragraph
- Since GPU-Ontario Hydro agreement may now be cancelled, it may not be appropriate to use the example.
- Page 13, 1st paragraph
- As mentioned earlier, the specific N.B. Power Lepreau export in which several utilities in the U.S. have participated was based principally on displacement of oil fired generation and not deferment of generating capacity in the U.S.
- Page 13, line 17
- The statement that PASNY's proposed 345 kV interconnection with Ontario Hydro should save an additional 5 million barrels of oil per year appears overly optimistic. It is true that this interconnection would increase the transfer capability by about 1000 MW; however, there are transmission bottlenecks in the U.S. which would prevent significant increases in energy exchanges beyond the values now being exported, i.e. 10,000-11,000 GWh/yr. 5 million barrels are about equivalent to 3,500-4,000 GWh/yr. and would thus require a 40% increase in exports over current levels.
- Page 13 last paragraph
- With respect to the environmental issues raised at the OH-GPU hearing before the Board, it should be noted that the Board did address these issues when it approved the application in its Reasons for Decision. However, Canadian Federal Government Cabinet approval was still pending when the cancellation of the project was made public.

GAO Note: Page number reference in this letter have been changed to correspond with the page numbers in this final report.



Energy, Mines and  
Resources Canada

Énergie, Mines et  
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Energy Policy  
Analysis

Analyse de la politique  
énergétique

Your file Votre référence

Our file Notre référence

June 18, 1982

Mr. J. Dexter Peach  
Director  
Energy and Minerals Division  
U.S. General Accounting Office  
Room 4915  
441 G Street N.W.  
Washington D.C.  
20548

Re: Canadian Imported Electricity

Dear Sir:

Mr. Conahan's letter of May 21, 1982 reached me June 11. Notwithstanding a pressing schedule, I am pleased to respond as quickly as possible given the obvious mutual importance of this subject.

My comments on your draft, which also reflect the views of our Electrical Branch, are as follows:

- 1) The report should be updated to reflect the latest developments on the GPU-Ontario Hydro project.
- 2) Referring to Page 11 to date little Canadian power has been an alternative to U.S. generation facilities, though this could occur in the future. Diversity exchanges do reduce reserve requirements on both side of the transaction.
- 3) We believe that the estimates of surplus capacity in Figure 2 may be rather high, and we recommend that you review these estimates with the utilities concerned, especially taking account of reserve requirements and construction schedule changes.
- 4) Referring to Pages 10 and 11, we comment on the reported U.S. utility perceptions of reliability as follows:

Ottawa, Ontario  
K1A 0E4

Ottawa (Ontario)  
K1A 0E4

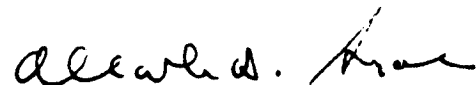
Canada

- 2 -

- a) Hydro-Quebec's system shuts down very seldomly and for very short periods of time at that. You may wish to study Hydro-Quebec's performance records to determine the factual basis for this perception.
  - b) The controversy between Quebec and Newfoundland would be most unlikely to affect existing power export commitments, given the specific definition of these contracts and the Quebec supply situation.
  - c) Canadian authorities did not renege on long-term energy contracts during the 1973-1974 Middle East Oil embargo. In one instance, a renewable short-term purchase arrangement was not renewed upon its expiry.
  - d) It is our perception, based on discussions with U.S. utilities in the North-East U.S.A., that they would prefer longer rather than shorter term contracts in the future because longer terms help to cushion the economics of transactions, they facilitate easier amortization of transmission lines, and they delay the need to load utility books with new generation capital.
- 5) Referring to the top of Page 11 , based on discussions with utilities, we are made to understand that the compensation problem is unlikely to occur below a 2000MW North-South power flow.

We thank you for this opportunity to review your draft. If we may be of any further assistance, please do not hesitate to contact us.

Yours sincerely,



Mark D. Segal

GAO Note: Page number references in this letter have been changed to correspond with the page numbers in this final report.





MANPOWER  
RESERVE AFFAIRS  
AND LOGISTICS

## ASSISTANT SECRETARY OF DEFENSE

WASHINGTON, D.C. 20301

8 JUL 1982

Mr. J. Dexter Peach  
Director, Energy  
and Minerals Division  
U. S. General Accounting Office  
Washington, D.C. 20548

Dear Mr. Peach:

This is to acknowledge receipt of your draft report "Imported Canadian Electricity--What Role Should it Play in the United States' Electric Power Plans" (GAO Code 005234, OSD Case #5990). As the report recommendations apply exclusively to the Department of Energy's policy making responsibilities we have no substantive comments.

Thank you for the opportunity to review the report.

Sincerely,

James N. Juliana  
Principal Deputy Assistant Secretary of Defense  
(Manpower, Reserve Affairs & Logistics)

005234





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