

**— NOTICE —**

THE ATTACHED FILES ARE OFFICIAL RECORDS OF THE DIVISION OF DOCUMENT CONTROL. THEY HAVE BEEN CHARGED TO YOU FOR A LIMITED TIME PERIOD AND MUST BE RETURNED TO THE RECORDS FACILITY BRANCH 016. PLEASE DO NOT SEND DOCUMENTS CHARGED OUT THROUGH THE MAIL. REMOVAL OF ANY PAGE(S) FROM DOCUMENT FOR REPRODUCTION MUST BE REFERRED TO FILE PERSONNEL.

**REGULATORY DOCKET FILE COPY**

DEADLINE RETURN DATE \_\_\_\_\_

Docket # 50-286

Control # 781080076

Date 4-11-78 of Document

REGULATORY DOCKET FILE

RECORDS FACILITY BRANCH

8111200264 780329  
 PDR ADOCK 05000286  
 I PDR

## Trustees of the Power Authority



Frederick R. Clark



George L. Ingalls



Richard M. Flynn



Robert I. Millonzi



William F. Luddy

George T. Berry, *General Manager and Chief Engineer*  
 Lewis R. Bennett, *Assistant General Manager—General Counsel*  
 Wilbur L. Gronberg, *Assistant General Manager—Engineering*  
 John W. Boston, *Director of Power Operations*  
 Thomas F. McCrann, Jr., *Controller*  
 John C. Bruel, *Secretary*

Power Authority of the State of New York, a public benefit corporation of the state, finance builds and operates electric generating and transmission facilities for purposes specified by the Legislature and Governor.

The Authority is composed of five trustees appointed by the Governor with advice and consent of the State Senate to serve overlapping terms of five years.

Authority projects are constructed without use of tax monies or state credit, through the sale of bonds to private investors. The bonds are repaid and the projects operated using revenues from operations.

The Authority operates the 800,000-kilowatt St. Lawrence Project near Massena, the 2,400,000-kilowatt Niagara Project near Niagara Falls, the 1,000,000-kilowatt Blenheim-Gilboa Pumped Storage Project in Schoharie County, the 821,000-kilowatt James A. FitzPatrick Nuclear Plant in Oswego County, the 873,000-kilowatt Indian Point 3 Nuclear Plant in Westchester County and the 775,000-kilowatt oil-fired Astoria 6 Plant in New York City. Authority transmission lines connect the projects to the state power grid.

### Contents

1977 in Review  
 People of the Power Authority  
 Niagara Power Project  
 St. Lawrence Power Project  
 FitzPatrick Nuclear Plant  
 Indian Point 3 Nuclear Plant  
 Astoria 6 Generating Plant  
 Blenheim-Gilboa Power Project  
 Production and Marketing  
 Improvements and Operations  
 Transmission  
 Construction  
 Future Construction  
 Small Hydroelectric Projects  
 Conservation, Research and Coordination  
 Related Improvements and the Environment  
 Visitors' Centers  
 Power Sales and Revenues  
 Finances  
 Financial Statements



**Power Authority of the State of New York**  
**Annual Report**  
**Year of 1977**

March 29, 1978

TO: His Excellency, Governor Hugh L. Carey  
The Honorable Arthur Levitt, Comptroller, State of New York  
The Honorable John J. Marchi, and members of the Senate  
Committee on Finance, State of New York  
The Honorable James T. McFarland, and members of the Senate  
Committee on Corporations, Authorities and Public Utilities,  
State of New York  
The Honorable Arthur J. Kremer, and members of the Assembly  
Committee on Ways and Means, State of New York  
The Honorable Irwin J. Landes, and members of the Assembly  
Committee on Corporations, Authorities and Commissions,  
State of New York  
Honorable Members of the Legislature

The Trustees of the Power Authority of the  
State of New York submit the 47th Annual  
Report pursuant to Sections 1002 and  
2500 of the Public Authorities Law.

Respectfully,  
Frederick R. Clark, *Chairman*  
George L. Ingalls, *Vice Chairman*  
Richard M. Flynn, *Trustee*  
Robert I. Millonzi, *Trustee*  
William F. Luddy, *Trustee*

10 Columbus Circle  
New York, New York 10019



Governor Hugh L. Carey

During 1977 three new Authority Trustees were confirmed, and Frederick R. Clark of Albany was elected Chairman and Chief Executive Officer of the Authority, effective June 1. He succeeded James A. FitzPatrick of Plattsburgh. Mr. Clark had been nominated by Governor Carey and confirmed by the State Senate prior to his election as Chairman.

Other new Trustees nominated by Governor Carey and confirmed by the Senate during 1977 were Robert I. Millonzi of Buffalo and William F. Luddy of White Plains.

Mr. FitzPatrick, who retired as Chairman, served as Chief Executive Officer of the Authority for 14 years.

Under his direction, the Authority more than doubled its generating capacity, financed some \$2-billion in new facilities and began a legislative-authorized expansion program. During Mr. FitzPatrick's stewardship, the Authority completed the Niagara Project, built the Blenheim-Gilboa Project and the FitzPatrick Nuclear Plant and acquired the partially completed Indian Point 3 Nuclear Plant and Astoria 6 oil-fired plant.

The rapid growth of the Authority has increased the complexity of its operations; a trend that is expected to continue. The Trustees in 1977 authorized a study by a nationally-known consulting firm to review the Authority's structure, procedures and management systems to

help determine their appropriateness to the Authority's present operations and future needs.

Production of electricity for the first time at the Astoria 6 Plant on February 12, 1977 was a milestone in the Authority's development. The plant, powered by oil, is the first Authority facility to burn a fossil fuel and its first located in New York City. By year-end, the plant had reached its rated capacity of 775,000 kilowatts (kw).

Continued above-average flows in the Niagara and St. Lawrence Rivers, increased generation at the Authority's Indian Point 3 nuclear plant, addition of the Astoria capability and judicious use of its Blenheim-Gilboa Pumped Storage Project enabled the Authority to establish two production records.

The five baseload plants, which are capable of sustained operation, and the Blenheim-Gilboa Project, a facility generally used during peak periods of consumer demand and in emergencies, jointly achieved a record production of 6,934,000 kw in the hour ending at 6 p.m. on December 30, the last business day of the year.

The baseload facilities generated 32 billion kilowatt hours (kwh) of electricity in 1977, about 300 million kwh more than the previous year and approximately 28 per cent of the electricity produced in New York State.

In addition, the Blenheim-Gilboa

Project produced more than 983 million kwh at times of peak consumer requirements for electricity.

During the year the Authority assumed full operating responsibility for its James A. FitzPatrick Nuclear Plant.

### A View of Energy

The Authority's operations, construction and planning in 1977 were conducted as increasing concerns were expressed nationally and in New York State over present and future energy supplies. President Carter and the Congress sought to establish a comprehensive energy program for the nation while Governor Carey and other northeastern governors were engaged in development of plans that could reduce the region's dependence on expensive imported oil.

While conservation and static industrial activity reduced the rate of growth in consumption of electricity, it was apparent that conservation alone would not be sufficient to meet energy requirements in the years ahead and that an adequate, reasonably priced supply of electricity would contribute to a more vigorous state economy.

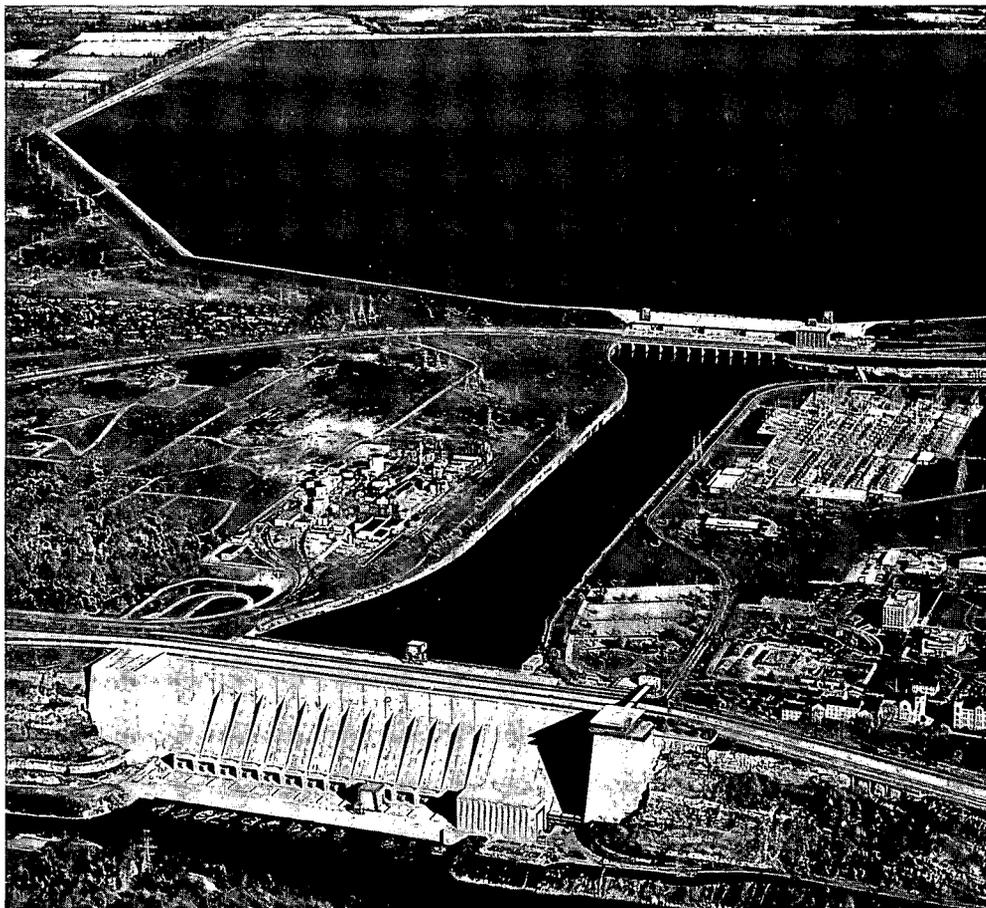
The dependence of New Yorkers on reliable electric service was emphasized in July when a series of unexpected events initiated a major blackout encompassing the City of New York and Westchester County. The events of July 13 and 14 demonstrated that shortage or absence of electricity strikes at the heart of society and that the production, transmission and distribution of electric power requires complex interrelationships.

The Authority's efforts are directed toward cooperation with other agencies of government, utilities in the private sector and the citizens of the state to help assure a stable and economical supply of electricity.

### Construction

Principal construction activities during the year involved work on three new transmission lines, one of them a major facility that will enable the Authority to import sizeable amounts of hydroelectric power from Quebec. The imports will save New York consumers millions of dollars each year and will help to reduce the state's use of expensive, imported oil for electric generation.

The transmission system will permit import of a minimum of 800,000 kilowatts of electricity from Quebec. In November Chairman Clark was assured by Hydro-Quebec that substantial additional quantities of electricity will be available to the Authority for more than a decade, in-



Niagara Power Project

creasing the potential for monetary and fuel savings by New York State users.

In December the Public Service Commission (PSC) approved the routes of the last two segments of the 155-mile, 765,000-volt transmission line route from Massena to Marcy, with a connection to Quebec, which will enable the Authority to initiate construction activities in those areas during the spring of 1978.

In a related proceeding, two PSC Administrative Law Judges early in 1978 recommended that the Commission find that 765,000-volt transmission lines of the Authority and other utilities can be operated safely in New York State as they have been elsewhere in the United States.

The third 345,000-volt line linking the Blenheim-Gilboa Project with the state grid was virtually completed before the end of 1977 and was energized for the first time January 25, 1978. The line connects the project and the Leeds Substation 37 miles to the southeast.

Nearly complete at year-end was a second 230,000-volt line from the St. Lawrence Project to Plattsburgh. This transmission will provide for increased power requirements of consumers in the North Country and will improve reliability of the transmission network in that area.

#### **Future Construction**

Hearings were conducted during the year on the Authority's applications to build two additional thermal generating plants scheduled for operation in the 1980s.

A joint panel of the federal Nuclear Regulatory Commission and the State Board on Electric Generation Siting and the Environment conducted hearings on the Authority's application to build the 1,200,000-kilowatt Greene County Nuclear Power Plant. Prime site for the facility is in an industrial area near the hamlet of Cementon in Greene County.

The State Board heard testimony during 1977 from Authority expert witnesses as it considered an application to build a 700,000-kilowatt coal and refuse-fueled plant. Prime site for the facility is on Staten Island in New York City.

Under review by the Federal Energy Regulatory Commission is the Authority's application to build a one-million-kilowatt pumped storage hydroelectric project at Prattsville in Greene County.

#### **New Programs**

Although New York State's major hydroelectric resources have been developed, there is a potential in existing dams, water supply reservoirs and similar facilities for production of electricity without impairing their principal functions.



St. Lawrence Power Project

Such developments have two benefits. They can, where technically and economically feasible, provide multiple uses for existing public works and can help to reduce the large quantities of fossil fuels used to generate electricity in New York State.

The Authority in 1977 agreed to provide technical expertise and a portion of the funding for a study by the New York State Energy Research and Development Authority (NYSERDA) directed toward identifying sites adaptable for small hydroelectric projects.

In addition, the Authority has begun its own studies to determine the possibility of adding hydroelectric turbine-generators at two New York City water supply reservoirs. Mayor Edward I. Koch and the New York City government are cooperating in the studies of the Kensico Reservoir in Westchester County and Ashokan Reservoir in Ulster County.

A potential for the combined total generation of 6,000 kilowatts of electricity exists at the two reservoirs.

While achieving many of its goals and simultaneously charting new courses for its future activity, the Authority maintained a strong financial position. Bonds continued to be retired ahead of schedule and steps were taken to maintain required bond reserves.

The Power Authority is an extremely valuable and productive asset of the State of New York. Its success is the result of the team effort, dedication and responsiveness of hundreds of people. Some of them are shown in this report. With their assistance and the cooperation of many units of government, private utilities, the financial community and others, the Power Authority will continue to do its share to assist New York State in meeting its energy needs.

Electricity flows from Authority projects to New York State's homes, farms and job-producing industries. Operation of the projects and planning for the future is made possible by members of the Authority staff whose varied talents and dedication contribute to insuring a reliable and economical supply of electricity to Authority customers. Some of these people are pictured on the front and back covers of the 1977 annual report and are identified on these pages.

## Top Row (left to right)

Vernadine Elmore, Secretary to Controller, New York Office  
Mitchell Epstein, Radiological and Environmental Services Technician, FitzPatrick Nuclear Plant  
Rita Callender, Billing Clerk, New York Office  
J. Phillip Bayne, Resident Manager, Indian Point 3 Nuclear Plant  
Bruce Gilmore, Assistant Operator, Niagara Project

## Second Row (left to right)

Michael Howland, System Shift Supervisor, Production Control Center, Niagara  
Henry Mackay, Shift Supervisor, Indian Point 3  
Audrey Hillis, Principal Clerk, Blenheim-Gilboa Project  
George L. Rorke, Nuclear Engineer, New York Office  
Amy Anzalone, Attorney, New York Office

## Third Row (left to right)

James Gillen, Radiation and Chemical Supervisor, Indian Point 3  
Vernon Gordon, Electrician, Blenheim-Gilboa  
Linda Brown, Purchasing Assistant, Indian Point 3  
Paul Koerner, Maintenance Clerk, Blenheim-Gilboa  
Charlene Faison, Production Technician, Indian Point 3  
James E. Brown, Lineman, Niagara

## Fourth Row (left to right)

Sharon Dietz, Telephone Operator, FitzPatrick Plant  
Joanne Volonakis, Secretary, Astoria 6 Generating Plant  
Walter Javorsky, Plant Engineer, Astoria 6  
Kevin O'Kane, Stockhandler, Astoria 6  
Rodney McDonald, Line Subforeman, St. Lawrence Project  
Maryann Ross, Secretary to Resident Manager, Transmission Line Construction Office, Oriskany

## Fifth Row (left to right)

Harry S. Kunsman, Line Foreman, Baldwinsville Service Building  
Kenneth Goodroe, Maintenance Subforeman, FitzPatrick Plant  
Marvin Gayfield, Transmission Line Engineer, Oriskany  
Harry Dennis, Electrician, Niagara  
John Griffin, Principal Nuclear Performance Engineer, New York Office  
Robert Eifler, Senior Electrical Technician, Astoria 6

## Sixth Row (left to right)

Lewis E. Burnett, Principal Electrical Engineer, New York Office  
Wayne LaComb, Personnel Officer, St. Lawrence  
Kurt Szeluga, Radiological and Environmental Services Technician, FitzPatrick Plant  
Alba Cortes, Draftswoman, New York Office  
Norman Wasmund, Journeyman Mechanic, Niagara

## Seventh Row (left to right)

Marie Riffe, Switchboard Operator, Niagara  
James Dunn, Equipment Operator, St. Lawrence  
William H. Scott, Electrician, St. Lawrence  
Concepcion Tan, Site Planner, New York Office  
Thomas J. Walsh, Electrician, Blenheim-Gilboa

## Front Cover



Back Cover



The Niagara Power Project, one of the world's largest hydroelectric power producers, has generated more than 218 billion kwh since operation began in February 1961.

The project was designed to develop the full potential of the United States' share of the Niagara River waters available for power diversion while preserving the scenic beauty of Niagara Falls.

The United States and Canada agreed in a 1950 treaty that at least 100,000 cubic feet of water per second (cfs) must flow over the Falls during daylight hours in the tourist season from April through October. At other times, the flow may be reduced to 50,000 cfs.

The remainder of the water in the river, which has an average flow of 203,000 cfs, is available for electric power production. It is shared equally, after certain adjustments, by the two countries.

To use water most efficiently under these conditions, the Niagara Project includes a pumped storage plant in addition to the main generating facility.

By locating the main generating plant 4½ miles below the Falls and the water intakes 2½ miles upstream from the Falls, the project takes advantage of 310 feet of the 326-foot drop in elevation between Lakes Erie and Ontario.

Visible parts of the water intakes are a concrete bulkhead and two gate structures nearly 100 feet high. The latter house 400-ton gates that can stop the flow of water into the two underground conduits. These conduits are each 46 feet by 66 feet and carry the water under the City of Niagara Falls four miles to the open canal and forebay connecting the Lewiston Pump-Generating Plant and the main Robert Moses Niagara Power Plant. The conduits are covered and the ground above is landscaped.

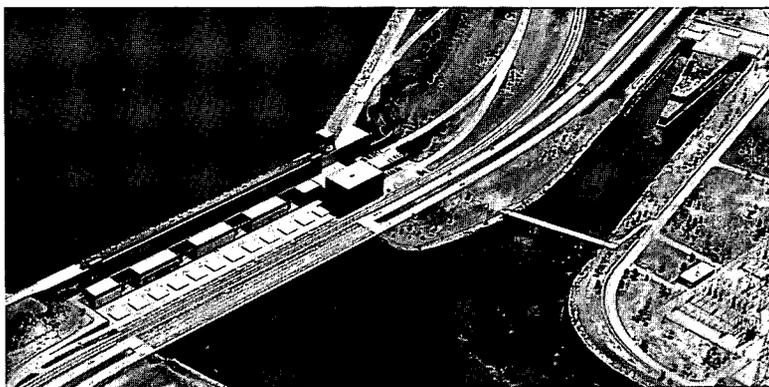
Behind the pump-generating plant is the 1,880-acre reservoir that can hold 60,000 acre-feet of water. At night when additional diversion is permitted and at other times when power demands are reduced, water is pumped from the forebay into the reservoir using power from the main plant.

When energy requirements increase, the 12 pump-motor units of the storage plant are reversed to become turbine-generators.

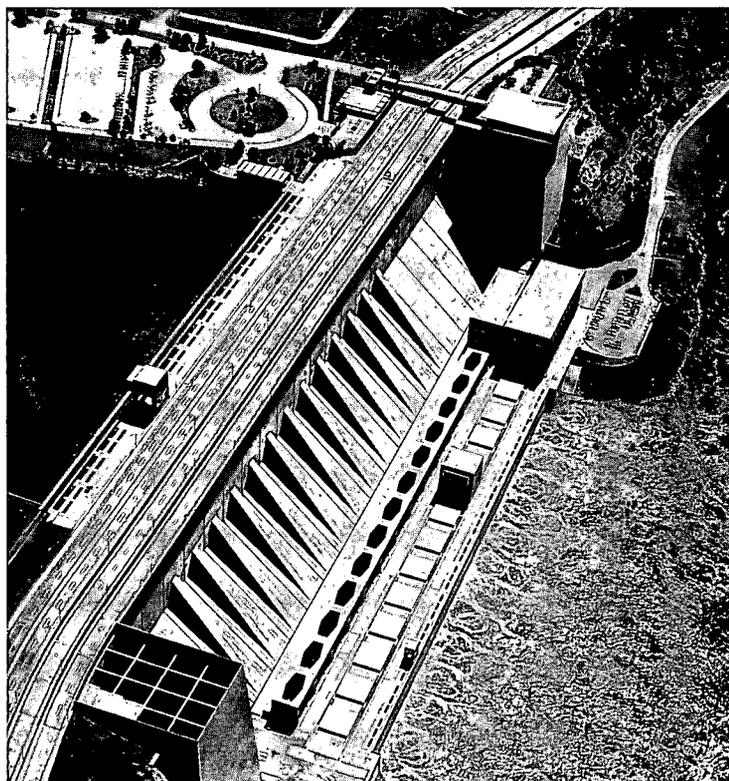
The stored water then rejoins that coming directly from the river. The intermingled water flows to the 13 units of the Moses Plant for production of electricity, after which the water is discharged into the lower river. The two Niagara plants, operated together, have a firm capability of 2,400,000 kw, although the nameplate rating of the units is 2,190,000 kw.



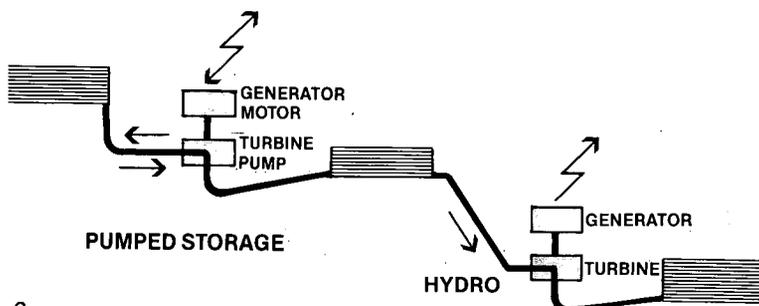
Niagara Project Intake Gates (foreground) beside upper Niagara River, with Niagara Falls at rear



Lewiston Pump Generating Plant



Robert Moses Niagara Power Plant



channel of the St. Lawrence River in the vicinity of the former rapids.

Long Sault Dam closed the southern channel and directs the flow of the river toward the power dam 3½ miles downstream. Long Sault Dam, a 2,960-foot-long curved-axis concrete structure, has 30 spillway gates. They can be opened to pass the entire river flow, or a portion of it during exceptionally high water. The dam is situated entirely within the United States, extending from the New York mainland to Barnhart Island.

Iroquois Dam, located at the western end of Lake St. Lawrence about 28½ miles upstream from the power dam, was designed to regulate the outflow of Lake Ontario. It is 1,980 feet long and has 32 sluiceways to accommodate the large river flow, with releases through the dam ranging from 180,000 to 350,000 cfs.

Adjacent to the Canadian end of Iroquois Dam is Iroquois Lock, uppermost of seven Seaway locks on the St. Lawrence River.

Upstream from Long Sault Dam, extensive excavation was accomplished to provide an adequate channel for Seaway navigation and to reduce river velocities to enable an ice cover to form in winter. This has served to alleviate the danger of ice jams that could disrupt power production and damage shore properties.

The dikes that form Lake St. Lawrence have long since blended into the natural topography of the valley.

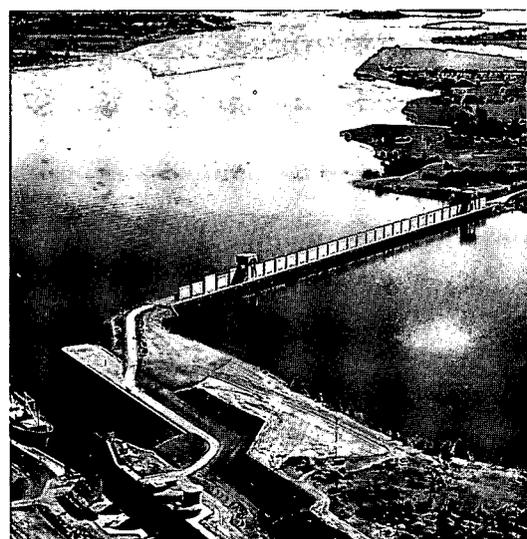
The Massena Intake control structure, flanked by a series of dikes at the upper end of the Massena Canal, provides the water supply to both the Village of Massena and the Alcoa plant.

The St. Lawrence Project, the first built by the Authority, includes three dams and many miles of dikes. Construction involved channel excavation spread over 40 miles of the St. Lawrence Valley and creation of the 60-square-mile Lake St. Lawrence, which tamed the International Rapids section of the river to improve navigation and make power production possible.

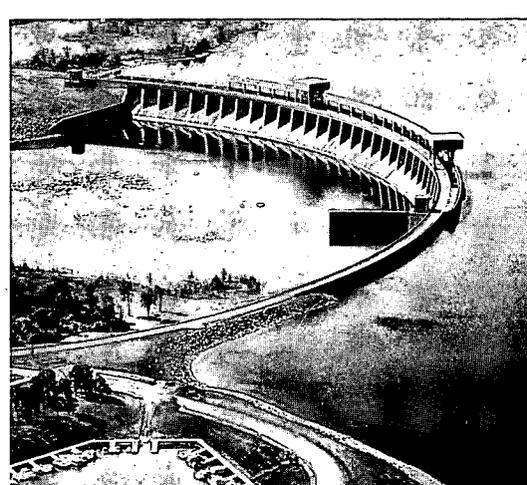
Built jointly by the Authority and Ontario Hydro, the project began producing electricity in July 1958. Since then, the Authority's generators have produced approximately 122 billion kwh of electricity.

The Robert Moses-Robert H. Saunders Power Dam, extending 3,300 feet from Barnhart Island near Massena, New York to Cornwall, Ontario, contains 16 turbine-generators on each side of the international boundary. The generators in New York have a total firm capability of 800,000 kw. The units on the Canadian side have a comparable capability.

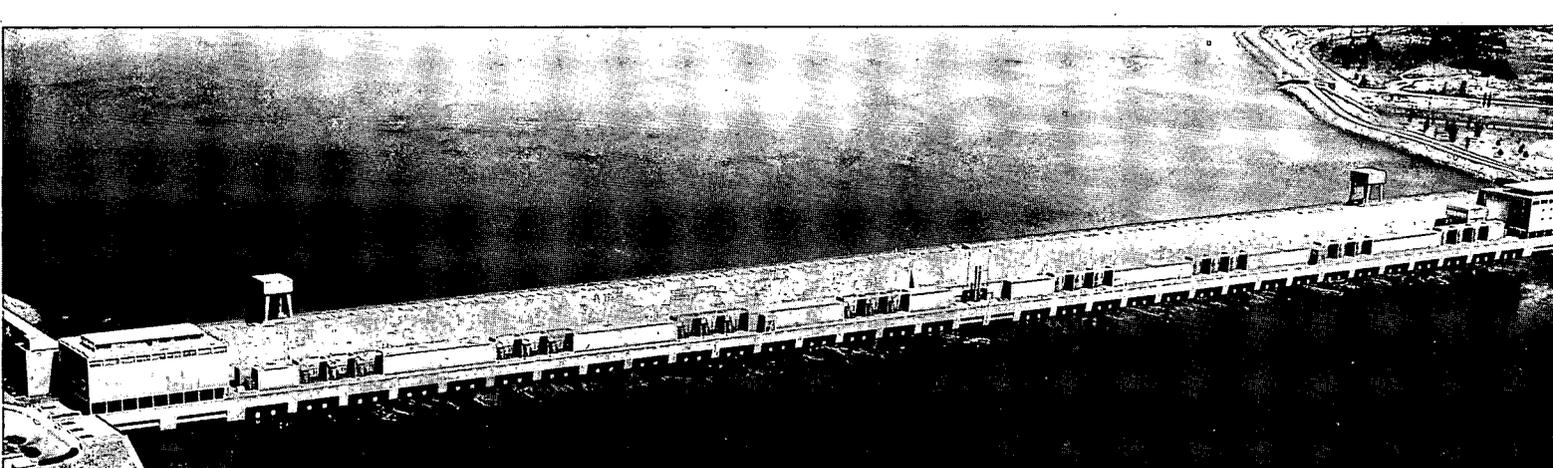
The power dam closed the northern



Iroquois Dam

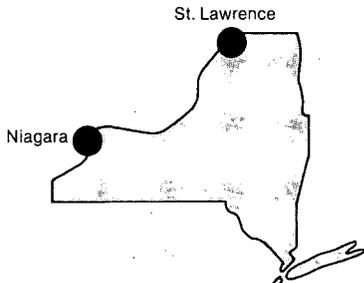


Long Sault Dam and State Park Boat Basin



Robert Moses-Robert H. Saunders Power Dam

St. Lawrence

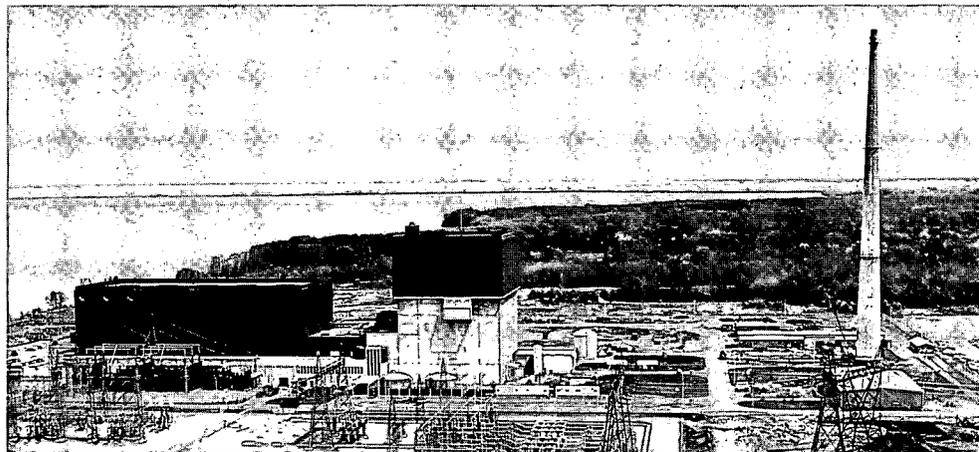


HYDRO

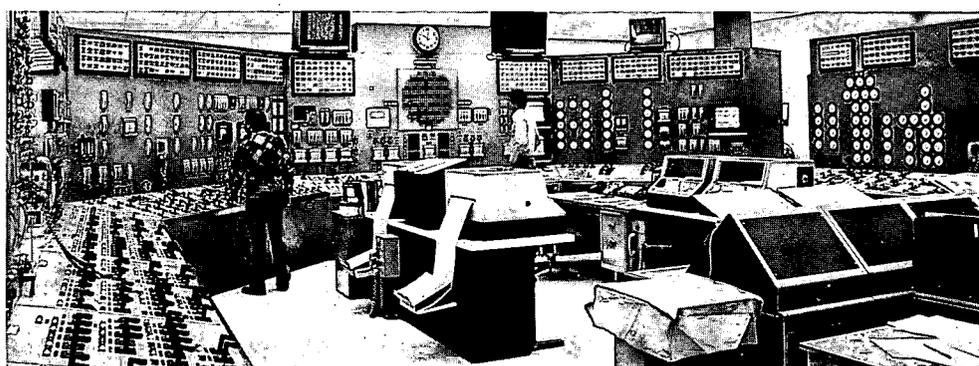


TURBINE

GENERATOR



James A. FitzPatrick Nuclear Power Plant



Control room at FitzPatrick Plant

The FitzPatrick Plant began partial commercial operation as the Authority's first nuclear generating unit in July, 1975. By the end of 1977, it had produced more than 10 billion kwh. Approximately 16,700,000 barrels of oil or 4,200,000 tons of coal would have been burned to produce an equivalent amount of electricity in a fossil-fired power plant.

In June 1977, the Authority assumed operating responsibility for the plant, which had been operated by the Niagara Mohawk Power Corporation on a reimbursable basis while the Authority recruited its own operating staff. Authorization for the transfer of responsibility was granted by the U.S. Nuclear Regulatory Commission.

The plant, located in the Town of Scriba on Lake Ontario near Oswego, was out of service from June 21 to September 25 for the first replacement of fuel and for planned maintenance and plant modifications.

To generate steam to rotate its turbine-generator, the plant uses a boiling water reactor consisting of a fuel core inside a 503-ton pressure vessel that is enclosed by a steel and concrete containment system within the reactor building.

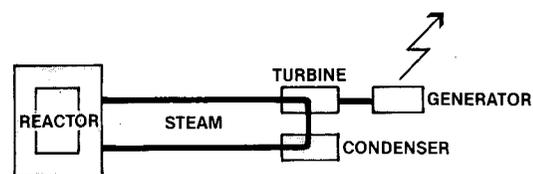
The core, an assembly of zirconium alloy tubes filled with slightly enriched uranium in pellet form, is capable of sustaining a controlled chain reaction when control rods are withdrawn.

Water, pumped into the reactor from the bottom, boils as it passes through the core. The resulting steam passes through separators and driers at the top of the reactor on its way to turn the turbine. Spent steam exhausts to the condenser to be cooled back to water that is re-circulated through the reactor.

The Authority built a 68-mile, 345,000-volt line to transmit the plant's power to its main cross-state system at a point near Utica. A tieline from the FitzPatrick Plant was built to Niagara Mohawk's adjacent Nine Mile Point switchyard, which is linked to the cross-state network near Syracuse by two additional 345,000-volt lines.



Technicians use binoculars to monitor refueling of the FitzPatrick Plant reactor



BOILING WATER NUCLEAR

# Indian Point 3 Nuclear Power Plant

J. Phillip Bayne, Resident Manager

The Indian Point 3 Plant on the Hudson River at Buchanan in Westchester County generated 8,634,247,000 kwh between startup in April 1976 and the end of 1977.

It would have required the burning of about 14,300,000 barrels of oil or 3,600,000 tons of coal to produce an equal amount of electricity in a fossil-fired plant. Indian Point 3 began partial commercial operation in August 1976 and achieved licensed commercial operation at a level of 873,000 kw the following October.

The plant was out of service for scheduled turbine-generator and other maintenance from October 7 to December 19, 1977. Prior to the scheduled shutdown, Indian Point 3 had produced electricity continuously for 175 days except during outages caused by transmission and distribution system disturbances on July 13-14 and September 26.

The heat of controlled nuclear fission provides the steam for the plant, which uses a pressurized water reactor. The pressure in the reactor keeps the water from boiling as it moves past the nuclear core to flow through a heat exchanger where its energy creates steam in a separate lower pressure system.

Enclosing and supporting the 433-ton reactor vessel is a primary shield of six-foot-thick concrete surrounded by a steel-lined reinforced concrete dome. The containment structure also encloses

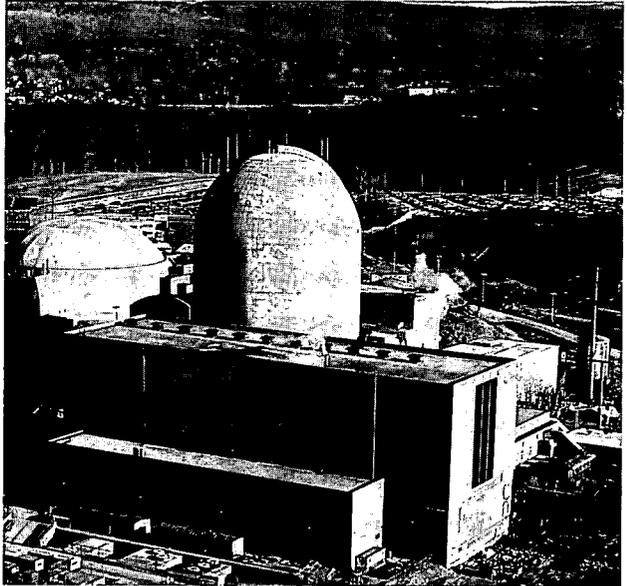
the entire reactor coolant system, steam generator reactor coolant loops and parts of the auxiliary and safeguard systems.

The licensed rating of the plant is expected to be increased from 873,000 to 965,000 kw after additional operating experience.

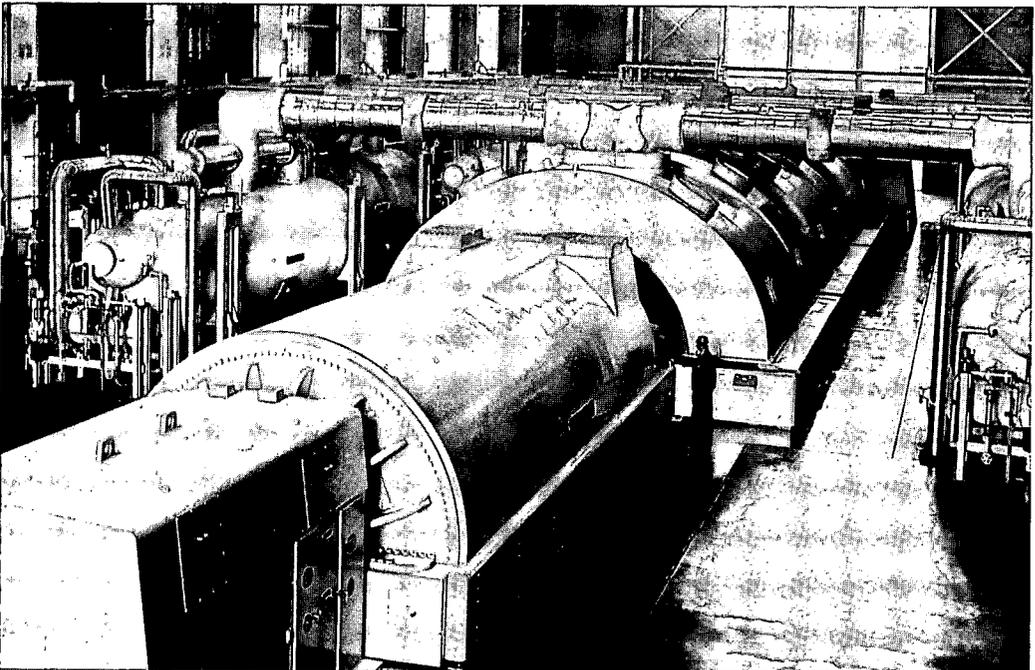
The plant is linked to the Consolidated Edison Company's nearby Buchanan Substation by a 345,000-volt transmission

line. Con Edison is operating the plant for the Authority pending granting of the Authority's application for amendment of the NRC license to transfer operating responsibility to the Authority.

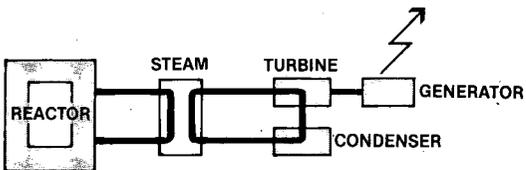
The plant was purchased in an incomplete state from Con Edison in accordance with a 1974 legislative authorization. The Authority is adding facilities to assure operation independent of the utility's two adjacent nuclear plants.



Indian Point 3 Nuclear Power Plant



Turbine-generator



PRESSURIZED WATER NUCLEAR

The Authority's newest plant, the 775,000-kw Astoria 6 oil-fired facility in Queens, reached its rated capacity by year-end.

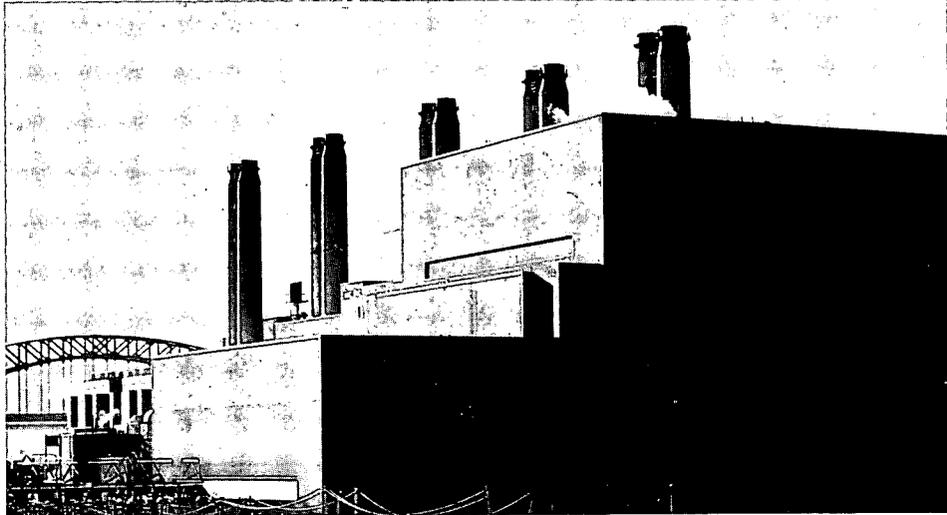
The plant, then incomplete, was purchased in 1974 from Con Edison in accordance with legislation that year. Con Edison operates five adjacent Astoria units.

Construction proceeded in 1977 on the oil storage and handling system that will provide an independent fuel supply for the plant. To insure independence of operation, the Authority has added supplementary facilities, including fire protection system improvements, a warehouse and a maintenance building, as well as modifications to the control room, electric metering, a waste water disposal tank and piping.

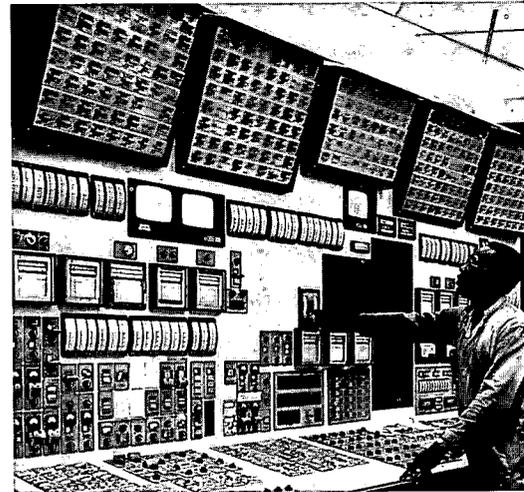
To produce electricity at the Authority's only oil-fired plant, preheated oil is sprayed into the furnace of the 175-foot-high balanced draft boiler through 36 burners.

The boiler is designed to produce each hour during normal operations 6.6 million pounds of steam, heated to 1,000 degrees Fahrenheit with a pressure of 2,400 pounds per square inch. The force of such steam is sufficient to turn the turbine-generator at a speed of 3,600 revolutions per minute.

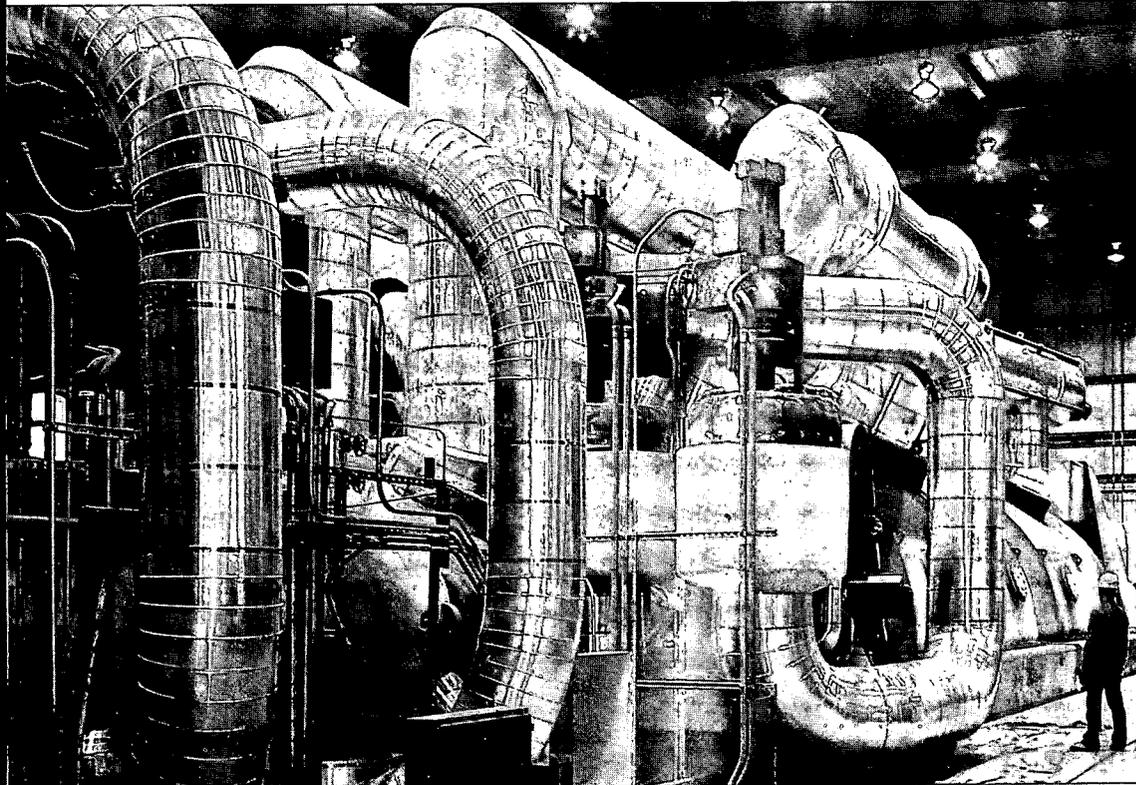
The plant is connected by two 345,000-volt underground circuits to a distribution substation at 15th Street in Manhattan, about 7½ miles to the south, on the opposite bank of the East River.



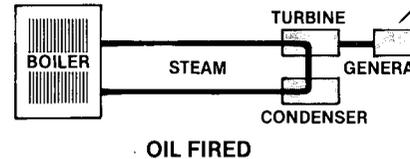
Astoria 6 Generating Plant (foreground)



Operating Mechanic Joseph Robinson in Astoria 6 control room



Steam lines at turbine-generator



In its fourth full year of operation, the Blenheim-Gilboa Pumped Storage Power Project continued its role of providing electricity at times of peak consumer demand or in emergencies.

Since producing first power in July 1973 the project has generated more than 4.17 billion kwh.

Named for the two Schoharie County towns in which it is located and situated on Schoharie Creek about 40 miles southwest of Albany, Blenheim-Gilboa has a capability of one million kw. The project consists of upper and lower reservoirs connected by underground tunnels passing through a four-unit powerhouse, plus a switchyard tied to the state power grid by three 345,000-volt transmission lines,

the last of which was energized early in 1978.

In periods of peak demand or emergencies, water is released from the upper reservoir to spin the four turbine-generators that produce electricity.

When electrical needs are lower, the turbine-generators are reversed to become electrically-motorized pumps that raise the water back to the upper reservoir, using the most efficient generating sources available.

The 360-acre upper reservoir on Brown Mountain has a capacity of almost five billion gallons of water with an energy potential of 12 million kwh of electricity.

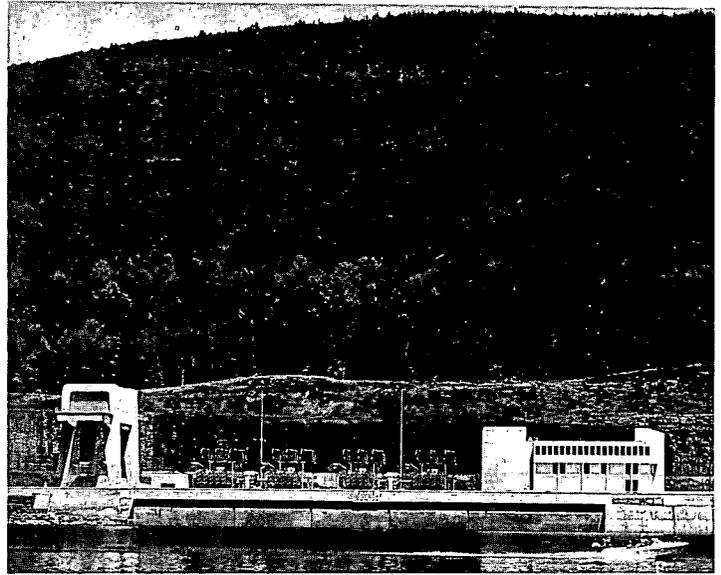
The 430-acre lower reservoir, 1,100 feet below the mountaintop, has a five-billion-

gallon capacity and is impounded by an 1,800-foot long earth and rock dam across Schoharie Creek downstream from the powerhouse. The dam contains a gated spillway and a low-level outlet.

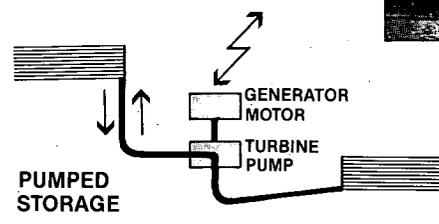
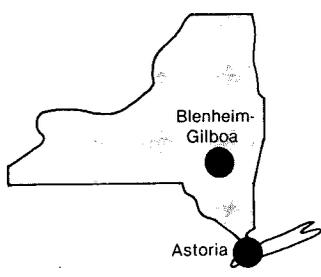
The powerhouse is a reinforced concrete semi-outdoor-type structure, 526 feet long and 130 feet high. Only the top few feet are visible above the water of the lower reservoir. Inside the powerhouse, four reversible hydraulic pump-turbines are connected to four generator-motors. Each unit is capable of generating 250,000 kw.



Aerial view of Blenheim-Gilboa Project



Powerhouse and lower reservoir at base of Brown Mountain



## Production and Marketing

Increased production at its Indian Point 3 Nuclear Plant and startup of Astoria 6 enabled the Authority to establish a new generating record in 1977 despite considerably reduced average river flows in the Niagara and St. Lawrence, which had been at all-time high levels in the last few years.

At St. Lawrence, where the average flow exceeded 300,000 cfs in 1976, flows fell to an average of 261,900 cfs for 1977. Niagara flows dipped to 215,000 cfs, their lowest level since 1971. The 1977 flows still exceeded the long-term averages on both rivers.

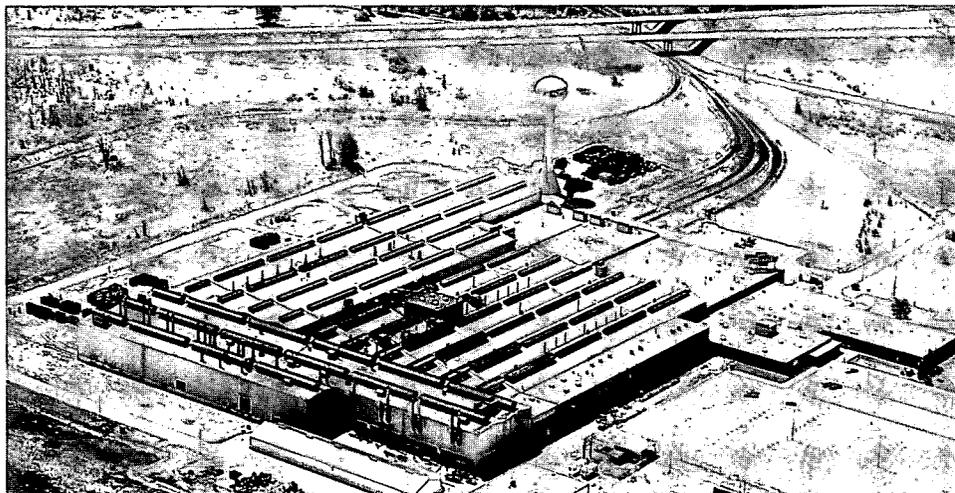
The St. Lawrence Project produced 6,801,699,000 kwh, despite the first extended non-scheduled shutdown of a generator in its 19-year history, to rewind a stator. The unit was repaired and returned to service in six weeks.

The Niagara Project generated 15,007,305,000 kwh, while accomplishing normal maintenance.

Authority nuclear generation totaled 9,430,148,000 kwh. The FitzPatrick Plant produced 3,893,555,000 kwh and the Indian Point 3 Plant produced 5,536,593,000 kwh.

The Blenheim-Gilboa Project generated 983,686,000 kwh during periods of greatest consumer demand for electricity.

Astoria 6 generated 766,054,000 kwh after initial production of power February 12.



Fifty-nine new governmental customers in Westchester County began receiving Authority service after the Governor approved their contracts for purchase of electricity from the Indian Point 3 and Astoria 6 Plants. Their addition brought to 76 the number of public customers in New York City and Westchester County using this power for public housing, schools, street lighting, mass transit and other public purposes, and increased the total number of Authority public customers to 126.

Governmental customers in New York City and Westchester saved approximately \$90 million annually as the result of their purchases of Authority electricity.

An additional \$21 million in fuel costs was saved by other metropolitan area consumers as a result of Con Edison's purchase of energy from Indian Point 3 and Astoria 6.

Purchase by Con Edison and the state's six other major private utilities of energy from the Authority's FitzPatrick Nuclear Plant resulted in further savings to state consumers of about \$21.8 million in fuel adjustment charges.

Contracts for the sale of power from the Niagara and St. Lawrence Projects to three upstate utilities require that savings be passed on to their rural and residential customers in the form of bill credits. In 1977, Niagara Mohawk Power Corporation credited rural and domestic customers with \$2,325,404; New York State Electric & Gas Corporation credited \$1,725,197; and Rochester Gas and Electric Corporation credited \$515,108.

These credits were in addition to approximately \$82 million in fuel adjustment charges accruing from the use of electricity produced in Authority baseload hydroelectric projects rather than the utilities' own thermal generating plants.

In 1977 the Trustees and the Governor approved contracts enabling six of the state's private utilities to purchase non-firm pumped storage energy.

The flexibility of operation and quick-starting capability of pumped-storage units form the basis for the contracts under which the Authority will produce the energy when it can be made available in addition to existing contractual commitments and when it will provide savings to the customers of the utilities. The utilities which will receive the energy are Central Hudson Gas & Electric Corporation, Con Edison, Long Island Lighting Company, New York State Electric & Gas, Orange and Rockland Utilities, Inc., and Rochester Gas and Electric.

Allocations of electricity were in-

creased to 21 municipal and rural electric cooperative systems effective at the beginning of 1978. They are the Cities of Plattsburgh and Salamanca, the Villages of Andover, Bath, Boonville, Endicott, Fairport, Hamilton, Holley, Lake Placid, Marathon, Rouses Point, Sherburne, Silver Springs, Skaneateles, Spencerport, Theresa, Tupper Lake, Watkins Glen and Westfield, and the Delaware County Electric Cooperative.

Increased operating expenses and the need to build new distribution facilities have caused a number of the systems to request rate increases. In 1977, the Authority approved interim increases for the City of Plattsburgh and the Village of Andover and new permanent rate schedules for the Villages of Akron and Castile, and the Delaware County Electric Cooperative.

In December, rates were increased for electricity produced at the FitzPatrick Nuclear Plant. The increase, approved in September, is designed to cover higher operating and maintenance costs than were anticipated when the previous rates were established in early 1976.

The Westchester governmental customers for whom Authority service began in 1977 are:

Village of Ardsley, Bedford Central School District, Board of Cooperative Educational Services-Southern Westchester, Village of Briarcliff Manor, Briarcliff Manor Union Free School District, Village



*Authority electricity powers industries such as the Carborundum Company at Niagara Falls (top, facing page), General Motors Corporation at Massena and such municipal systems as Iliion. Public use in the New York City metropolitan area includes the subways of the Metropolitan Transportation Authority, City College of New York and the New York City Housing Authority, which operates units such as the Bronx apartment house at top.*



of Bronxville, Byram Hills Central School District, Chappaqua Central School District, Town of Cortlandt, Croton-Harmon Union Free School District.

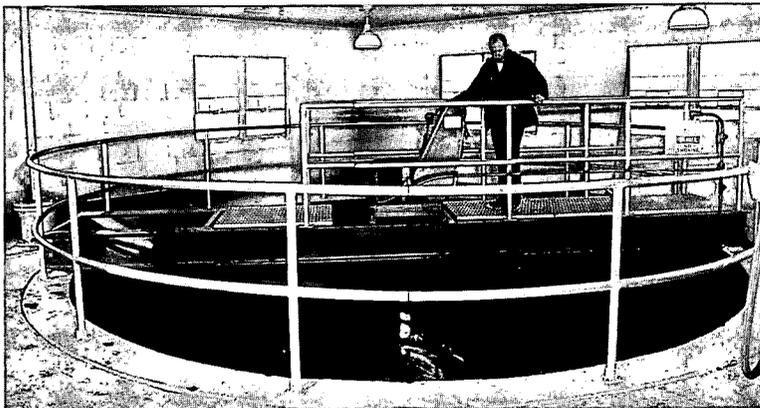
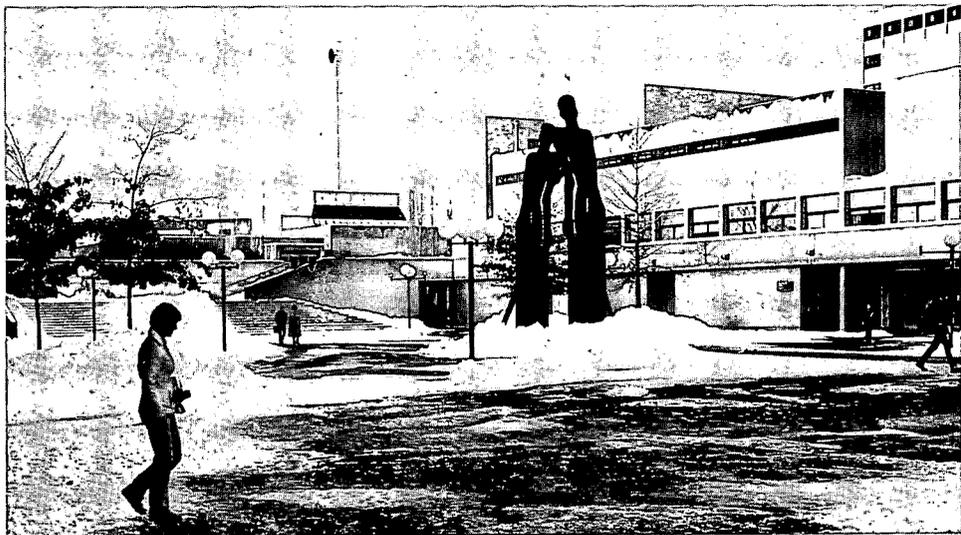
Also, Village of Dobbs Ferry, Town of Eastchester, Eastchester Union Free School District, Village of Elmsford, Town of Greenburgh, Greenburgh Housing Authority, Town of Harrison, Village of Hastings-on-Hudson, Village of Irvington, Lakeland Central School District.

Also, Village of Larchmont, Town of Mamaroneck, Village of Mamaroneck, Mamaroneck Union Free School District, Montrose Improvement District, Village of Mount Kisco, Town of Mount Pleasant, Mount Pleasant Central School District, City of Mount Vernon, City of Mount Vernon School District, Town of New Castle.

Also, New Rochelle Municipal Housing Authority, Town of North Castle, North Tarrytown Housing Authority, Town of Ossining, Ossining Union Free School District, Village of Pelham, Pelham Union School District, Village of Pleasantville, Pleasantville Union Free School District, Village of Port Chester.

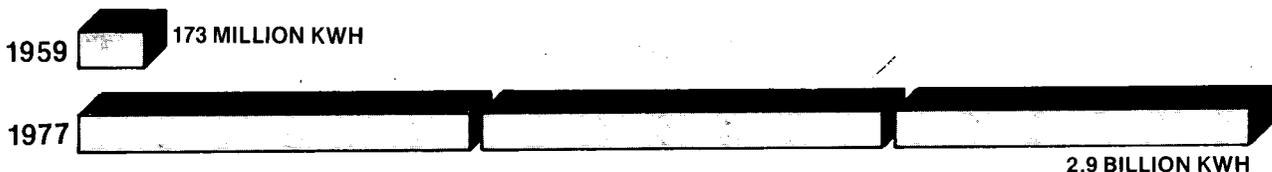
Also, Port Chester Housing Authority, Port Chester-Rye Union Free School District, City of Rye, Town of Rye, Rye Neck Union Free School District, Scarsdale Union Free School District, Thornwood Water District, Village of Tuckahoe, Tuckahoe Union Free School District, Tuckahoe Housing Authority.

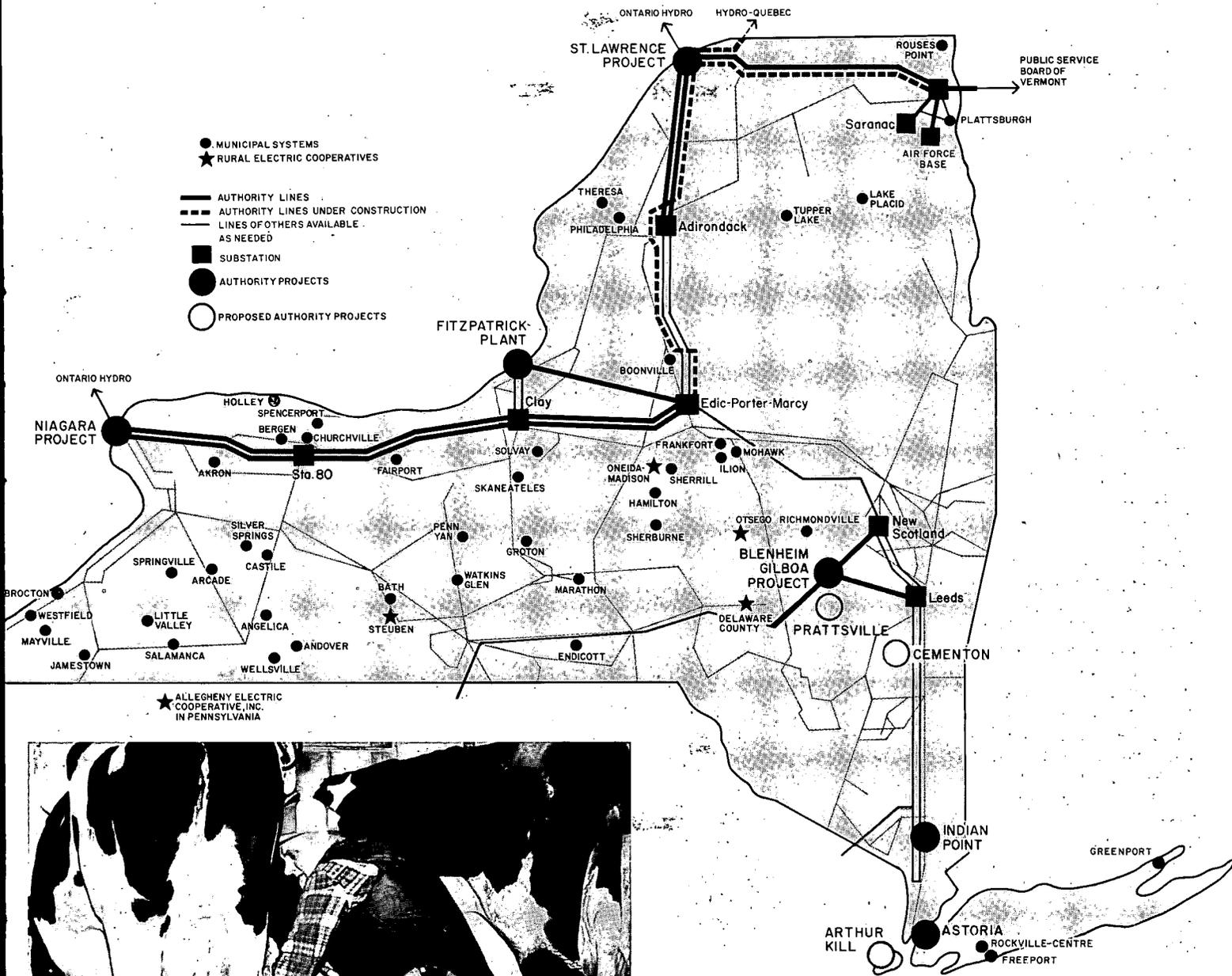
Also, Union Free Schools of the Tarrytowns, Valhalla Union Free School District, Westchester Joint Water Works, City of White Plains, City School District of the City of White Plains, White Plains Housing Authority, The Municipal Housing Authority for the City of Yonkers, Town of Yorktown.



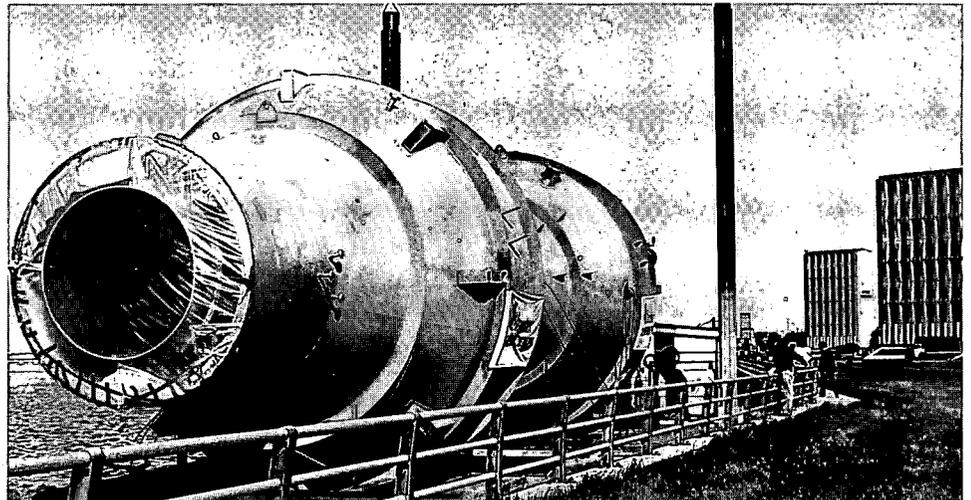
*Users of Authority power include the State University of New York at Plattsburgh (top); the Village of Buchanan, with its municipal building housed in a historic former school building and the Richmondville sewage treatment plant.*

**ELECTRIC SALES TO MUNICIPAL SYSTEMS AND RURAL ELECTRIC COOPERATIVES**





Authority power distributed by the Delaware County Electric Cooperative in the Delhi area helps farmer John Eckart milk his cows.



Huge evaporation unit being unloaded near Niagara Project intake gates is part of a \$60 million expansion of the Hooker Chemicals & Plastics Corp. facilities, made possible by an allocation of power from the Authority's FitzPatrick Nuclear Plant.

Engineering and design work continued throughout 1977 for the Authority's system-wide energy control center that it will build adjacent to the Marcy Substation near Utica.

The center will coordinate operations at all Authority power projects and provide for the most efficient dispatch of energy. Communications links will connect the center with similar facilities of the state's private utilities and with the New York Power Pool control center near Albany. The existing production control center at the Niagara Project will be replaced by the new expanded facility, expected to begin operating in 1980.

The Authority also plans to construct a transmission line maintenance and training center at Marcy. The maintenance center will service Authority lines in central New York. The training center will enable Authority linemen from all parts of the state to undergo training in maintenance and repair of transmission lines under field conditions.

Major improvements and additions to the St. Lawrence switchyard continued during the year to increase reliability of service to Authority customers in the North Country, strengthen interconnections with Ontario Hydro and provide connections with new Authority transmission lines.

Engineering was completed in 1977 and a contract awarded for construction of a seven-tower microwave radio system directly connecting the Massena and

Marcy Substations. The microwave link will be used to monitor voltages and current flows on the Massena-Marcy 765,000-volt transmission line and to provide operating data to the energy control center.

Normal maintenance was conducted at each project during the year. Maintenance at Niagara and St. Lawrence continued to be scheduled to assure that the maximum number of units were available at times of high water.

Maintenance of major plant components and systems occurred during planned shutdowns of the Authority's two nuclear plants, and the Authority completed its first refueling at the FitzPatrick Plant.

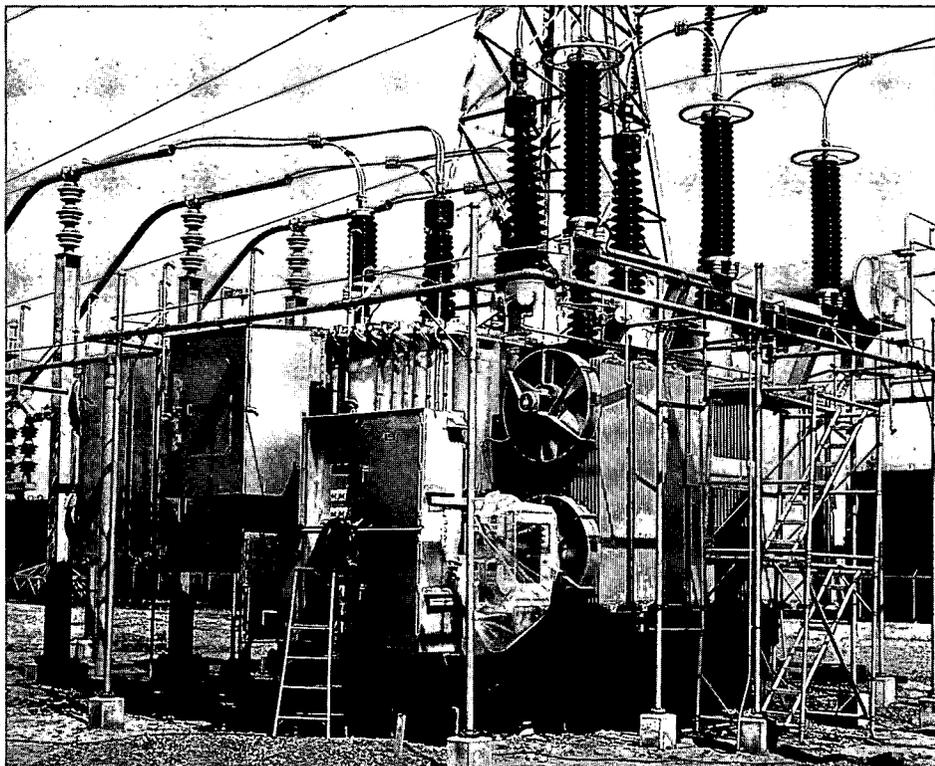
The Blenheim-Gilboa Project in June received the National Safety Council's Commendation Award for completing the four years from 1973 through 1976 without a lost-time injury. Project employees accomplished 484,562 man-hours of work during that time, and in 1977 extended their record to a fifth consecutive year.

## Ice and Power

Ice booms installed by the Authority and Ontario Hydro at St. Lawrence and Niagara formed favorable ice covers early in 1978, under which the full flows of the rivers could pass freely.

However, river flows and power production were reduced for the second straight winter at St. Lawrence because of ice problems in the Beauharnois Canal concurrent with late navigation. The ice booms across the main shipping channel international section were not closed until Dec. 30, well into the initial period of ice formation in that area. In the process of forming the ice cover over Lake St. Lawrence, large areas of open water caused a hanging dam to form at the leading edge of the cover near Iroquois Dam, temporarily reducing flows and power production at St. Lawrence.

As a result, deliveries of interruptible power to the two aluminum companies in the St. Lawrence area had to be curtailed for several days. No other Authority customers were affected.



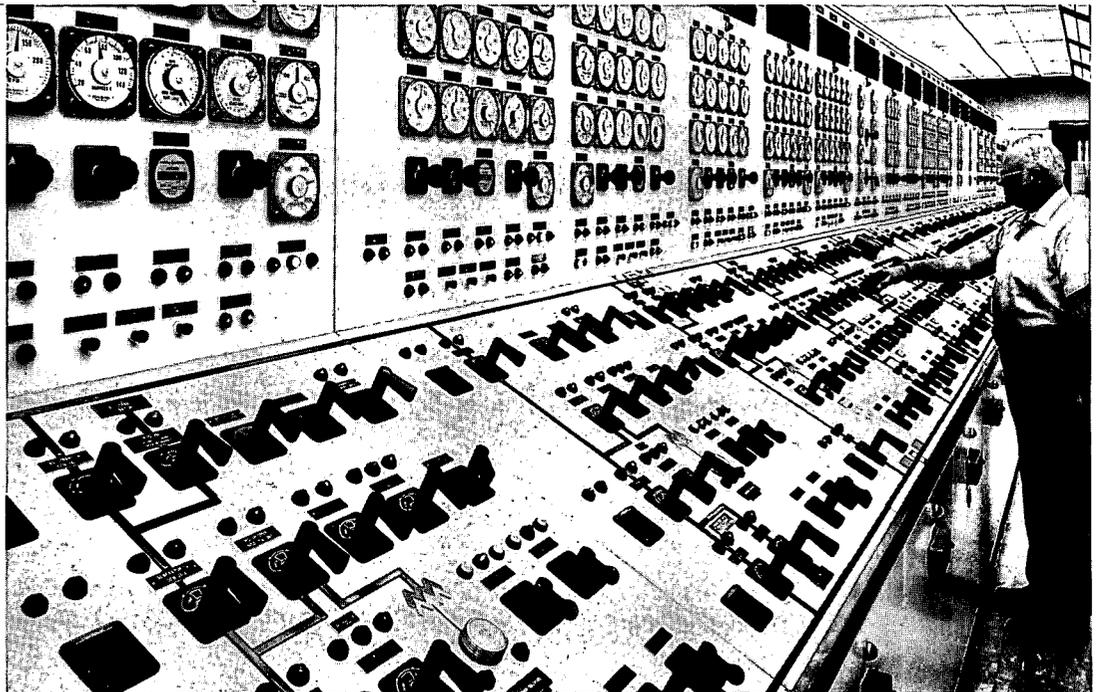
Transformer maintenance at St. Lawrence switchyard



Ice boom in Lake Erie



Operators Jerald Farrell (left) and Paul Rusinko at Niagara control room





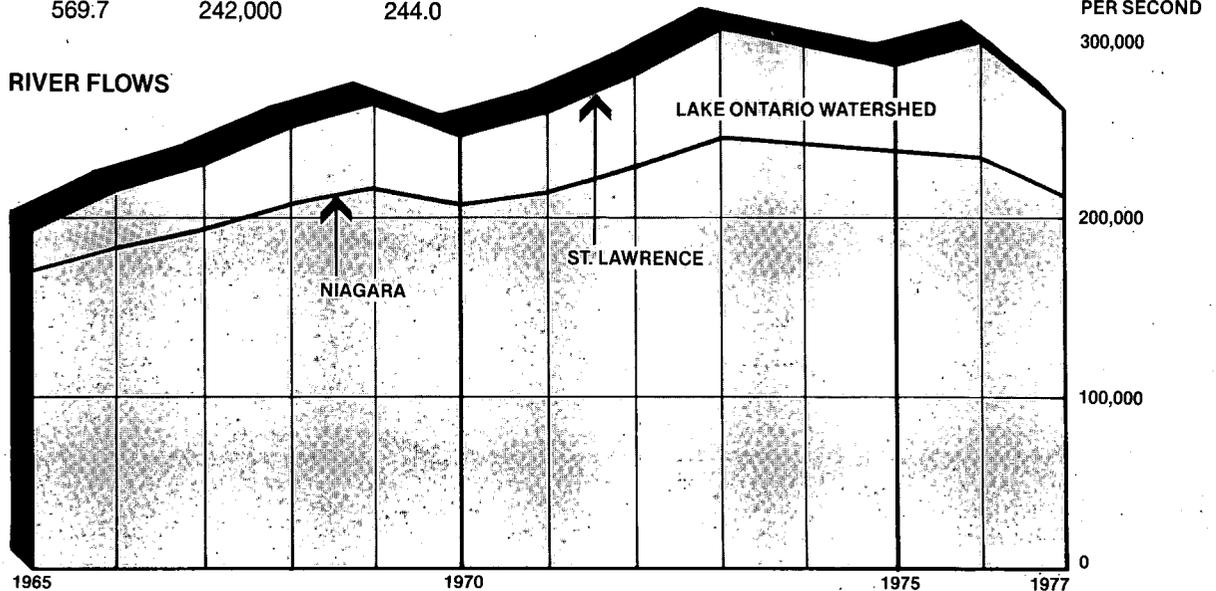
McDonald Thorburn welds plates on Niagara turbine runner.



System Shift Supervisor Ralph B. McDonald at computer terminal in the Authority's Production Control Center

### River Flows and Lake Levels

	Niagara		St. Lawrence	
	Average River Flow (cfs)	End of Year Lake Erie Level (IGL 1955)	Average River Flow (cfs)	End of Year Lake Ontario Level (IGL 1955)
1965	172,000	569.6	195,000	244.2
1966	186,000	569.8	220,000	244.3
1967	194,000	570.4	234,000	244.7
1968	207,000	570.5	252,000	244.3
1969	219,600	571.4	265,800	243.7
1970	209,800	571.0	249,800	244.2
1971	213,000	571.6	258,000	243.7
1972	229,000	572.3	280,800	245.7
1973	247,000	571.5	308,100	244.7
1974	243,000	571.6	299,000	243.9
1975	238,000	570.3	284,000	244.2
1976	236,000	571.6	300,100	244.0
1977	215,000	570.3	261,900	245.5
Long Term Average	203,000	569.7	242,000	244.0



Construction of the Authority's 765,000-volt line and a second 230,000-volt line in the North Country will strengthen the network by which electricity from Authority projects and interconnections is transmitted to load centers. This is done over lines built and operated by the Authority and other members of the New York Power Pool.

The Authority owns two 345,000-volt circuits extending from Niagara Falls to Utica, a distance of 199 miles. They deliver power to Stations 80 and Pannell of Rochester Gas and Electric, to Niagara Mohawk Power Corporation's Clay Substation near Syracuse and to Niagara Mohawk's Edic Substation near Utica.

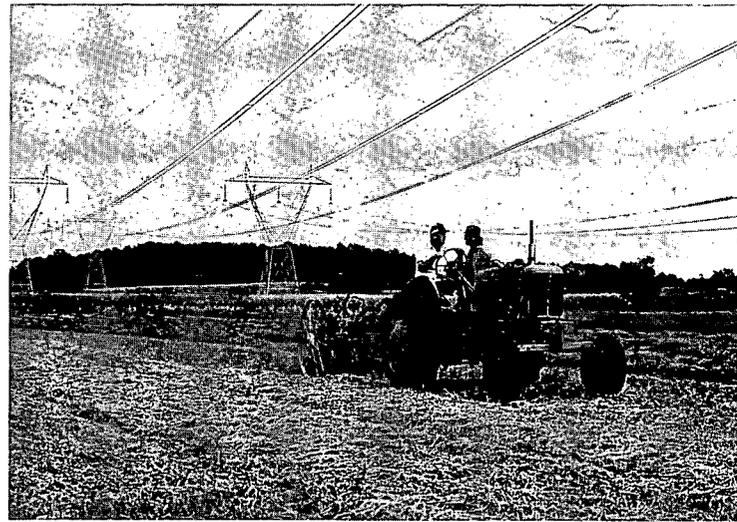
At Edic, the Authority lines connect with those of Niagara Mohawk, which extend to a connection with Consolidated Edison north of New York City.

A connection also is made at Utica to two Niagara Mohawk 230,000-volt lines that run northerly to the Authority's Adirondack Substation. From Adirondack, two 230,000-volt, 86-mile lines owned by the Authority extend to the St. Lawrence switchyard. Thus, the total system provides a connection between the Niagara and St. Lawrence Projects.

Power from the FitzPatrick Plant flows to the main cross-state transmission network over a 68-mile, 345,000-volt transmission line to the Edic Substation.

The Authority owns a 230,000-volt, 71-mile line from Massena to an Authority substation near Plattsburgh, where voltage is reduced to 115,000 and 46,000 volts. Construction of the second line to Plattsburgh is nearing completion.

From the Plattsburgh Substation, power is transmitted to Vermont at 115,000 volts, utilizing an overhead transmission line that connects to submarine cables under Lake Champlain. The New York portion of the line is owned by the Authority and



the Vermont portion by the Vermont Electric Power Company.

Power from the Plattsburgh Substation also is transmitted over a 115,000-volt line to the Authority's Saranac Substation, where there is an interconnection with the New York State Electric & Gas Corporation system.

The City of Plattsburgh built a 115,000-volt line from its Receiving Station No. 1 to the Authority's Plattsburgh Substation and constructed its Receiving Station No. 2 to obtain power from the Authority's Plattsburgh-Saranac Line.

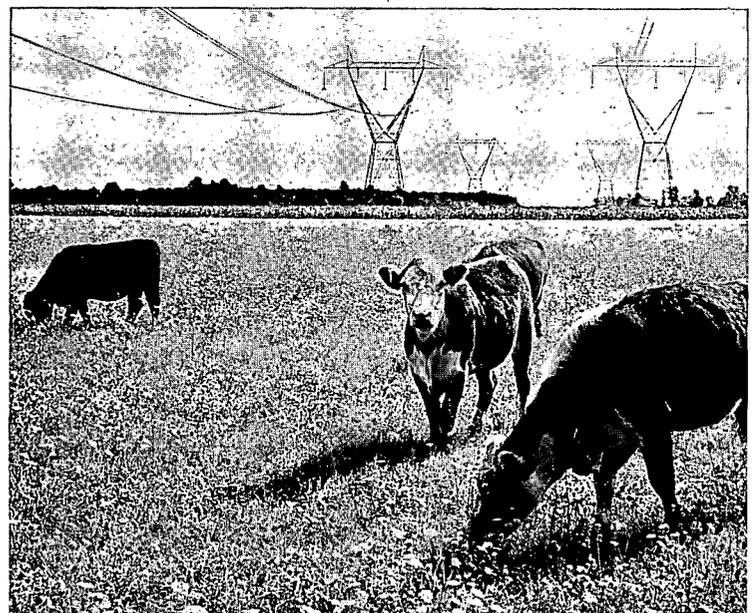
The United States Air Force Base near Plattsburgh purchases all its electric power directly from the Authority via a 46,000-volt line which the Authority built from its Plattsburgh Substation.

Power to and from the Blenheim-Gilboa Project flows over three 345,000-volt lines, each about 35 miles long. One to the southwest connects with a New York State Electric & Gas line near Delhi in Delaware County. Another, running northeast from the project, connects with the

New Scotland Substation of Niagara Mohawk in Albany County. The third line, connecting the project with Niagara Mohawk's Leeds Substation to the southeast in Greene County, was energized January 25, 1978.

Details on construction of the 765,000-volt line from Massena to Marcy, with a connection to Quebec, can be found on the following page.

*Agriculture is one of the many productive uses of the rights-of-way of Authority transmission lines. The field of tomato plants and the cattle pasture are beneath the Authority's main cross-state 345,000-volt line from Niagara Falls to Utica.*



Work on three new transmission lines continued in 1977. They were begun in 1976 after the Authority received necessary federal and state approvals. One of the lines, connecting the Blenheim-Gilboa Project and the Leeds Substation, was energized in January 1978.

## Massena to Marcy Transmission

Approximately 43 percent of construction had been completed by year-end on the 765,000-volt transmission line from Massena to Marcy with a connection to Quebec. The line will permit import of a minimum of 800,000 kw of Canadian hydroelectric power during the seven "warm-weather" months of each year, providing tens of millions of dollars in annual fuel cost savings to New York consumers.

Late in the year, Chairman Clark was assured by Hydro Quebec that substantial quantities of hydroelectric power will be available to New York State for more than a decade in addition to the 800,000 kw provided for in the basic contract. These additional imports will substantially increase the economic benefits to New York State and further reduce the state's dependence on imported oil.

In December, the State Public Service Commission approved routes of the two final segments, totaling about 20 miles, of the 165-mile transmission system, issuing a formal order the following month. The Authority immediately began preparing the detailed Environmental Management and Construction Plans (EM&CP) required for these sections of the line.

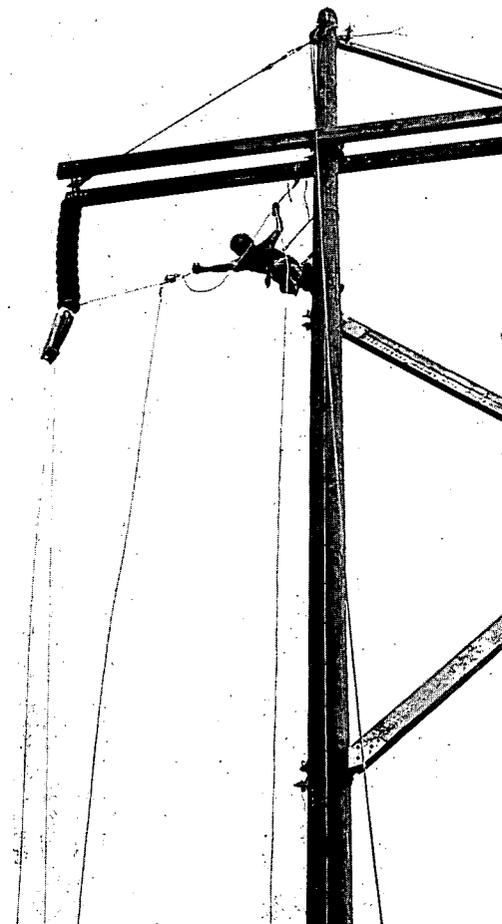
The Authority applied for PSC certification to build the 765,000-volt line in September 1973. After exhaustive hearings, the PSC authorized partial construction in June 1976. The Authority began clearing the right-of-way, much of it adjacent to existing transmission lines, in September of that year.

By the end of 1977, more than 70 percent of the route had been cleared, almost 40 percent of the necessary structures had been erected, and nearly 70 percent of the Massena and Marcy Substations had been completed. The work force reached a peak of 1,116 persons.

Delays in construction, principally due to the lengthy regulatory process, will defer completion of the line until the fall of 1978.

The Authority during the year expanded its policies and procedures with regard to active agricultural land along the route of the line and compensated farmers for any crop losses encountered during and in the aftermath of construction. The new procedures were endorsed by an Agricultural Advisory Committee formed earlier to advise the Authority on agricultural matters pertaining to construction of the line.

The transmission system includes new substations at Massena and Marcy; an eight-mile, double-circuit 230,000-volt line from the Massena Substation to the St. Lawrence switchyard; a two-mile, 345,000-volt line between the Marcy Substation and the existing Edic Substation; a 134-mile, 765,000-volt line connecting the new substations; and a 21-mile, 765,-



Stringing conductors on new St. Lawrence to Plattsburgh line

000-volt line from the new Massena Substation to Quebec.

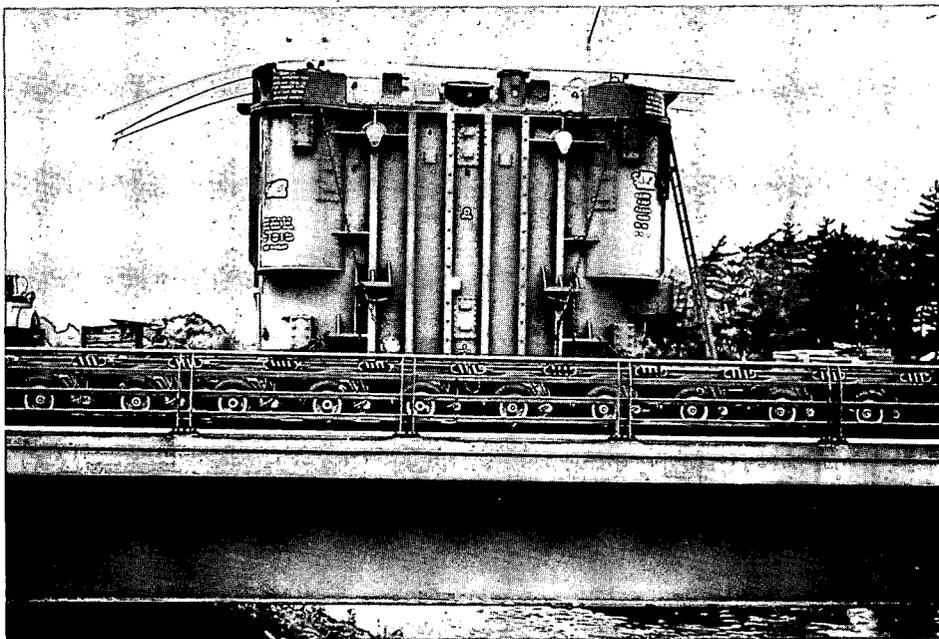
## St. Lawrence to Plattsburgh Transmission

Approximately 99 percent of the work had been completed by year-end on the second 71-mile, 230,000-volt line from the St. Lawrence Project to Plattsburgh. Construction began in July 1976, after certification of the route and approval of the Authority's detailed EM&CP. The Authority applied for the certificate in 1974.

The line is parallel and adjacent to the existing 230,000-volt line built in 1958, minimizing the amount of land required and avoiding the establishment of a new transmission corridor. Wood pole structures similar to those on the existing line support the conductors.

A substation built as part of the new facilities near Willis Road at South Chateaugay was 74 percent complete at year-end. It will step down voltage to 115,000 volts for interconnections with existing and future lines of that voltage in the area. Similar interconnections have been made possible by addition of a transformer at the existing Plattsburgh Substation.

The new line is required to meet the area's increasing energy needs. It also will provide benefits in reliability and



Two-hundred-ton transformer rolls to new Massena Substation

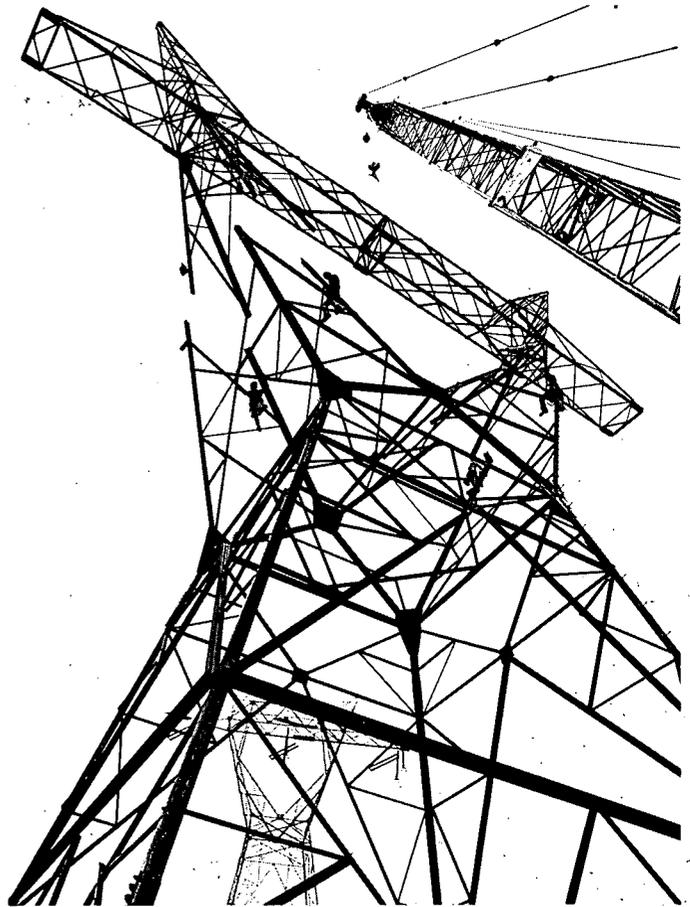
economy to Authority customers in the North Country and Vermont by eliminating low voltage problems in the event of an outage on the existing line, reducing total transmission losses and permitting transmission equipment to be removed from service for maintenance without detrimentally increasing loads on other area lines.

### Gilboa to Leeds Transmission

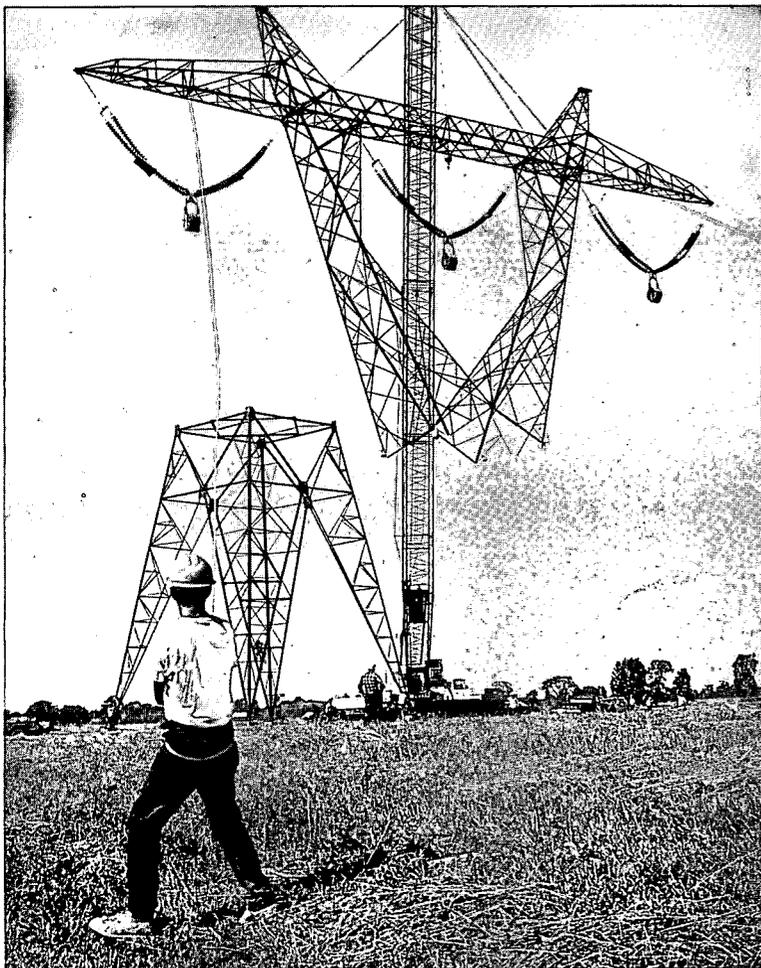
Electricity was transmitted over the 37-mile, 345,000-volt Gilboa to Leeds line on January 25, 1978, about 8½ years after it had been licensed in 1969.

Hearings and litigation covering the route delayed the start of work on the line until late 1976, when a three-judge panel of the United States Court of Appeals for the Second Circuit unanimously upheld a Federal Power Commission (FPC) order authorizing its construction.

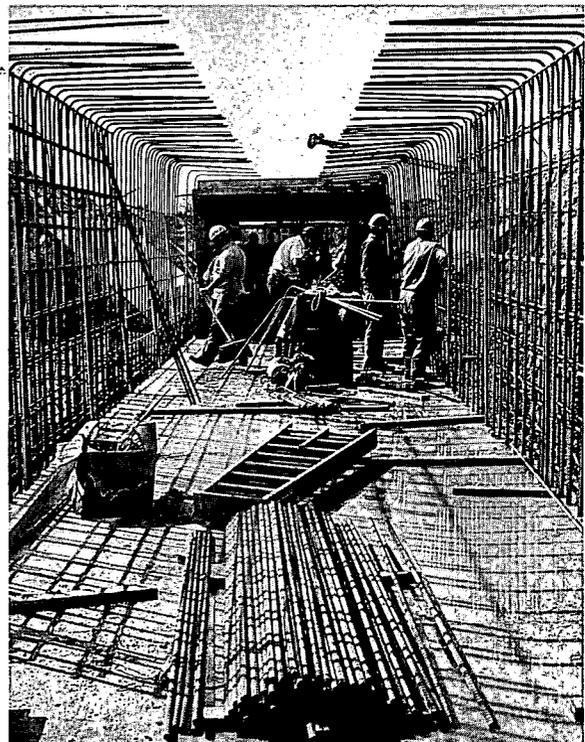
The line was one of three 345,000-volt circuits approved by the FPC in 1969 as part of the Blenheim-Gilboa Project. The two other lines were placed in service when completed in 1972, and the project began operation the following year.



Adding top section of tower on the Gilboa to Leeds line



Completing tower for the 765,000-volt line



Reinforcing steel frames workers building the control cable tunnel at Massena Substation

Authority applications to build three new generating facilities progressed through federal and state licensing processes during 1977.

## Greene County Nuclear Power Plant

Joint federal-state hearings on the Authority's applications to build the 1,200,000-kw Greene County Nuclear Power Plant began in January and continued throughout the year.

Prime site for the plant is at Cementon, in an industrial area on the west bank of the Hudson River about 40 miles south of Albany.

The site was selected by the Authority over an alternate at Athens, 10 miles north, largely on the basis of existing land use.

By February 1978, more than 12,000 pages of Authority testimony, including examination of witnesses, had been presented in the joint hearings, the first conducted by the U.S. Nuclear Regulatory Commission (NRC) and the New York State Board on Electric Generation Siting and the Environment. Approval of both agencies is required for construction.

Witnesses at the hearings testified that construction of the plant would produce a total payroll of more than \$200 million, employ more than 2,100 workers at the peak of construction and create more than 3,700 secondary or service jobs in the area during the peak work period. Other testimony stressed that construction and operation would have little or no impact on plant or animal life, air quality, water quality and quantity, or area weather.

Also in 1977, an NRC Advisory Committee on Reactor Safeguards concluded, in the words of the Atomic Energy Act, that the plant could be built "with reasonable assurance that it would operate without undue risk to public health and safety."

The Authority applied during the year to the NRC for a limited work authorization to begin site preparation prior to completion of the hearings. The application was pending at year-end.

The plant will use a pressurized water reactor. It will generate about 6.8 billion kwh annually, saving 11,400,000 barrels of oil or 2,900,000 tons of coal each year.

## Fossil-fueled Plant

The State Siting Board began public hearings in May 1977 on the Authority's application to construct a 700,000-kw fossil-fueled plant on Staten Island in New York City. Prime site for the plant, which would burn coal as a primary fuel and could also consume 2,100 tons of city refuse a day, is on the east bank of the Arthur Kill.

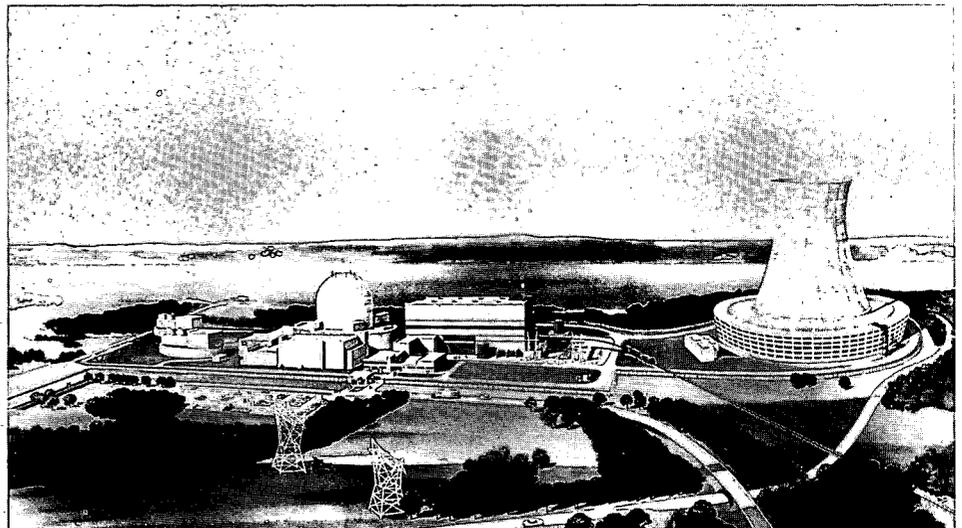
The Authority completed its direct

testimony in the hearings, including examination of its witnesses, in January 1978, by which time a total of 3,656 pages had been compiled on various environmental and economic issues.

## Prattville Pumped Storage Power Project

The Authority in May submitted a revised application to the FPC to build the one-million-kw Prattville Pumped Storage Power Project on Schoharie Creek at the juncture of Schoharie, Greene and Delaware Counties. Review of the application and related exhibits by the Federal Energy Regulatory Commission (FERC), successor to the FPC, was continuing as the year ended.

Like the Authority's Blenheim-Gilboa Project, the Prattville Project will produce electricity at times of peak consumer demand.



Artist's rendering of Greene County Nuclear Power Plant

# Small Hydroelectric Projects

The Authority announced plans early in 1978 to study possible installation of 6,000 kw of hydroelectric generating capacity at Ashokan Reservoir in Ulster County and Kensico Reservoir in Westchester County. Both facilities are owned by New York City.

The water supply function of the two reservoirs would not be affected by the hydroelectric projects. Mayor Edward I. Koch and the New York City government are cooperating in the studies.

Ashokan Reservoir, located in the Town of Olive, could provide an estimated 4,000 kw of generating capacity. The anticipated capability of Kensico Reservoir, in the Town of Mount Pleasant, is 2,000 kw.

The combined annual electric production of the two projects would be about 36 million kwh, an amount that otherwise would require burning of at least 60,000 barrels of oil.

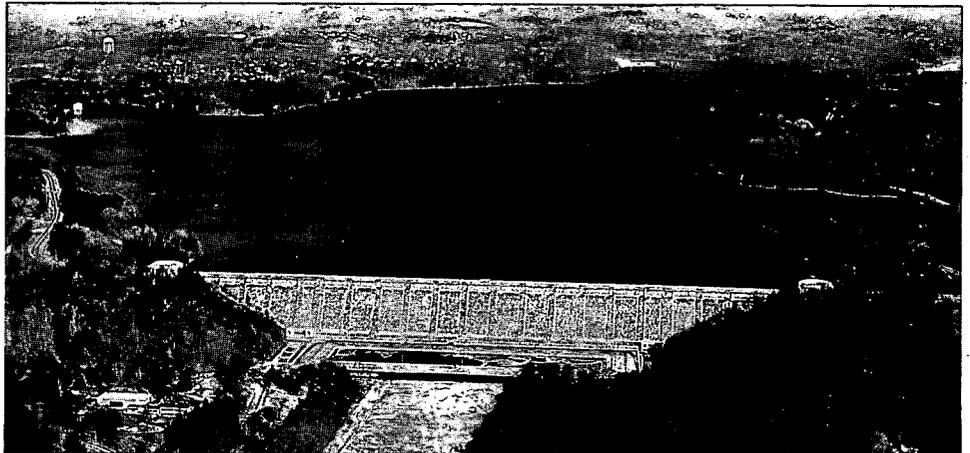
Conceptual plans for both projects provide for turbine-generators to be installed near the heads of the tunnels leading from the reservoirs into the aqueduct systems. No modification to dam structures would be required. Because of the projects' small size, only low-voltage transmission links to existing area lines would be needed.

In addition to its study of the two sites, the Authority is providing technical expertise and part of the funding for a study by the New York State Energy Research and Development Authority of the potential for small hydro-power development in the state.

The one-year study, announced in August 1977, is emphasizing sites with production potential of from 50 to 15,000 kw. Consideration is being given to undeveloped sites and to those which formerly

produced power or were used for other purposes. A major goal is selection of 10 to 20 sites for development as hydroelectric demonstration projects, possibly by 1981.

The Authority is one of the nation's largest producers of hydroelectric power. Its interest in small hydroelectric facilities reflects its belief that such projects can further help to reduce the nation's dangerous dependence on expensive foreign oil. Higher oil prices, as well as development of new types of turbine-generators, have increased the economic and technical feasibility of small-capacity generating plants.



Kensico Reservoir



Ashokan Reservoir

## Energy Conservation

The Authority encourages a reduction in non-essential use of electricity by its municipal system, rural cooperative, governmental and industrial customers.

Authority staff members in 1977 worked with representatives of three of the largest public customers—the City of New York, the Port Authority of New York and New Jersey and the Metropolitan Transportation Authority—to review the extensive conservation efforts each has undertaken.

Other customers also have reported to the Authority on their conservation activities, with particular emphasis on electric power. The reports indicate that electricity is being saved through various means, ranging from reduced use of lights and air conditioners in homes and public buildings to the introduction of more efficient production procedures and devices by industries.

Conservation by retail customers of the municipal systems and cooperatives in New York State who purchase their bulk power supply from the Authority is encouraged in rate design. When acting on requests from these systems for permission to increase rates, the Authority generally requires that percentage increases in the "tail blocks"—the highest levels of energy consumption—be greater than those in lower usage categories.

Wide distribution continues of a folder on energy conservation published by the Authority. Two booklets that discuss conservation also have been distributed.

The Authority is conducting a conservation program that includes decreased lighting and lowered heat levels to reduce energy consumption at its own projects and offices.

## Research and Development Empire State Electric Energy Research Corporation

The Authority is an active member of the Empire State Electric Energy Research Corporation (ESEERCO), which seeks improved methods of generating and transmitting electricity.

The corporation was formed by the state's private electric utility companies and the Authority in 1973 as an extension and restructuring of the former Empire State Atomic Development Associates (ESADA).

Through ESEERCO, the Authority participates in research relating to its programs, including cooling tower design;

air pollution controls; and nuclear reactor, transmission system, and environmental improvements.

## New York State Energy Research and Development Authority

The Authority cooperates with the New York State Energy Research and Development Authority (NYSERDA), whose responsibility is to develop new technologies for production and conservation of energy. The Chairman of the Power Authority serves as an ex-officio member of NYSERDA.

In 1975, the New York State Atomic and Space Development Authority was reconstituted by New York legislation as NYSERDA. The legislation also authorized the Power Authority to construct demonstration projects of new energy technologies that show promise of commercial feasibility.

The Power Authority has been involved with NYSERDA on several research projects including small hydro plants, advanced energy technologies and environmental protection techniques.

## New York Power Pool

Formed in 1966 to coordinate the reliable and economic dispatch of power, the New York Power Pool (NYPP) has expanded its purpose to combine the skills of its members in long-range planning, energy conservation and environmental protection.

The Authority and the state's seven major private utilities are members of the pool, which has headquarters in an automated control center near Albany.

The control center, opened in 1969, uses highly sophisticated equipment to schedule and dispatch power produced by members and imported from outside

the state. It is linked by voice and data communication circuits with members' production control centers and neighboring power pools.

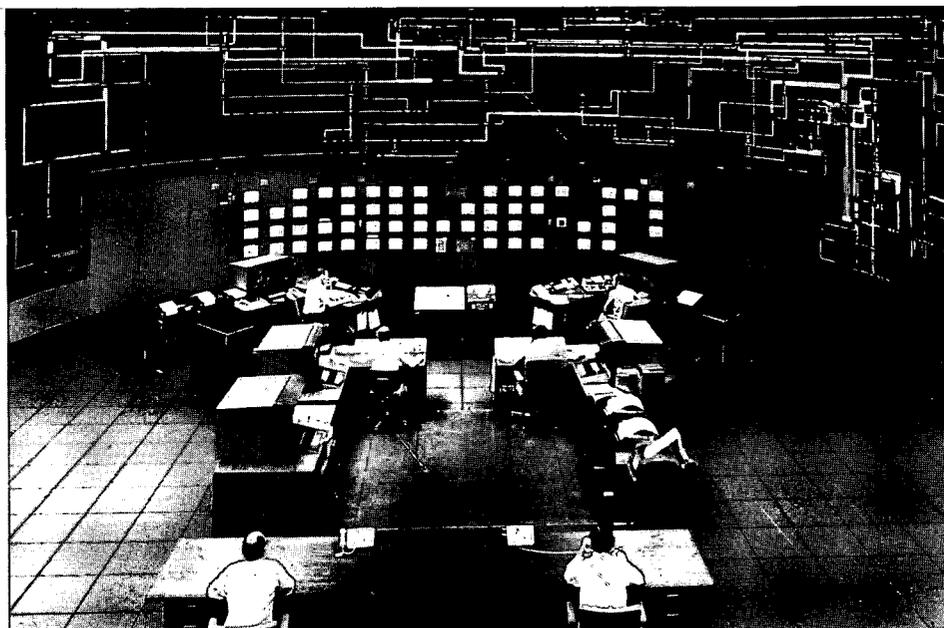
On July 21, 1977, NYPP coordinated generation, import and dispatch of power to meet an all-time record statewide demand of 21,167,000 kw. The previous peak of 20,267,000 kw was reached in 1973.

## Northeast Power Coordinating Council

The Authority is a member of the Northeast Power Coordinating Council (NPCC) and contributes to its goal of improving reliability of electric service. The council is an association of 21 electric power systems in New York, New England and the Canadian Provinces of New Brunswick and Ontario. The members of the council operate generating plants with a capacity of nearly 77 million kw, about 98 percent of the total for the region.

## Great Lakes Commission

The Authority participates in the work of the Great Lakes Commission, an informal consultative body of the eight Great Lakes states—New York, Illinois, Indiana, Michigan, Minnesota, Ohio, Pennsylvania and Wisconsin. The members form a panel for consultations on matters affecting the Great Lakes Basin and provide recommendations to state and federal governments.



New York Power Pool Control Center.

The Authority has been protecting and enhancing the environment since it began construction of its first project, St. Lawrence, in 1954. The program has taken many forms, tailored to the needs of the areas near the power facilities.

### St. Lawrence Project

The Authority's conservation and recreation program for the St. Lawrence Project served as a model for hydroelectric developments throughout the nation. In an area that contained minimal public recreation facilities, the Authority created a complex of parks, wildlife management sanctuaries, marinas, bathing beaches and picnic groves for the enjoyment of millions of visitors and area residents.

Major features include:

- Wilson Hill Waterfowl Management Area, with 3,000 acres, of which 1,900 are under water. It is located near Wilson Hill, a 350-acre promontory into Lake St. Lawrence. Preserved by the Authority under agreement with and managed by the State Department of Environmental



Picnic group at Robert Moses State Park near St. Lawrence Project

Conservation (DEC), it has become a major location for establishment of flocks of wild Canada geese and other water fowl.

- Robert Moses State Park, with 700 acres on Barnhart Island and 1,600 acres on the New York mainland, including picnic areas, camping, trailer sites and scenic overlooks. The park facilities are operated by the Thousand Islands State Park and Recreation Commission. The park is a haven for deer and other wildlife.

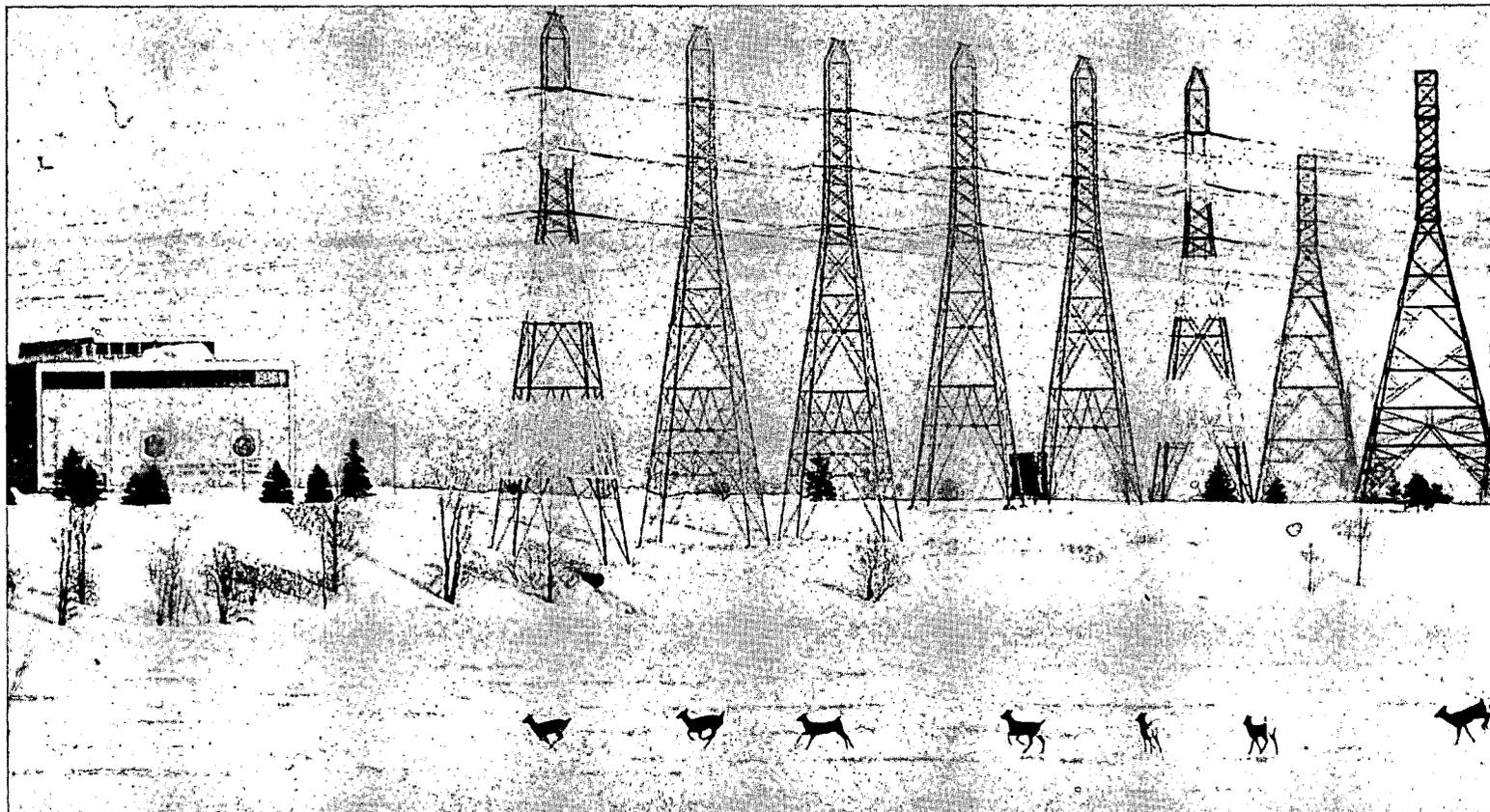
- Barnhart Island Marina, Boat Basin and Picnic Area, a sheltered cove for mooring small craft. Docks, launching ramps and picnicking facilities are located nearby.

- Barnhart Island Beach on the shore of Lake St. Lawrence.

- Hawkins Point Overlook and Boat Launching Ramp on the mainland.

- Coles Creek Marina and Campsite in the Town of Waddington.

- Outdoor recreation facilities for the Towns of Massena, Waddington and



Deer frolic in snow near Moses Plant at St. Lawrence

Lisbon and the Village of Waddington, among them beaches, parks, boat launching ramps and play areas.

- Islands encompassing some 2,700 acres and preserved in their natural state under Authority jurisdiction. They are available for conservation, recreation and wildlife management uses when needed.

### Niagara Project

The Authority's major efforts in the Niagara area were dedicated to the restoration of scenic beauty and construction of public facilities for recreation. The program included:

- Expansion of the Niagara Reservation, the state park at the famed cataracts; extension of the upstream end of Goat Island, situated between the American and Horseshoe Falls; and construction of the American Rapids Bridge between the mainland and Goat Island. These facilities are operated by the Niagara Frontier State Park and Recreation Commission.

- Construction of a 10-mile section of the Robert Moses State Parkway to provide scenic access and bypass a congested industrial district.

- Creation of the 132-acre Reservoir State Park and initial development of recreation, including use of the reservoir embankment for sledding and skiing.

- Provision of access to the Lewiston



Fishing at Lewiston Reservoir

Reservoir for shoreline fishing from designated areas.

- Acquisition of land for the 193-acre Lewiston State Park on which the State Office of Parks and Recreation built Artpark, a major performing arts center.

- Creation of a park near the falls in which the Commission built a geological museum.

- New facilities for the City of Niagara

Falls, including a 144-acre enlargement of Hyde Park, an expanded municipal golf course, the first playground in the downtown area and a sledding hill.

- Financial contributions to the effort to reduce erosion of the Horseshoe Falls.

At Niagara, as at all Authority projects, buildings were designed to present a pleasing appearance and areas were landscaped.

### Blenheim-Gilboa Project

Historic restoration, outdoor recreation, wildlife preservation and scenic enhancement are the bases for the Authority's award-winning program at Blenheim-Gilboa. The program, which received the highest outdoor recreation award of the United States Department of the Interior, included:

- Creation of Mine Kill State Park, with a three-pool swimming complex, picnic areas, playfields, scenic overlooks, hiking trails, and a launching ramp that opens the lower reservoir to boating and fishing. Built by the Authority and transferred to the Saratoga-Capital District State Park and Recreation Commission for operation, it opened in 1973.

- Acquisition of additional land for a wildlife management program to offset any possible loss of wildlife areas.

- Maintenance of Mine Kill Falls in the park area as a natural sanctuary for deer



Barnhart Island beach at Lake St. Lawrence

and small animals that can be explored only by hiking trails.

- Building of an overlook on Route 30 to provide a scenic view of Mine Kill Falls.

- Establishment of a comprehensive cultural, educational and recreational center at the historic Lansing Manor property adjoining the lower reservoir.

- Planting of thousands of trees to improve the scenic quality of the area surrounding major project features.

In August, the Authority completed construction of a new fish pond as part of the public recreational facilities of the Blenheim-Gilboa Project. The 16-acre pond, located about 10 miles northwest of the project in the hamlet of Summit, was stocked with trout by the State DEC, which administers the facility.

### **FitzPatrick Nuclear Plant**

Environmental studies, begun before construction, continue at the FitzPatrick Plant to monitor operations for the protection of the public and the environment. Radiation monitoring stations both on and off the site, a laboratory at the plant area, a meteorological tower and regularly scheduled lake cruises provide detailed information regarding fish and wildlife, air and water quality, and plant life.

The program, undertaken jointly with Niagara Mohawk, owner of a nearby nuclear plant, initially assembled data that was used to design the FitzPatrick Plant in compliance with state and federal regulations.

### **Indian Point 3 Nuclear Plant**

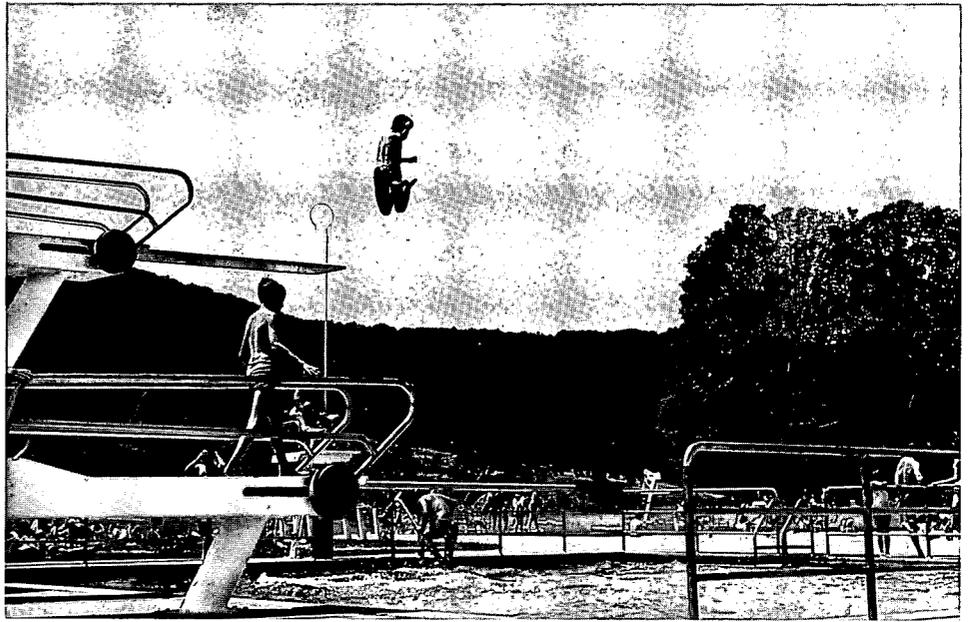
A similar environmental program is underway at Indian Point.

Authority researchers use precision instruments for microscopic examination of samples of plant and animal life in a laboratory on the site, jointly operated by the Authority and Con Edison, owner of Indian Point 1 and 2.

### **Astoria 6 Generating Plant**

Air and water quality are protected in the design and operation of the Astoria 6 Plant. The plant burns low-sulfur, low-residue oil in a boiler specially designed to recirculate heat and gases that might otherwise be released to the environment. The plant's twin stacks are constantly monitored, in part through use of closed-circuit television pictures that are continuously displayed for operators in the control room.

Water to cool the steam from the turbine is taken into the plant condenser



Diver at Mine Kill State Park



Sledding at Lewiston Reservoir hill



Canada geese at Lake St. Lawrence

through a low-velocity intake that prevents fish impingement. The water is returned through underwater ports in a discharge canal engineered to provide rapid dissipation of heat, thus avoiding adverse thermal effects on the East River.

### Transmission

The rights-of-way of the Authority's transmission lines are available for a wide variety of multiple uses.

These include farming, pasturing, recreation, and wildlife management. In addition, the lines pass near parking lots, shopping centers and a motel.

The Authority policy is to acquire permanent easements to build and maintain the lines. The easements permit owners to use the land on the right-of-way for any purpose that does not interfere with reliable line operation and maintenance.

Remodeling of the Niagara Project's Power Vista and opening of the Lansing Manor Museum by the Authority and the Schoharie County Historical Society helped to attract more than 340,000 persons in 1977 to visitors' facilities at and near Authority projects. Cumulative attendance at the centers increased to almost seven million persons.

### Niagara Project

The Niagara Power Vista, crowning the south abutment of the Robert Moses Niagara Power Plant, reopened in late March after a major renovation and updating. The center provides a comprehensive view of energy and Man's use of it since ancient times and looks ahead to future developments.

Outdoor balconies and floor-to-ceiling windows offer breathtaking views of the Niagara River and Gorge 350 feet below.

Thomas Hart Benton's painting of Father Louis Hennepin at Niagara Falls is a feature of the main exhibit floor. Father Hennepin was the first European to write extensively of Niagara Falls. The tercentenary of his visit will be marked in 1978.

A terrain map shows buildings and natural features of the Niagara area, including the Falls and the power projects.

Development of hydraulic power at Niagara, from the first efforts in the 18th Century to the current project, is traced in a museum area that includes artifacts related to historical facilities.

### Blenheim-Gilboa Project

The Lansing Manor Museum was opened in 1977 as the newest component of the historical-educational-cultural complex at the Blenheim-Gilboa Project.



Lansing Manor complex at Blenheim-Gilboa

The museum is operated by the Schoharie County Historical Society under an arrangement with the Authority, which has restored the house to its appearance during the period from 1819 to 1860 when it was one of the area's most hospitable and fashionable homes. The early 19th-Century home of John T. Lansing Jr. is a classic example of late Federal architecture and contains American Empire furniture. The museum is open to visitors during the summer months.

Open year-round is the project visitors' center, housed in a classic barn on the Lansing Manor property, which overlooks the project lower reservoir and powerhouse. The property was acquired for a wildlife management program that is continuing under supervision of the State Department of Environmental Conservation.

The barn contains displays of energy sources of the past, present and future, as well as cultural, historical and environmental exhibits relating to the Schoharie Valley. An observatory offers scenic views of the surrounding area.

The barn also is the location of the Schoharie Valley Field Station of the Atmospheric Sciences Research Center of the State University of New York at Albany, which displays a variety of scientific instruments and provides daily local weather forecasts.

### St. Lawrence Project

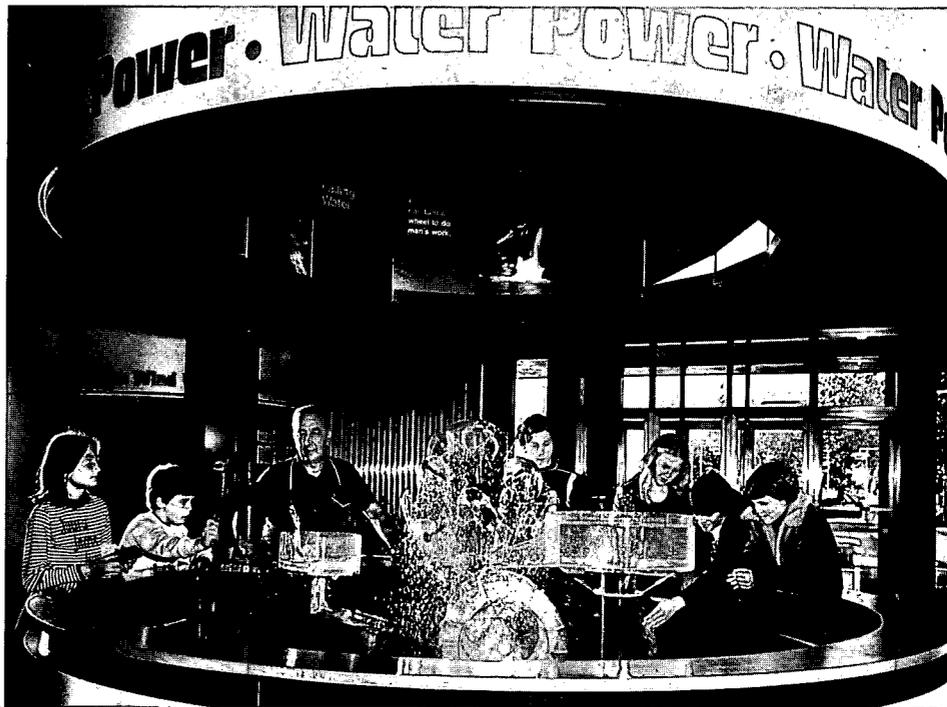
The main exhibit floor of the St. Lawrence Project visitors' center is atop the Robert Moses Power Dam, more than 100 feet above the lower level of the St. Lawrence River. An observation deck provides visitors with views of the surrounding parklands, as well as the Adirondacks, 30 miles away, and eastern Canada.

Dioramas, maps, cutaway working models and films show visitors how the project works and illustrate the rich history of the St. Lawrence Valley.

Two paintings by Thomas Hart Benton and a carved terrain map show the travels of Jacques Cartier on his St. Lawrence River voyages of discovery in 1534.

### FitzPatrick Nuclear Plant

The Authority and Niagara Mohawk



Water-power displays at Niagara Power Vista

jointly operate the Energy Information Center at Nine Mile Point, near the FitzPatrick Plant and Niagara Mohawk's nuclear complex.

Featured at the center are a 40-foot nuclear plant model, which shows how nuclear fission is transformed into electrical energy, and a multi-screen show tracing the history of energy development. Visitors also can witness a simulated nuclear chain reaction in a specially-designed fission chamber display.

Additional information is provided through visitor-operated displays, exhibits on research and conservation, and a three-dimensional model tracing thermal patterns at the FitzPatrick Plant.

### Student Programs

Special educational programs are offered to students from various grade levels at the Authority visitors' centers. During 1977, approximately 6,360 students were provided with programs at the Power Vista, 2,600 at St. Lawrence, 1,890 at Blenheim-Gilboa and 7,000 at Nine Mile Point.

Authority representatives also visited

schools and colleges to present programs on energy subjects.

### Stimulation of Tourism

Authority staff members actively participate in tourism programs that aid local economies by attracting visitors to project areas. The Authority cooperates with and provides assistance to Chambers of Commerce and local, state and federal officials in tourism promotion efforts.

### Publications

Energy conservation, general energy subjects, and the Authority and its programs and projects are covered in a variety of booklets and folders available at Authority visitors' centers and offices.

### Films

The history of the Authority and its projects is told in a 22½-minute color-and-sound film entitled "Electricity . . . for People." It is available for showing on request.

A new film, produced with other Power Pool members, encourages safe practices near electrical facilities. Also available are films on other energy subjects.

# Power Sales and Revenues

## Energy Sales

## Revenues

Year	KWH (1000's)	From Power	From Use of Transmission Facilities	From Wheeling Charges	From Gilboa Pumped Storage Services	Total
1968	20,796,780	\$ 91,595,592	\$4,338,799	\$ 1,453,096	\$	\$ 97,387,487
1969	22,234,733	96,508,443	4,339,810	1,739,241		102,587,494
1970	20,882,750	93,208,530	4,375,523	1,877,987		99,462,040
1971	21,130,429	93,950,742	4,414,332	2,014,484		100,379,558
1972	22,705,862	98,582,787	4,509,747	2,233,729		105,326,263
1973	24,803,717	106,627,339	4,611,265	2,481,194	4,816,085	118,535,883
1974(A)	24,597,450	105,994,911	4,632,214	2,619,917	17,854,709	131,101,751(C)
1975(B)	26,324,431	116,409,805	4,757,857	2,921,949	19,274,381	143,363,992
1976(D)	30,396,937	177,206,865(E)	5,050,707	16,157,711(F)	20,498,088	218,913,371(G)
1977(H)	33,280,833	296,717,073	5,502,923	93,792,057	18,728,498	414,740,551

(A) First full year with full capacity at Blenheim-Gilboa Project.

(B) First commercial operation of FitzPatrick Nuclear Plant.

(C) Includes inter-project sales with the 1970 Project.

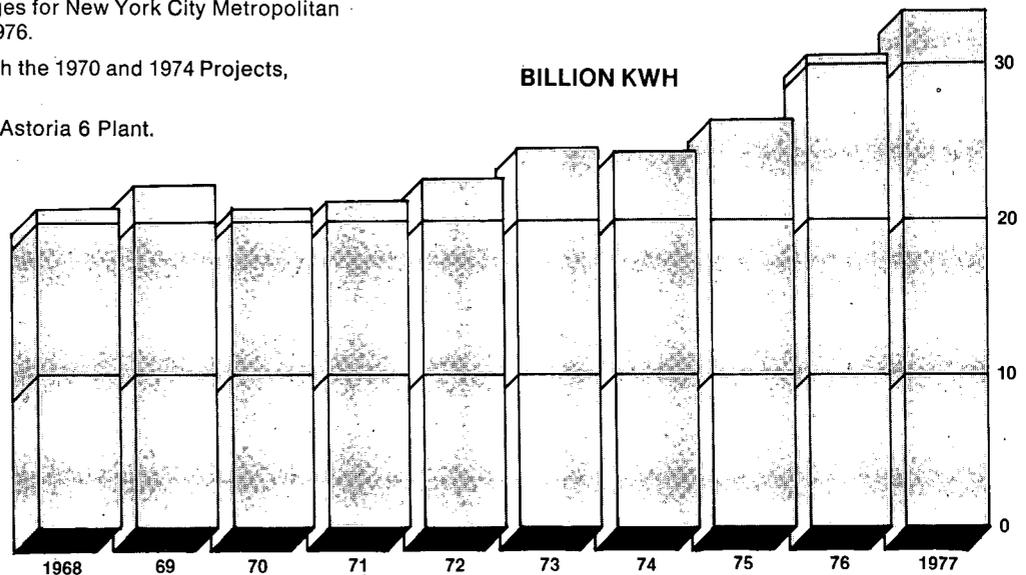
(D) First commercial operation of Indian Point 3 Nuclear Plant.

(E) Includes sales of purchased power beginning in 1976.

(F) Includes delivery service charges for New York City Metropolitan Area customers beginning in 1976.

(G) Includes inter-project sales with the 1970 and 1974 Projects, beginning in 1976.

(H) First commercial operation of Astoria 6 Plant.



### Customers Served Directly with Power from Hydroelectric Projects

Village of Akron  
 Village of Andover  
 Village of Angelica  
 Village of Arcade  
 Village of Bath  
 Village of Bergen  
 Village of Boonville  
 Village of Brocton  
 Village of Castile  
 Village of Churchville  
 Village of Endicott  
 Village of Fairport  
 Village of Frankfort  
 Village of Freeport  
 Village of Greenport  
 Village of Groton  
 Village of Hamilton  
 Village of Holley  
 Village of Ilion  
 City of Jamestown  
 Lake Placid Village, Inc.  
 Village of Little Valley  
 Village of Marathon  
 Village of Mayville  
 30

Village of Mohawk  
 Village of Penn Yan  
 Village of Philadelphia  
 City of Plattsburgh  
 Village of Richmondville  
 Village of Rockville Centre  
 Village of Rouses Point  
 City of Salamanca  
 Village of Sherburne  
 City of Sherrill  
 Village of Silver Springs  
 Village of Skaneateles  
 Village of Solvay  
 Village of Spencerport  
 Village of Springville  
 Village of Theresa  
 Village of Tupper Lake  
 Village of Watkins Glen  
 Village of Wellsville  
 Village of Westfield

Allegheny Electric Cooperative, Inc.  
 Delaware County Electric Cooperative, Inc.  
 Oneida-Madison Electric Cooperative, Inc.  
 Otsego Electric Cooperative, Inc.

Steuben Rural Electric Cooperative, Inc.  
 Aluminum Company of America  
 General Motors Corporation  
 Reynolds Metals Company  
 United States Air Force  
 Public Service Board of the State of Vermont  
 New York State Electric & Gas Corporation  
 Niagara Mohawk Power Corporation  
 Rochester Gas and Electric Corporation

### Blenheim-Gilboa Pumped Storage Project

Central Hudson Gas and Electric Corporation\*  
 New York State Electric & Gas Corporation  
 Niagara Mohawk Power Corporation  
 Rochester Gas and Electric Corporation

\* Central Hudson's share of Blenheim-Gilboa capacity has been assigned to New York State Electric & Gas Corp. on a temporary basis.

## Industry Served Indirectly with Niagara Project Power

### Replacement Power:

The Power Authority is required by Federal law to supply 445,000 kilowatts of its low cost firm power to the Niagara Mohawk Power Corporation to replace low cost power previously obtained from the Company's Adams and Schoellkopf Plants at Niagara Falls. This power is largely resold to designated industries at the Power Authority's wholesale firm power rate plus a transmission charge and such state and local revenue taxes as are applicable. The following industries were supplied during the year with this low cost power. The average amount allocated was 336,000 kw.

Airco Alloys Division, Airco, Inc.  
Airco Speer Carbon-Graphite Division,  
Airco, Inc.

Allied Chemical Corporation

American Standard, Inc.

Anaconda-Brass Division,

Anaconda Company

Atlas Steel Casting Company

Bethlehem Steel Corporation

Buffalo Forge Company

The Carborundum Company

Donner-Hanna Coke Corporation

Dresser Transportation Equipment

Division, Dresser Industries, Inc.

Dunlop Tire & Rubber Corporation

E. I. duPont de Nemours & Company  
Inc.

FMC Corporation Industrial Chemical  
Division

General Abrasive Company, Inc.

General Mills, Inc.

Great Lakes Carbon Corporation

Hooker Chemicals & Plastics

Corporation

International Multi-Foods Corporation

International Paper Company

Nabisco, Inc.

Niagara Falls Water Treatment Plant

Nitec Paper Corporation

Olin Corporation

The Pillsbury Company

The Prestolite Company Division,

Eltra Corporation

Republic Steel Corporation

Spaulding Fibre Company, Inc.

Stauffer Chemical Company

TAM Division, NL Industries

Union Carbide Corporation

### Expansion Power:

The Power Authority has allocated all of the 250,000 kilowatts of Niagara Project firm power reserved for sale to industries within thirty miles of the Niagara Project. This power is sold to local utility companies and by them to industries which require low cost power to enable them to expand operations or to establish new industries in the Niagara Frontier area.

Allocations of expansion power were provided during the year to the industries listed below:

Airco Alloys Division, Airco, Inc.

Airco Industrial Gases Division,  
Airco, Inc.

Airco Speer Carbon-Graphite Division,  
Airco, Inc.

Arcata Graphics Corporation  
Bethlehem Steel Corporation  
The Carborundum Company  
Donner-Hanna Coke Corporation  
E. I. duPont de Nemours & Company,  
Inc.

General Mills, Inc.

General Motors Corporation-Harrison  
Radiator Division

Graphite Products Division,

The Carborundum Company

Great Lakes Carbon Corporation

Hooker Chemicals & Plastics  
Corporation

International Multi-Foods Corporation  
Moog, Inc.

Nitec Paper Corporation

Olin Corporation

The Pillsbury Company

Pyron Company Division, Amax Inc.

Republic Steel Corporation

Spaulding Fibre Company, Inc.

TAM Division, NL Industries

Union Carbide Corporation

### Customers Served with Power from James A. FitzPatrick Nuclear Power Plant

Aluminum Company of America

Hooker Chemicals & Plastics  
Corporation

Air Products & Chemicals Inc.

Reynolds Metals Company

Airco Industrial Gases Division,  
Airco, Inc.

Airco Speer Carbon-Graphite Division,  
Airco, Inc.

Burdox, Inc.

E. I. duPont de Nemours & Company,  
Inc.

Dresser Transportation Equipment  
Division, Dresser Industries, Inc.

Olin Corporation

Airco Alloys Division, Airco, Inc.

Central Hudson Gas and Electric  
Corporation

Consolidated Edison Company of  
New York, Inc.

Long Island Lighting Company

New York State Electric & Gas

Corporation

Niagara Mohawk Power Corporation

Orange and Rockland Utilities, Inc.

Rochester Gas and Electric  
Corporation

### Customers Served During 1977 with Power from the Indian Point 3 Nuclear Power Plant and Astoria 6 Generating Plant

Village of Ardsley

Bedford Central School District

Village of Briarcliff Manor

Briarcliff Manor Union Free School  
District

Village of Bronxville

Village of Buchanan

Byram Hills Central School District

Chappaqua Central School District

Town of Cortlandt

Village of Croton-on-Hudson

Croton Harmon Union Free School  
District

Village of Dobbs Ferry

Town of Eastchester

Eastchester Union Free School District  
Village of Elmsford  
Town of Greenburgh  
Greenburgh Housing Authority  
Town of Harrison  
Village of Hastings-on-Hudson  
Hendrick Hudson School District  
Village of Irvington  
Lakeland Central School District  
Village of Larchmont  
Town of Mamaroneck  
Village of Mamaroneck  
Mamaroneck Union Free School District  
Metropolitan Transportation Authority  
Montrose Improvement District  
Village of Mount Kisco  
Town of Mount Pleasant  
Mount Pleasant Central School District  
City of Mount Vernon  
Mount Vernon City School District  
Town of New Castle  
City of New Rochelle  
New Rochelle Municipal Housing  
Authority

City of New York

New York City Housing Authority

Office of General Services, New York  
State

Town of North Castle

Village of North Tarrytown

North Tarrytown Housing Authority

Town of Ossining

Village of Ossining

Ossining Union Free School District

City of Peekskill

Village of Pelham

Village of Pelham Manor

Pelham Union Free School District

Village of Pleasantville

Pleasantville Union Free School District

Port Authority of New York and  
New Jersey

Village of Port Chester

Port Chester Housing Authority

Port Chester-Rye Union Free School  
District

City of Rye

Town of Rye

Rye Neck Union Free School District

Village of Scarsdale

Scarsdale Union Free School District

Village of Tarrytown

Union Free School of the Tarrytowns

Thornwood Water District

Village of Tuckahoe

Tuckahoe Housing Authority

Tuckahoe Union Free School District

Valhalla Union Free School District

Westchester County

Westchester Joint Water Works

Westchester, Southern Board of  
Cooperative Educational Services

City of White Plains

White Plains City School District

White Plains Housing Authority

City of Yonkers

Yonkers Housing Authority

Town of Yorktown

Consolidated Edison Company of  
New York, Inc.

The Indian Point 3 Plant began com-  
mercial operation on August 30, 1976.

The Astoria 6 Plant began commercial  
operation on March 7, 1977.

## Finances

### 1977 Activity

A total of \$1.260 billion of bonds have been issued to finance projects under the General Purpose Bond Resolution since its adoption in late 1974. Included in this amount is \$200 million of general purpose bonds which were sold on January 25, 1977 to finance a portion of the costs of acquiring and completing the Astoria 6 Plant and the Indian Point 3 Nuclear Plant, as well as a portion of the construction cost of the Massena-Marcy 765-kv Transmission Line and the Greene County Nuclear Plant. In addition, \$20 million of the \$60 million promissory notes issued in 1976 were repaid, while the \$200 million of promissory notes issued in 1975 and due in 1978 and 1980 remain outstanding.

In October 1977, a financing arrangement was completed with two New York banks under which the Authority may finance the purchase of up to \$50 million of natural uranium concentrates for use as nuclear fuel.

Payments for the fuel will commence 18 months after delivery and will consist of three semi-annual installments. Interest is computed as a fraction of the prime rate in effect from time to time. As of December 31, 1977, the Authority had purchased \$23.7 million of nuclear fuel under the arrangement.

### Revenues

#### General Revenue Bond Resolution of 1954

The Niagara and St. Lawrence Projects produced revenues of \$108.489 million during 1977, of which \$23.460 million were applied to the operating fund and \$11.850 million to the improvement fund under the General Revenue Bond Resolution.

Interest of \$12.679 million was paid on general revenue bonds and \$42.902 million of bonds were retired at a cost of \$42.275 million, including \$4.818 million resulting from acceptance of offers received in response to the Authority's invitation to tender published in October

1977. At January 1, 1978, \$305.441 million bonds remained outstanding. The Authority continues to meet the requirements of the General Revenue Bond Resolution and to maintain a favorable position with respect to the schedule of General Revenue bond retirements required under the Revenue Bond Resolution adopted in 1970.

#### Revenue Bond Resolution of 1970

The FitzPatrick Nuclear Plant and the Blenheim-Gilboa Pumped Storage Project, constructed under the Revenue Bond Resolution, produced revenues of \$74.793 million in 1977. Deductions of \$54.216 million were made for expenses and \$20.577 million, together with \$23.206 million from the bond reserve account, were applied to the payment of interest on bonds, meeting the bond service requirements of the Revenue Bond Resolution. Due primarily to increased costs of operating and maintaining the FitzPatrick Plant, a rate increase became necessary and was approved by the Authority in September 1977. The revised rates, which became effective in December 1977 and increased the FitzPatrick Plant's monthly demand charge from \$3.00 to \$6.50 per kilowatt, are expected to provide adequate revenues to meet the requirements of the Revenue Bond Resolution after providing for operating and maintenance expenses.

#### General Purpose Bond Resolution of 1974

On February 28, 1977, the Astoria 6 Plant was designated as completed. After that date, under the General Purpose Bond Resolution, revenues from the plant were added to those received from the Indian Point 3 Plant completed in 1976. In 1977 these revenues totalled \$247.197 million, from which deductions of \$156.174 million were made for operating expenses. Interest of \$79.151 million was paid and \$11.872 million were deposited in the bond reserve account to meet the requirements of the General Purpose Bond Resolution.

# Financial Statements

## Statement of Condition December 31, 1977 (in thousands)

Assets	1954 Project	1970 Project	General Purpose	Total
Electric Plant (Note B):				
In service	\$1,099,459	\$570,809	\$ 881,020	\$2,551,288
Construction work in progress	29,660	910	246,018	276,588
Nuclear fuel (net of amortization)		39,295	86,755	126,050
Total electric plant	1,129,119	611,014	1,213,793	2,953,926
Cash (includes time deposits)	41,201	1,479	102,176	144,856
Investment in U.S. Government securities, at cost (\$361,356 principal amount— Note B)	99,285	61,163	200,907	361,355
U.S. Government securities purchased under agreements to resell, at cost	930	3,855	3,225	8,010
Interest receivable on investments and time deposits	2,205	3,133	5,472	10,810
Receivables—customers	17,649	9,272	13,245	40,166
Materials and supplies (at average cost)	2,405	1,771	3,180	7,356
Prepayments and other assets	1,370	510	6,327	8,207
Preliminary investigations			40,334	40,334
Intra Authority balances	10,883	(1,903)	(8,980)	
	<u>\$1,305,047</u>	<u>\$690,294</u>	<u>\$1,579,679</u>	<u>\$3,575,020</u>
<b>Liabilities and Other Credits</b>				
Bonds outstanding (Note F)	\$ 305,441	\$734,000	\$1,260,000	\$2,299,441
Promissory notes payable (Note D):				
Short-term			170,000	170,000
Long-term			70,000	70,000
Fuel financing payable (Note D)			23,737	23,737
Retained on contracts	802	446	7,841	9,089
Accounts payable and accrued liabilities	7,945	12,006	39,043	58,994
Deferred credits—advance estimated billings			13,501	13,501
	<u>314,188</u>	<u>746,452</u>	<u>1,584,122</u>	<u>2,644,762</u>
Bonds Retired From:				
Bond service	259,594			259,594
Bond reserve	280,542			280,542
General reserve	256,473			256,473
	<u>796,609</u>			<u>796,609</u>
Revenues Allocated To:				
Bond service	8,930	3,649	7,127	19,706
Bond reserve	27,911		14,670	42,581
General reserve	61,043			61,043
Insurance and improvement fund	27,639			27,639
Working capital	29,525	(1,053)	9,492	37,964
Additions to electric plant	39,202	2,628	710	42,540
Fuel reserve		14,018	2,894	16,912
	<u>194,250</u>	<u>19,242</u>	<u>34,893</u>	<u>248,385</u>
Bond proceeds used to provide interest and fuel		(75,400)	(39,336)	(114,736)
	<u>194,250</u>	<u>(56,158)</u>	<u>(4,443)</u>	<u>133,649</u>
	<u>\$1,305,047</u>	<u>\$690,294</u>	<u>\$1,579,679</u>	<u>\$3,575,020</u>

The accompanying notes are an integral part of these financial statements.

**1954 Project**

**Summary of Funds—1977**

(in thousands)

	Revenue	Operating	General Con- struc- tion	General*			Insur- ance & Improve- ment
				Bond Service	Bond Reserve	General Reserve	
<b>Available Funds January 1, 1977</b>	\$ —0—	\$19,910	\$230	\$ 2,967	\$35,244	\$36,690	\$27,238
<b>Cash Receipts:</b>							
Sale of power, transmission and wheeling charges	100,804						
Earnings on investments and time deposits	7,591		11				
Lease of property	94						
Administrative expenses reimbursed from other funds—prior year		9,138					
Other, net			86				
<b>Total Receipts</b>	<u>108,489</u>	<u>9,138</u>	<u>97</u>				
<b>Total Available</b>	108,489	29,048	327	2,967	35,244	36,690	27,238
Transfer of funds—Revenue	(108,489)	23,460		34,232	13,693	37,104	
—Other						(11,850)	11,850
	<u>\$ —0—</u>	<u>52,508</u>	<u>327</u>	<u>37,199</u>	<u>48,937</u>	<u>61,944</u>	<u>39,088</u>
<b>Cash Disbursements:</b>							
Interest on bonds				12,679			
Retirement of bonds:							
Term (\$33,357 principal amount)				12,335	12,665	7,732	
Serial (\$9,545 principal amount)				9,326	214	3	
Operations and maintenance		16,598					
Purchased power		164					
Wheeling charges		3,560					
Construction costs including additions to electric plant in service		520	2				11,850
Administrative expenses allocated to other funds		10,883					
<b>Total Disbursements</b>		<u>31,725</u>	<u>2</u>	<u>34,340</u>	<u>12,879</u>	<u>7,735</u>	<u>11,850</u>
<b>Available Funds December 31, 1977</b>		<u>\$20,783</u>	<u>\$325</u>	<u>\$ 2,859</u>	<u>\$36,058</u>	<u>\$54,209</u>	<u>\$27,238</u>
Distributed as follows:							
Demand deposits		\$ 924	\$ 5	\$ 6	\$ 2	\$ 4	\$ 2
Time deposits		12,710	320			14,720	12,508
Investment in U.S. Government securities		6,219		2,853	36,056	39,429	14,728
U.S. Government securities purchased under agreements to resell		930					
Accrued interest purchased						56	
<b>Totals</b>		<u>\$20,783</u>	<u>\$325</u>	<u>\$ 2,859</u>	<u>\$36,058</u>	<u>\$54,209</u>	<u>\$27,238</u>

\*In the hands of the Bond Trustee.

The accompanying notes are an integral part of these financial statements.

**1970 Project**

**Summary of Funds—1977**

(in thousands)

	Revenue	Operating	Nuclear Fuel Reserve	Construction	General*	
					Bond Service	Bond Reserve
<b>Available Funds January 1, 1977</b>	<u>\$ —0—</u>	<u>\$ 417</u>	<u>\$4,861</u>	<u>\$6,636</u>	<u>\$ —0—</u>	<u>\$85,581</u>
<b>Cash Receipts:</b>						
Sale of power, transmission and wheeling charges	68,860					
Earnings on investments and time deposits	5,933			162		
<b>Total Receipts</b>	<u>74,793</u>			<u>162</u>		
<b>Total Available</b>	<u>74,793</u>	<u>417</u>	<u>4,861</u>	<u>6,798</u>		<u>85,581</u>
Transfer of funds—Revenue	(74,793)	49,746	4,470		20,577	
—Other					23,206	(23,206)
	<u>\$ —0—</u>	<u>50,163</u>	<u>9,331</u>	<u>6,798</u>	<u>43,783</u>	<u>62,375</u>
<b>Cash Disbursements:</b>						
Interest on bonds					43,783	
Operations and maintenance (Note B-5)		39,023				
Administrative expenses transferred from 1954 Project		1,612		476		
Purchased power		4,245				
Wheeling charges		645				
Construction costs including additions to electric plant in service (Note B-5)		764	9,199	6,206		
<b>Total Disbursements</b>		<u>46,289</u>	<u>9,199</u>	<u>6,682</u>	<u>43,783</u>	
<b>Available Funds December 31, 1977</b>		<u>\$ 3,874</u>	<u>\$ 132</u>	<u>\$ 116</u>	<u>\$ —0—</u>	<u>\$62,375</u>
Distributed as follows:						
Demand deposits		\$ 19	\$ 5	\$ 26		\$ 4
Time deposits				90		1,335
Investment in U.S. Government securities			127			61,036
U.S. Government securities purchased under agreements to resell		3,855				
<b>Totals</b>		<u>\$ 3,874</u>	<u>\$ 132</u>	<u>\$ 116</u>		<u>\$62,375</u>

\*In the hands of the Bond Trustee.

The accompanying notes are an integral part of these financial statements.

**General Purpose**  
**Summary of Funds—1977**  
(in thousands)

	Revenue	Operating	Fuel Reserve	Construction	
				Astoria 6	Indian Point 3
<b>Available Funds January 1, 1977</b>	\$ —0—	\$ 18,578	\$ —0—	\$32,012	\$60,987
<b>Cash Receipts:</b>					
Sale of power, transmission, wheeling and other charges	240,408				
Earnings on investments and time deposits	6,789			2,968	2,715
Sale of general purpose bonds				31,570	19,662
Accrued interest on bonds sold				58	
<b>Total Receipts</b>	<u>247,197</u>			<u>34,596</u>	<u>22,377</u>
<b>Total Available</b>	247,197	18,578		66,608	83,364
Transfer of funds—Revenue	(247,197)	142,661	13,513		
—Other			21,057	(17,132)	(3,692)
	<u>\$ —0—</u>	<u>161,239</u>	<u>34,570</u>	<u>49,476</u>	<u>79,672</u>
<b>Cash Disbursements:</b>					
Interest on bonds and notes					
Payment of semi-annual installment of 5¼ % promissory notes					20,000
Construction costs including additions to electric plant in service		707	31,790	33,277	21,623
Operations and maintenance		26,492			
Administrative expenses transferred from 1954 Project		350		1,122	1,105
Purchased power		18,534			
Wheeling and cycle conversion charges		82,339			
Financing costs				795	380
Preliminary investigations					
Interest on notes to be reimbursed by Operating Fund in 1978					3,162
<b>Total Disbursements</b>		<u>128,422</u>	<u>31,790</u>	<u>35,194</u>	<u>46,270</u>
<b>Available Funds December 31, 1977</b>		<u>\$ 32,817</u>	<u>\$ 2,780</u>	<u>\$14,282</u>	<u>\$33,402</u>
Distributed as follows:					
Demand deposits	\$ 2	\$ 21	\$ 17	\$ 4	\$ 4
Time deposits	18,265	2,525	14,010	1,095	1,095
Investment in U.S. Government securities	13,050	234		31,183	31,183
U.S. Government securities purchased under agreements to resell	1,500			255	1,120
<b>Totals</b>		<u>\$ 32,817</u>	<u>\$ 2,780</u>	<u>\$14,282</u>	<u>\$33,402</u>

\* In the hands of the Bond Trustee.  
The accompanying notes are an integral part of these financial statements.

Construction		General*				Note Proceeds Account
Greene County	Massena- Marcy Line	Projects' Study	Temporary Interest	Bond Service	Bond Reserve	
\$19,083	\$26,757	\$24,100	\$14,715	\$—0—	\$ 93,961	\$22,064
3,308	4,461	1,073				1,089
47,417	59,184		29,113		13,054	
93	108			31		
50,818	63,753	1,073	29,113	31	13,054	1,089
69,901	90,510	25,173	43,828	31	107,015	23,153
		(233)		79,151	11,872	
69,901	90,510	24,940	43,828	79,182	118,887	23,153
			25,017	79,182		6,784
27,389	60,819					
1,014	884	514				
1,147	1,340					8
		15,435				7,841
29,550	63,043	15,949	25,017	79,182		14,633
\$40,351	\$27,467	\$ 8,991	\$18,811	\$—0—	\$118,887	\$ 8,520
\$ 6	\$ 10		\$ 2		\$ 5	\$ 14
18,815	21,070	\$ 5,320	950		12,220	7,825
21,530	6,387	3,321	17,859		106,662	681
		350				
\$40,351	\$27,467	\$ 8,991	\$18,811		\$118,887	\$ 8,520

**Revenues and Disposition of Revenues—1977**  
(in thousands)

	<u>1954 Project</u>	<u>1970 Project</u>	<u>General Purposes</u>
<b>Revenues</b>			
Power Sales			
Demand charges	\$ 35,408	\$42,582	\$ 86,13
Energy charges	59,003	27,626	63,39
Other	1,060		24
	<u>95,471</u>	<u>70,208</u>	<u>149,76</u>
Transmission charges	4,762	741	
Wheeling and cycle conversion charges	3,471	750	89,57
Earnings on investments and time deposits	7,941	6,389	10,12
Lease of property	94		
	<u>\$111,739</u>	<u>\$78,088</u>	<u>\$249,45</u>
<b>Disposition of Revenues</b>			
Operating expenses			
Operations	\$ 12,837	\$15,812	\$ 20,67
Fuel consumed		\$ 9,084	\$34,810
Less: Provided from initial fuel supplies		<u>9,084</u>	<u>34,810</u>
Maintenance (Note B)	4,955	26,943	9,03
Purchased power	164	5,398	21,93
Wheeling and cycle conversion charges	3,471	750	89,57
Replacement of electric plant	101	24	
Interest on long-term debt	12,432	45,404	91,79
Less: Provided from bond reserve		<u>22,659</u>	22,745
Retirement of bonds	61,481		
Additions to (reduction in)			
Electric plant	12,944	1,599	70
Fuel reserve		6,139	2,89
Bond reserve			11,92
Accumulated working capital	3,354	(1,322)	92
	<u>\$111,739</u>	<u>\$78,088</u>	<u>\$249,45</u>

The accompanying notes are an integral part of these financial statements.

## Statement of Receipts and Disbursements—1977

(in thousands)

<b>Cash Balance January 1, 1977</b>	<u>\$ 99,739</u>
<b>Cash Receipts:</b>	
Sale of power, transmission, wheeling and other charges	410,072
Earnings on investments and time deposits	36,101
Lease of property	94
Sale of General Purpose Bonds—Series F	200,000
Accrued interest on bonds sold	290
Sale of investments, net	64,418
Other, net	86
<b>Total Receipts</b>	<u>711,061</u>
<b>Total Cash Available</b>	<u>810,800</u>
<b>Cash Disbursements:</b>	
Interest on bonds and notes	178,448
Retirement of 1954 Project bonds:	
Term (\$33,357 principal amount)	32,732
Serial (\$9,545 principal amount)	9,543
Repayment of semi-annual installment of 5¾ % promissory notes	20,000
Operations and maintenance	90,934
Purchased power	22,943
Wheeling and cycle conversion charges	86,544
Construction costs including additions to electric plant	163,158
Fuel	40,989
Financing costs	3,670
Preliminary investigations	15,435
Purchase of U.S. Government securities purchased under agreements to resell, net	1,541
Interest purchased, net	7
<b>Total Disbursements</b>	<u>665,944</u>
<b>Cash Balance December 31, 1977</b>	<u>\$144,856</u>

The accompanying notes are an integral part of these financial statements.

**Note A—General**

Power Authority of the State of New York is a body corporate and politic, a political subdivision and a corporate municipal instrumentality of the State of New York created by the Legislature of the State by Chapter 722 of the Laws of 1931, approved April 27, 1931, and last amended by Chapter 482 of the Laws of 1976.

Properties and income of the Authority are exempt from taxation. However, the Authority is authorized by Chapter 908 of the Laws of 1972 to enter into agreements to make payments in lieu of taxes with respect to property acquired for any project where such payments are based solely on the value of real property without regard to any improvement thereof by the Authority and where no bonds to pay any costs of such project were issued prior to January 1, 1972.

**Note B—Accounting Policies**

(1) Accounts of the Authority are maintained in accordance with the Uniform System of Accounts as prescribed by the Federal Energy Regulatory Commission, adapted to provisions of the Authority's bond resolutions.

(2) Electric plant in service and construction work in progress consist primarily of amounts expended to construct, acquire and complete, and place in operation the generating, transmission and related plant facilities of the Authority. Such expenditures include, in accordance with the bond resolutions, net bond discount and financing costs incurred in the issuance of bonds and notes, interest on bonds and notes (less interest income on unexpended funds), and revenues received for power produced net of expenditures incurred in operating the plant prior to the date of completion. Electric plant in service and construction work in progress are stated at initial cost and include the cost of additions financed from operating revenues. The source of funds used to finance such plant expenditures to December 31, 1977 are as follows:

1954 Project	
General Revenue Bonds	\$1,089,916,827
Operating Revenues	39,202,273
	<u>\$1,129,119,100</u>
1970 Project	
Revenue Bonds	\$ 569,090,571
Operating Revenues	2,628,492
	<u>\$ 571,719,063</u>
General Purpose Projects	
General Purpose Bonds	
and Sale of Notes	\$1,126,327,869
Operating Revenues	709,800
	<u>\$1,127,037,669</u>

(3) The amortization of nuclear fuel is

provided on a unit of production basis. Rates are determined and periodically revised to amortize the costs of nuclear fuel over its useful life. Due to the uncertain future of the nuclear fuel reprocessing industry and the absence of government approvals for reprocessing and plutonium recycling, the Authority is estimating no value for residual credits or costs for future nuclear fuel reprocessing. Cumulative amortization of nuclear fuel at December 31, 1977, totalled \$21,284,000 for the 1970 Project and \$24,410,000 for the General Purpose projects.

(4) The 1970 resolution and the General Purpose resolution provide for a fuel reserve account as a part of the Operating Fund established by each resolution. Each of the resolutions provides that in addition to the initial fuel requirements funded from bond proceeds, sufficient amounts from revenues be deposited in the account to enable the Authority to pay the cost of fuel as it becomes payable. Operating expenses are to be charged for the amount of fuel consumed subsequent to the use of the initial fuel supplies which include, in the case of nuclear fuel, the first reload.

(5) On the basis of an analysis completed in 1977, certain contract services, rendered prior to 1977 in connection with the FitzPatrick Nuclear Plant, aggregating \$8,370,000, originally disbursed from the Construction Fund and recorded as construction costs, have been charged to 1970 Project maintenance expense. During 1977, \$5,218,000 of this amount was reimbursed to the Construction Fund from the Operating Fund.

(6) Amounts disbursed from the Projects' Study Fund for preliminary investigations of a project are transferred to construction work in progress upon the identification and issuance of the initial series of bonds for a project under the General Purpose resolution.

(7) The Authority's bond resolutions provide that operating expenses shall not include any provision for depreciation, amortization or similar charges. Effective recovery of investment in facilities is accomplished through allocation of available revenues to funds for the retirement of bonds at cost. Any excess of principal amount over the cost of bonds retired is used for additional bond retirements. The cost of facility replacement is treated as an operating expense.

(8) In accordance with the Authority's bond resolutions all revenues, as defined, are required to be paid into a revenue fund established under each of the resolutions on and after completion or the latest estimated date of completion of

each project, whichever is earlier.

(9) Funds for the payment of interest on all bond indebtedness due and payable on January 1, 1978 were deposited with each of the Bond Trustees prior to December 31, 1977, and accordingly there is no liability reflected in the accompanying statements.

(10) The aggregate market value of investments in securities, at December 31, 1977, based upon published bid prices, amounted to \$361,600,000.

(11) Employees of the Authority are members of the New York State Employees' Retirement System. For personnel who became members of the System prior to July 1, 1976, the Authority contributes the entire amount determined by the System to be payable. Effective January 1, 1977, personnel who became members of the System July 1, 1976 and thereafter deposit three percent of gross salary, with the Authority contributing the balance payable to the System for these employees. Pension costs for the year ended December 31, 1977 of \$3,479,000 are based on billings received from the System. The Authority's employees are also covered by the Federal Insurance Contributions Act (Social Security).

(12) Sales and purchases of power between generating facilities financed under the same bond resolution have been eliminated in the presentation of revenues and operating expenses.

(13) Customers' meters are read and bills are rendered on a monthly cycle basis. This system of billing results in earned but unbilled revenues for services provided which have been accrued to December 31, 1977.

**Note C—Bond Resolutions**

The Authority has adopted the following resolutions:

**1954 Project**

A General Revenue Bond Resolution adopted on December 21, 1954 (the 1954 resolution), provides that revenues from the Niagara and St. Lawrence power plants and related transmission lines (the 1954 Project), in excess of operating expenses and working capital and necessary reserves therefor are first applied to the payment of bond service (interest and principal installments due on outstanding bonds); then a sum equal to forty percent of each year's bond service is set aside in a bond reserve account (the amount in such account above the next year's bond service is used to retire bonds); any remaining revenues are deposited in a general reserve account to be used for the retirement of bonds or paid to the Authority for deposit in an insurance fund or an improvement fund. A total of

\$1,102,050,000 principal amount of bonds was issued under the 1954 resolution, of which \$305,441,000 remain outstanding at December 31, 1977. No additional bonds may be issued under the 1954 resolution.

### **1970 Project**

A Revenue Bond Resolution adopted as of June 15, 1970 (the 1970 resolution), provides that proceeds from the sale of bonds for the Blenheim-Gilboa Pumped Storage Project, the FitzPatrick Nuclear Plant and the FitzPatrick-Edic Transmission Line (the 1970 Project), be sufficient to provide for construction costs, to pay interest during the construction period and to deposit in the bond reserve account a bond reserve requirement of two years' interest. Amounts in the bond reserve account are applied by the Bond Trustee monthly to meet any deficiency in the bond service account and may be paid to the Authority for emergency repairs or replacements. Amounts in the bond reserve account above the bond reserve requirements are used to retire bonds. During the period since the bond reserve requirement was restored by the application of a portion of the proceeds of the Series H bonds issued on May 19, 1976, an aggregate of \$25,190,834 has been transferred to the bond service account by the Bond Trustee through December 31, 1977 for the payment of interest. Effective December 23, 1977, the FitzPatrick Plant's demand charge was increased from \$3.00 to \$6.50 per kilowatt-month. The revised rates are expected to provide adequate revenues to meet the requirements of the 1970 resolution. Upon the retirement of all the bonds issued under the 1954 resolution, the bond reserve requirement will be reduced to one year's interest. Revenues in excess of operating expenses and working capital and necessary reserves therefor are applied first to the payment of bond service (interest only to December 31, 1984, thereafter, interest and principal installments due on outstanding bonds); then a sum equal to twenty five percent of each year's bond service is set aside in a bond reserve account; any remaining revenues are deposited in a general reserve account to be paid to the Authority for any lawful corporate purpose. Prior to the retirement of 1954 Project bonds, failure to earn revenues sufficient to provide for the deposit of twenty five percent of each year's bond service into the bond reserve account does not constitute an event of default under the 1970 resolution. Upon the retirement of all bonds issued for the 1954 Project not later than January 1, 1985 (the date established in a schedule

set forth in the 1970 resolution) revenues of the 1954 Project, after providing for operating expenses and working capital and reasonable and necessary reserves therefor will be applied to the extent necessary to meet any deficiency in the 1970 bond service or bond reserve accounts. A total of \$734,000,000 principal amount of bonds has been issued under the 1970 resolution, all of which remain outstanding at December 31, 1977. The Authority has the right to issue additional bonds on a parity with the 1970 bonds (i) to complete the 1970 Project, (ii) to refund one or more series of bonds outstanding under the 1970 resolution or all of the 1954 Project bonds then outstanding, and (iii) to finance major repairs, replacements, improvements, betterments or additions to the 1970 Project.

### **General Purpose**

A General Purpose Bond Resolution adopted on November 26, 1974 (the General Purpose resolution) provides for the financing of projects other than those projects financed under the 1954 and 1970 resolutions of the Authority. Projects are defined in the resolution to mean any project of the Authority directly or indirectly related to power generation or transmission, whether owned jointly or singly by the Authority, including any output in which the Authority has an interest, heretofore or hereafter authorized by the Power Authority Act and hereafter specified in the supplemental resolution adopted at the time a series of bonds is issued. The General Purpose resolution pledges the full faith and credit of the Authority to the payment of the bonds as well as all its revenues and other income not subject to previous pledges (i.e., the 1954 and 1970 resolutions). The Authority also pledges not to issue any bonds or notes secured by a charge or lien on such revenues and income equal or prior to the charge or lien of the General Purpose resolution.

The General Purpose resolution provides that proceeds from the sale of bonds for the projects specified in the supplemental resolutions be sufficient to provide for construction costs, to pay interest during construction and a bond reserve requirement of one year's interest. Amounts in the bond reserve account will be applied by the Bond Trustee monthly to meet any deficiency in the bond service account and may be paid to the Authority for emergency repairs or replacements. Amounts in such account above the bond reserve requirement are used to retire bonds. All revenues not pledged under the 1954 or 1970 resolutions from any project of the Authority

after its completion (after deductions for operating expenses and working capital and necessary reserves therefor and for projects' study) are applied first to the payment of bond service (interest only to December 31, 1985, thereafter interest and principal installments due on outstanding bonds), then a sum equal to fifteen percent of each year's bond service is set aside in a bond reserve account; any remaining revenues are deposited in a general reserve account to be paid to the Authority for any lawful corporate purpose. Upon the retirement of all bonds issued for the 1954 Project, that portion of the revenues of such project (after providing for operating expenses and working capital and reasonable and necessary reserves therefor) in excess of the amount required under the 1970 resolution, will be deposited into the Revenue Fund under the General Purpose resolution. The Authority covenants that at all times rates and charges will be sufficient, together with other moneys available therefor, to meet the financial requirements of the General Purpose resolution. The General Purpose resolution provides that upon the issuance of bonds for a project for which bonds have not previously been issued, the Authority will certify that for the five years commencing either in 1986 (the year after the 1954 bonds are covenanted to be retired) or, if later, in the year after the latest estimated date of completion of any project, estimated revenues not subject to the pledge of the 1970 resolution less estimated operating expenses will be at least 1.20 times estimated maximum aggregate bond service for all bonds issued under the General Purpose resolution then estimated to be outstanding.

The General Purpose resolution also established a Projects' Study Fund to finance preliminary efforts of the Authority to determine appropriate methods to fulfill its purposes under the Power Authority Act. There is deposited into the fund (i) out of bond proceeds, the amount set forth in a supplemental resolution, and (ii) if there is no deficiency in bond service, an amount not to exceed two percent of revenues not pledged under the 1954 or 1970 resolutions.

### **Note D—Financing**

On January 25, 1977, pursuant to the General Purpose resolution and the Sixth Supplemental General Purpose Bond Resolution adopted on January 25, 1977, the Authority sold for settlement and delivery on February 9, 1977 \$200,000,000 principal amount of General Purpose bonds, Series F. The proceeds of the

bonds, after deposits of \$13,053,695 to the bond reserve account and \$29,112,973 to the temporary interest fund, are being used to pay a portion of the construction costs of Astoria 6, Indian Point 3, Massena-Marcy Line and Greene County Plant.

The \$200,000,000 principal amount of promissory notes (of which \$150,000,000 are 7¼ % notes due July 1, 1978 and \$50,000,000 are 7½ % notes due July 1, 1980) sold pursuant to a Note Resolution adopted on July 16, 1975, remain outstanding. The notes are direct and general obligations of the Authority payable out of any moneys of the Authority available therefor and not otherwise pledged. The pledge created by the Note Resolution is subordinate to the prior pledges created by the 1954 resolution, the 1970 resolution and the General Purpose resolution. Substantially all the proceeds of the notes have been applied to the payment of a portion of the cost of construction of General Purpose projects.

Of the \$60,000,000 principal amount of 5¾ % promissory notes sold pursuant to a Note Resolution adopted on September 21, 1976 to pay a portion of the cost of construction of Indian Point 3, \$40,000,000 remain outstanding at December 31, 1977 and mature in four equal semi-annual installments from March 30, 1978.

On October 14, 1977; the Authority entered into an arrangement under which two banks agreed to make available to the Authority amounts up to a maximum of \$50,000,000 to meet payments for the purchase of natural uranium concentrates required for future operation of its nuclear power plants. The deferred cost of the uranium is payable in three equal semi-annual installments, commencing eighteen months after each delivery of uranium. Interest is computed at a specified fraction of the prime rate in effect from time to time and is payable one year prior to the first principal installment date and semi-annually thereafter. As of December 31, 1977, the Authority had purchased an aggregate amount of \$23,736,706 of uranium under this arrangement with principal installments of \$15,298,537 and \$8,438,169 payable in 1979 and 1980, respectively.

#### Note E—Federal Energy Regulatory Commission Annual Charge

As of December 31, 1976, an aggregate of \$1,760,756 of charges assessed by the former Federal Power Commission for years 1961 through 1975 for its cost of administering Part 1 of the Federal Power Act for the Niagara Power project had been paid by the Authority under protest. On April 5, 1977, the Commission issued an order granting the Authority only partial exemption from such charges. Accordingly, \$1,590,017 of these deposits were charged to operations; the balance of \$170,739 was refunded to the Authority.

#### Note F—Bonds Outstanding

The General Revenue Bonds issued for the 1954 Project outstanding at December 31, 1977 bear interest payable semi-annually on January 1, and July 1, with maturities and interest rates per annum shown below:

1954 Project	Amount	Maturity January 1	Interest Rate
Series A—St. Lawrence Power Project Term Bonds	\$ 75,523,000	1995	3.20%
Series B—Barnhart Plattsburgh Transmission Line Project Serial Bonds	1,067,000	1979 to 1985	2.75% and 2.80%
Series C—Supplemental Transmission Line Project Serial Bonds	619,000	1979 to 1985	3.75%
Series E—Niagara Power Project Term Bonds	54,461,000	2006	4.20%
Series F—Niagara Power Project Term Bonds	60,100,000	2006	4.20%
Serial Bonds	3,400,000	1979	3.75%
Series G—Niagara Power Project Term Bonds	36,712,000	2006	4.375%
Serial Bonds	2,040,000	1979	4.00%
Series H—Niagara Power Project Term Bonds	24,534,000	2006	4.125%
Serial Bonds	3,160,000	1979 to 1980	3.75%
Series J—Niagara Power Project Term Bonds	28,354,000	2006	3.75%
Serial Bonds	1,700,000	1979	3.40%
Series K—Niagara Power Project Term Bonds	8,069,000	2006	3.625%
Serial Bonds	660,000	1979 to 1980	3.30% and 3.35%
Series L—Second Circuit Transmission Line Project Term Bonds	3,092,000	2006	3.55%
Serial Bonds	1,950,000	1979 to 1984	3.25% and 3.30%
	<u>\$305,441,000</u>		

None of the Bonds of Series D or I has been or will be issued by the Authority.

The Bonds are subject to redemption prior to maturity in whole or in part in inverse order of the maturities beginning on January 1, 1979 or any date thereafter at various redemption prices according to the date of redemption, together with accrued interest to the redemption date. The Bonds mature in annual installments, including sinking fund requirements for the Term Bonds.

The Revenue Bonds issued for the 1970 Project outstanding at December 31, 1977 bear interest payable semi-annually on January 1, and July 1, with maturities and interest rates per annum shown below:

1970 Project	Amount	Maturity January 1	Interest Rate
Series A—Term Bonds	\$120,000,000	2010	6.875%
—Serial Bonds	20,000,000	1986 to 1993	6.50%
Series B—Term Bonds	85,500,000	2010	5.625%
—Serial Bonds	24,500,000	1986 to 1995	5.10% to 5.50%
Series D—Term Bonds	98,000,000	2010	5.875%
—Serial Bonds	22,000,000	1986 to 1995	5.10% to 5.60%
Series E—Term Bonds	39,000,000	2010	5.50%
—Serial Bonds	11,000,000	1986 to 1995	4.90% to 5.30%
Series F—Term Bonds	95,000,000	2010	5.50%
—Serial Bonds	29,000,000	1986 to 1995	4.75% to 5.30%
Series G—Term Bonds	85,000,000	2010	5.375%
—Serial Bonds	25,000,000	1986 to 1995	5.00% to 5.20%
Series H—Term Bonds	64,000,000	2010	7.50%
—Serial Bonds	16,000,000	1986 to 1995	6.00% to 7.10%
	<u>\$734,000,000</u>		

None of the Bonds of Series C has been or will be issued by the Authority.

The Bonds will be subject to redemption prior to maturity in whole or in part in inverse order of maturities beginning on January 1, 1981 at various redemption prices according to the date of redemption and the amount redeemed together with accrued interest to the redemption date.

The General Purpose Bonds issued for the Astoria 6 Project, Projects' Study, the Indian Point 3 Project, the Transmission Line Project and the Greene County Plant Project outstanding at December 31, 1977 bear interest payable semi-annually on January 1, and July 1, with maturities and interest rates per annum as shown below:

<u>General Purpose</u>	<u>Amount</u>	<u>Maturity January 1</u>	<u>Interest Rate</u>
Series A—Astoria 6 Project			
Term Bonds	\$ 125,000,000	2010	7.875%
Serial Bonds	25,000,000	1987 to 1995	6.50% to 7.30%
Series B—Astoria 6 Project and Projects' Study			
Term Bonds	110,000,000	2010	8.125%
Serial Bonds	40,000,000	1987 to 1997	6.90% to 7.90%
Series C—Astoria 6 Project Indian Point 3 Project and Transmission Line Project			
Term Bonds	610,000,000	2001	9.50%
Series E—Astoria 6 Project, Indian Point 3 Project, Transmission Line Project, Greene County Plant Project and Projects' Study.			
Term Bonds	130,000,000	2010	7.25%
Serial Bonds	20,000,000	1987 to 1994	6.00% to 6.90%
Series F—Astoria 6 Project, Indian Point 3 Project, Transmission Line Project and Greene County Plant Project			
Term Bonds	175,000,000	2010	6.625%
Serial Bonds	25,000,000	1987 to 1993	5.40% to 6.10%
	<u>\$1,260,000,000</u>		

None of the Bonds of Series D has been or will be issued by the Authority.

The Bonds will be subject to redemption in whole or in part in inverse order of maturities beginning January 1, 1985 in the case of Series A, June 1, 1985 in the case of Series B, January 1, 1986 in the case of Series C, October 1, 1986 in the case of Series E and February 1, 1987 in the case of Series F at various redemption prices according to the date of redemption and the amount redeemed, together with accrued interest to the redemption date.

#### **Note G—Commitments and Claims**

Estimated costs to be incurred on outstanding contracts for projects under construction or authorized for construction at December 31, 1977 aggregated approximately \$246,000,000. In addition, the Authority has entered into contracts for materials and major components for future projects, which contracts contain termination provisions defining the Authority's liability in the event of such termination.

No provision has been made for land acquisition claims in excess of appraisal estimates deposited with the Comptroller of the State of New York. Such deposits are included in construction work in progress.

#### **Note H—Contingencies**

There are pending before Federal and State courts and Federal and State agencies actions and proceedings involving several of the Authority's projects or planned projects. While the ultimate outcome of these matters is not presently determinable, the Authority's General Counsel is of the opinion that the Authority has meritorious positions with respect to these matters. It is possible, however, that the effect of these matters may be to delay or impede the Authority's construction and operation of such projects or planned projects and to require the Authority to incur substantial additional costs or postponement of revenues.

Under regulations established by the Nuclear Regulatory Commission effective August 1, 1977, each licensee of a nuclear plant must provide a guarantee that assures, following a nuclear incident anywhere in the United States, that it can pay retrospective premiums up to a maximum of \$10,000,000 in each calendar year for each large power reactor it operates. The Authority has submitted to the Commission such guarantees for both its James A. FitzPatrick and Indian Point 3 nuclear power plants. In connection with the FitzPatrick plant guarantee, the Authority has entered into a revolving credit/term loan arrangement with a bank.

The United States District Court for the Western District of North Carolina, in a case not involving the Authority, has held unconstitutional the provisions of the Price-Anderson Act which presently limit to \$560,000,000 the aggregate maximum liability of the Federal government and reactor operators for damages resulting from incidents involving nuclear reactors. The Supreme Court has granted a petition to review the decision. If the decision is upheld, the Authority's potential liability might be greater than that provided for under existing insurance and indemnity arrangements.

COOPERS & LYBRAND

CERTIFIED PUBLIC ACCOUNTANTS

IN PRINCIPAL AREAS  
OF THE WORLD

Power Authority of the State of New York  
New York, New York

We have examined the statement of condition of the Power Authority of the State of New York as of December 31, 1977, and the summary of funds and revenues and disposition of revenues of the 1954 Project, 1970 Project and General Purpose projects and the statement of receipts and disbursements for the year then ended. Our examination was made in accordance with generally accepted auditing standards and, accordingly, included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

The aforementioned financial statements of the Authority are prepared on the basis of the provisions of the respective bond resolutions. Such resolutions require allocation of available revenues for debt service and bond retirements and the treatment of the cost of facility replacement as an operating expense in lieu of provisions for depreciation, amortization or similar charges that would otherwise be applicable under generally accepted accounting principles for commercial enterprises. Effective recovery of investment in plant facilities is accomplished through allocation of available revenues to funds for the retirement of bonds at cost. Accordingly, the financial statements of the Authority are appropriately presented under accounting principles required by or appropriate to the provisions of the respective bond resolutions rather than in accordance with generally accepted accounting principles.

In our opinion, such financial statements present fairly the financial position of the Power Authority of the State of New York at December 31, 1977 and the cash and fund transactions, changes in fund balances, and revenues and disposition of revenues of the 1954 Project, 1970 Project and General Purpose projects and the receipts and disbursements for the year then ended, in conformity with accounting principles required by or appropriate to the provisions of the respective bond resolutions, applied on a basis consistent with that of the preceding year.

*Coopers & Lybrand*

New York, New York  
February 16, 1978.

People of the Power Authority: Refer to pages 4 and 5.



Cover design by Ralph J. Kellner and Associates, Brooklyn N.Y.