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BEFORE THE UNITED STATES

ATOMIC ENERGY COMMISSION

In the Matter of	)	
	)	
Consolidated Edison Company of New York, Inc.	)	Docket No. 50-286
(Indian Point Station, Unit No. 3)	)	

STATEMENT OF REASONS OPPOSING SUSPENSION OF THE INDIAN POINT UNIT NO. 3 CONSTRUCTION PERMIT PENDING NEPA ENVIRONMENTAL REVIEW

October 19, 1971

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I. ENVIRONMENTAL IMPACT OF CONSTRUCTION

A. Current Status of Construction (as of October 1, 1971)

Construction of Indian Point Unit No. 3 is approximately 60% complete. Work has been started in all areas, except the nuclear service building and the generator leads. Approximately 800 tradesmen are now employed on the site.

Excavation is substantially complete. Grading has been done in support of present construction. Foundations have been completed except for the fuel handling building. Final grading and landscaping remain to be done in all areas.

Completion of individual structures is as follows:

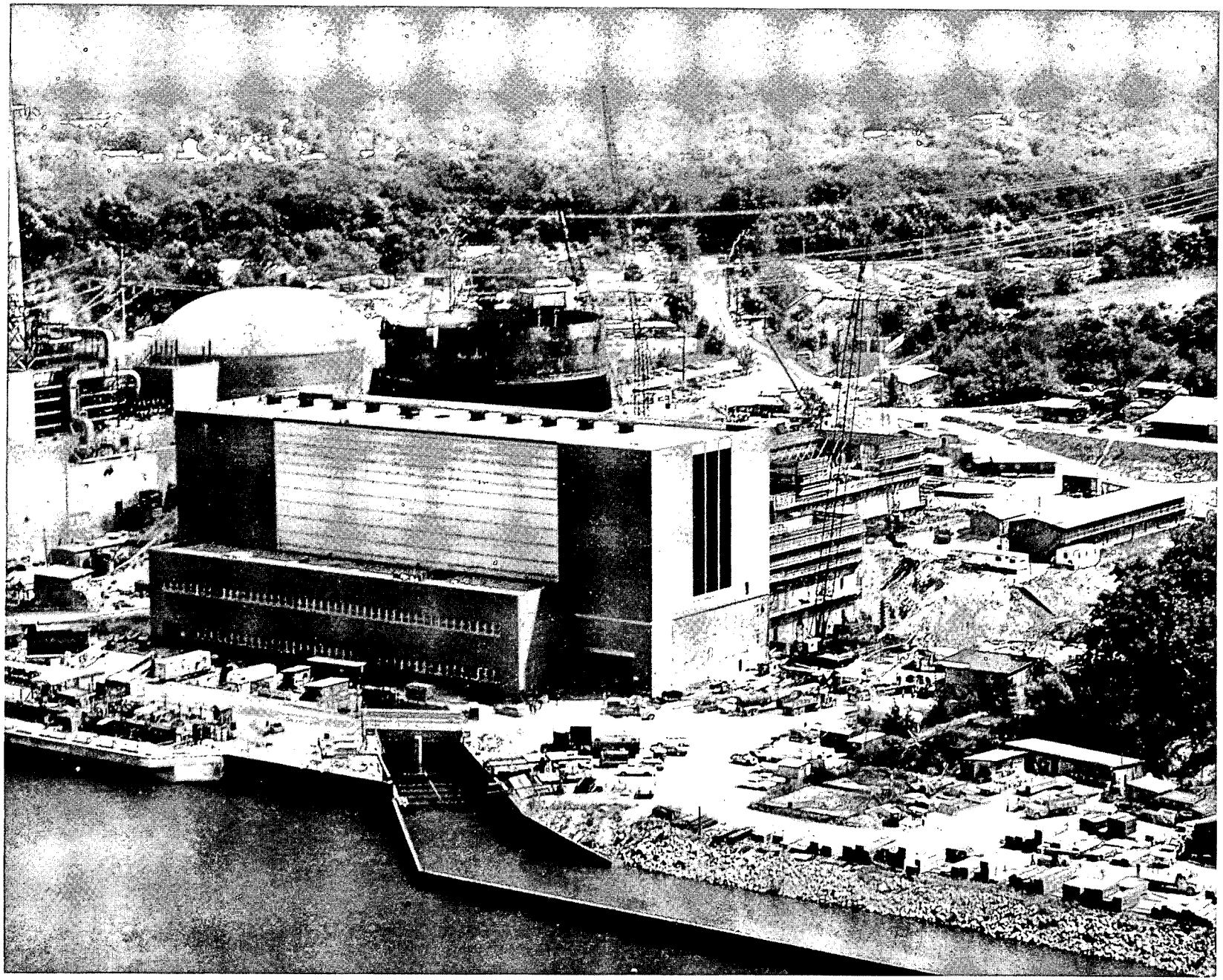
Intake structure	95%
Discharge structure	90%
Containment	60%
Control building	85%
Turbine hall and heater bay	90%
Diesel generator building	25%
Waste holdup tank pit	80%
Fuel handling building	5%
Fan house	3%
Refueling water and primary water storage tanks	10%
Primary auxiliary building	75%

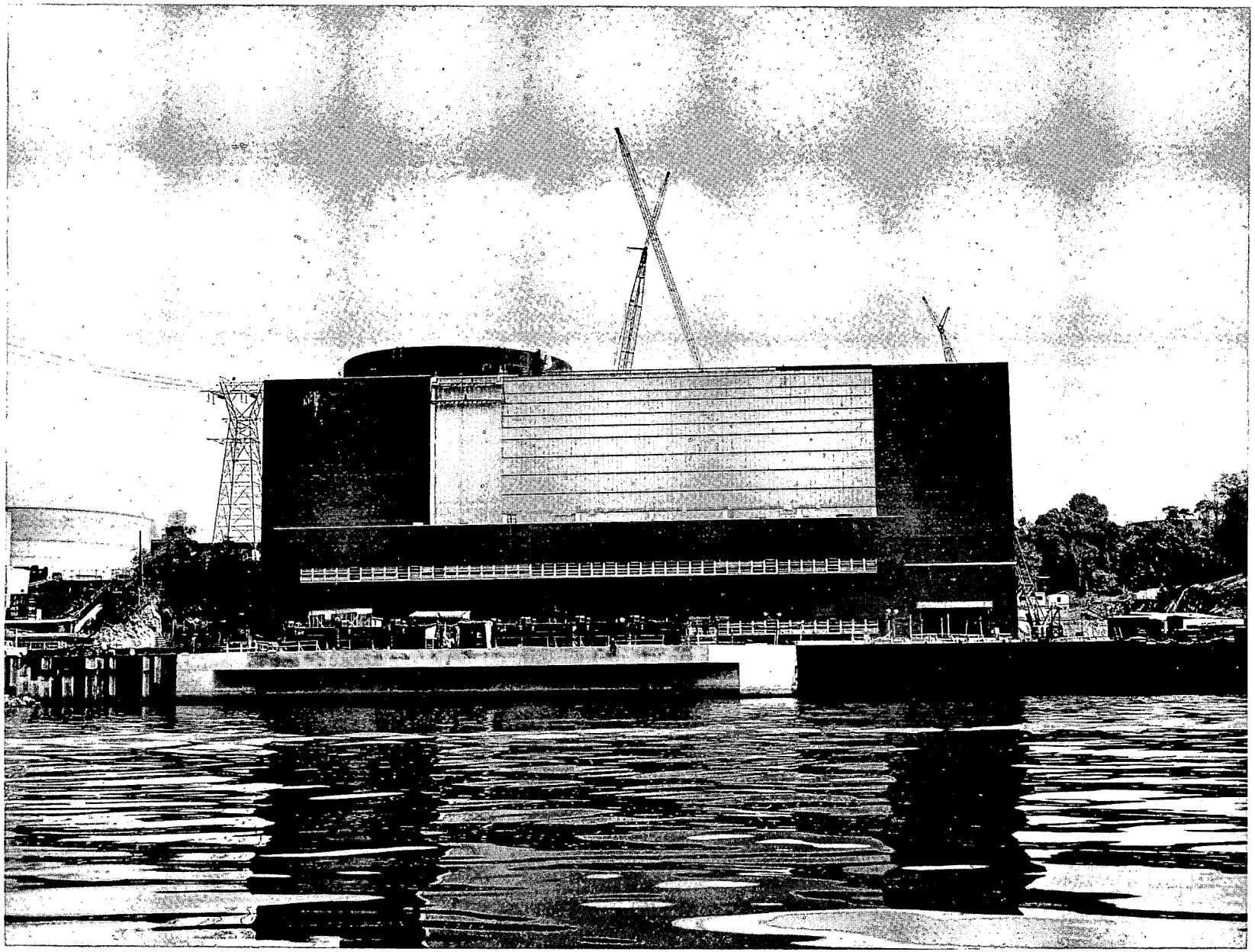
The current advanced state of construction commits the location and space allocation of almost every major component. The circulating water system is nearly complete. Space for the components of the liquid, gaseous and solid waste disposal systems in the primary auxiliary building is committed. Work has started and is in progress on all major plant systems. The 6900 volt electrical system is 40% complete. The 480 volt system

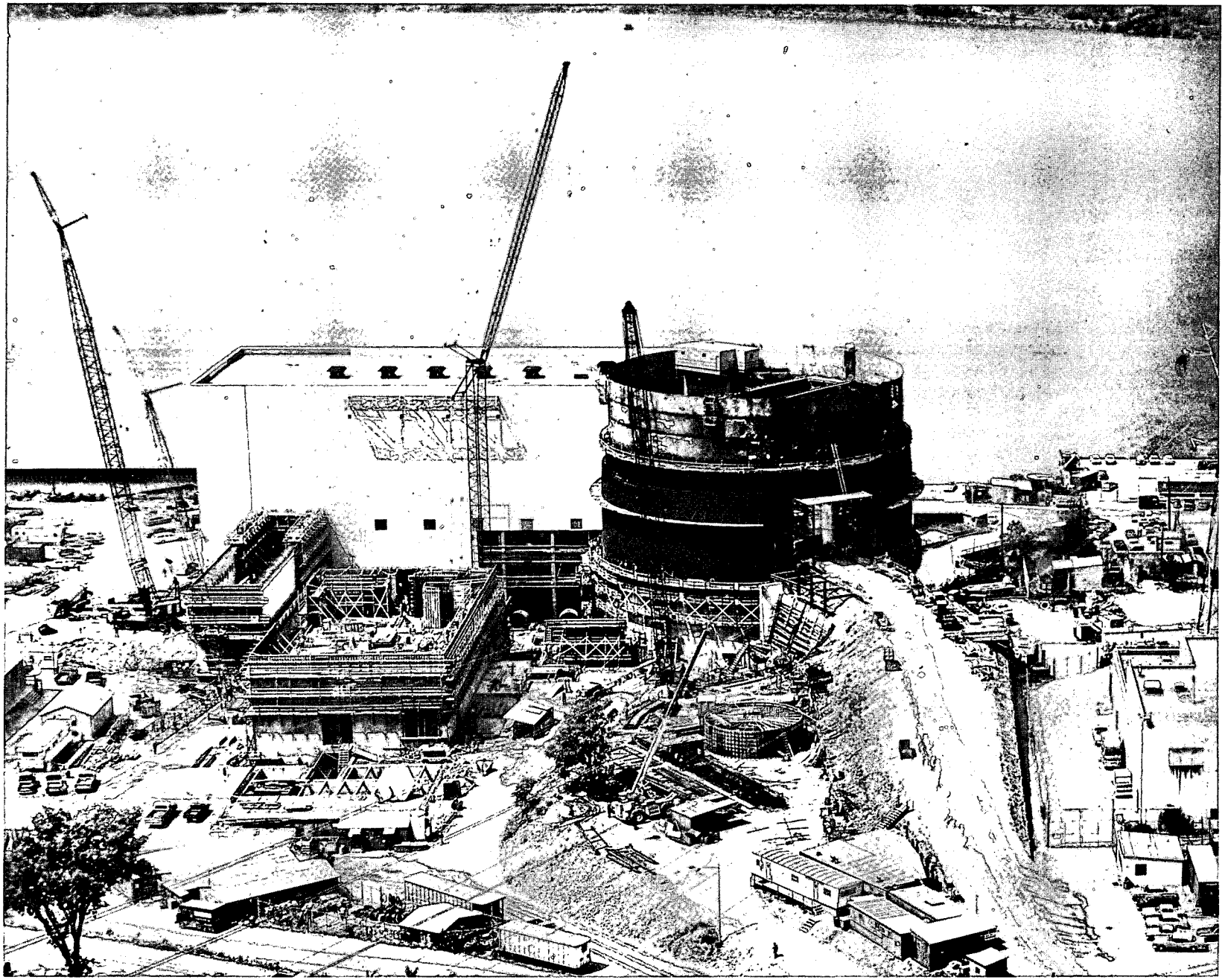
is 10% complete. Little work has been accomplished on instrumentation and control. Most major components are in place with the majority of the balance in storage on site, awaiting installation. Major components which are not yet set in place include 4 of the 6 moisture separator - steam reheaters, 1 of 2 main transformers, and the unit auxiliary transformer. The four major plant cranes are operational.

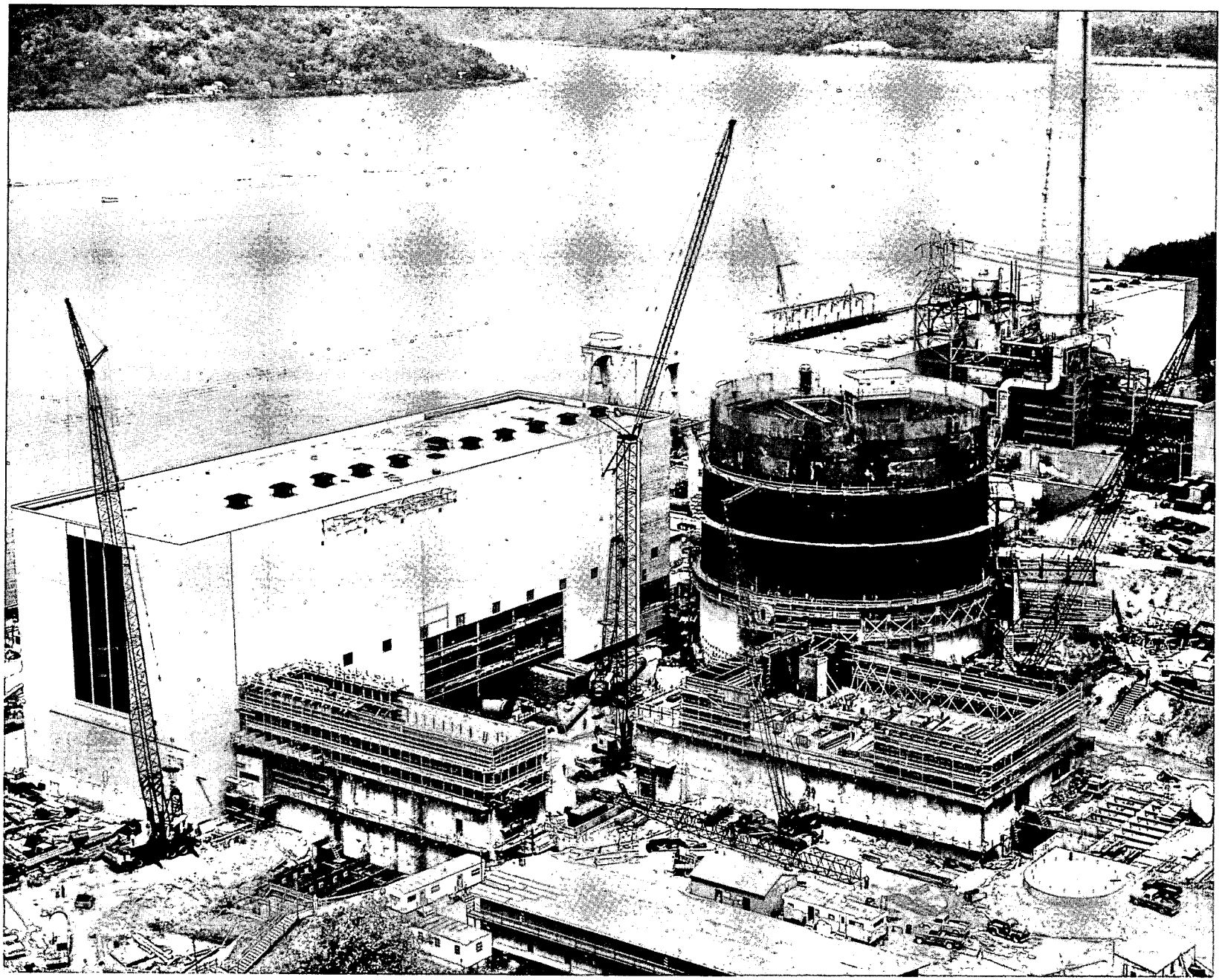
Most of the plant piping is fabricated and in place or on site in storage, except for parts of the main steam, boiler feed, auxiliary coolant, safety injection, and chemical and volume control systems. Piping connections are in various stages of completion in the plant, ranging from less than 1% complete for safety injection to 90% complete for circulating water. A major effort on piping is now in progress in all areas.

The four attached photographs illustrate the state of construction as of late August, 1971. It should also be noted that heavy construction along the river is complete.









B. Environmental Effects of Construction to Date

At the Indian Point site today, within the confines of a limited cleared area, there exists the construction site for a nuclear complex with laydown areas, parking lots for workers' cars, construction buildings, an array of heavy equipment and all the activity normally associated with large scale construction. While the temporary environmental impact of such change and activity cannot be termed desirable, the work has been planned and controlled so as to localize and minimize any effects. All land required for construction has been cleared and graded.

The main boundaries of the site have been left relatively untouched in an attempt to provide a visual and acoustic shield for the surrounding neighborhood. As construction approaches completion, and work forces and equipment on the site diminish, orderly restoration will begin to accelerate. Complete restoration of the site is expected to be accomplished within one year of the completion of Indian Point Unit No. 3. At that time a new park with recreational, educational and cultural facilities will be built on the portions of the site not used for utility facilities. Plans for the park are discussed below.

While some minor relocation of wildlife has occurred as a result of construction, approximately one-half of the site peripheral to the construction area remains untouched and provides an immediate refuge. This has held to a minimum the actual distance of wildlife relocation. When the areas disturbed during construction have been restored, rapid wildlife resettlement can be expected. Combustion products released to the atmosphere during construction as a result of the operation of

diesel-powered equipment are of the type associated with any large-scale construction job. Since relatively little dredging and filling were required for the construction of the Indian Point Unit No. 3 intake and discharge structures, their effects on benthic organisms were minimal.

During various construction and testing phases of Indian Point Unit No. 3, non-routine releases of chemicals into the Hudson River will be required. None of these releases has yet occurred during the construction of Indian Point Unit No. 3, and none is expected to occur for at least one year. It is anticipated that the environmental review contemplated by Section C of revised 10CFR50, Appendix D, will be completed prior to the commencement of such releases.

C. Environmental Impact of Continued Construction

There will be no adverse environmental impact from continued construction of Indian Point Unit No. 3. In fact, in view of the current advanced state of construction, the environmental effect of continuance of the project will be a scenic improvement to the site and area in general. Should construction be suspended at this time, the work leading to the ultimate development of the master plan for the site (discussed below) will be interrupted. This interruption will increase the amount of time necessary to realize the overall beneficial scenic and environmental improvement in the Indian Point vicinity.

Of the 239 acres comprising the Indian Point site, about two-thirds are currently being used for construction related activities. Following the completion of Indian Point Unit No. 3, the plant area will occupy only 35 acres, approximately 16% of the site. This represents a very low "use density" compared to other kinds of industrial development which might have occurred at Indian Point. Figures 1, 2 and 3 portray the development of this site for recreational purposes. Figure 1 is an illustrative plan, and Figure 2 is an aerial photograph of the site as it exists during construction. The overlay indicates existing conditions. Figure 3 is the same aerial photograph with an overlay showing the stages for development of the master plan, with projected completion dates. The actual dates will depend on the progress of construction. Landscaping and planting have begun in 1971 in vacated construction areas and will continue as use of other areas for

construction is discontinued. Most of the landscape areas will be completed and usable upon the completion of Indian Point Unit No. 3 now scheduled for 1974.

The master plan envisages that a new Visitor's Center will be constructed to the south and east of the plant, within an area presently cleared for construction parking. The new center will be considerably larger than the existing facility and include more sophisticated exhibits. Its construction is expected to begin in 1973 and to be completed in late 1974.

The area surrounding the Visitor's Center will contain paths, and open and enclosed spaces for horticulture and outdoor exhibits. The exhibits will focus upon the peaceful uses of nuclear energy. The location of a training simulator at the site, where visitors could view personnel learning nuclear plant operations, is currently under consideration. Outdoor overlooks and other amenties, along with expanded parking facilities, will also be provided. The master plan allows for the eventual development in a consistent manner of the adjoining Trap Rock site, south of Indian Point. The northern part of the site consisting of 80 acres of wooded area is planned for development as a nature preserve. Picnic facilities, trails and other accommodations will be improved and expanded while otherwise maintaining the wooded area in its natural state. Con Edison is also considering providing facilities for nature study in this area.

The major recreational uses of the area surrounding this site are fishing, boating and the use of the various parks in the general vicinity. Neither these nor any other recreational uses of the area will be foreclosed or imparied by the continued construction of Indian Point Unit No. 3.

Although construction noise will exist during continued construction, the distance to the nearest residential area and the topography of the site make this noise virtually inaudible at residential areas.

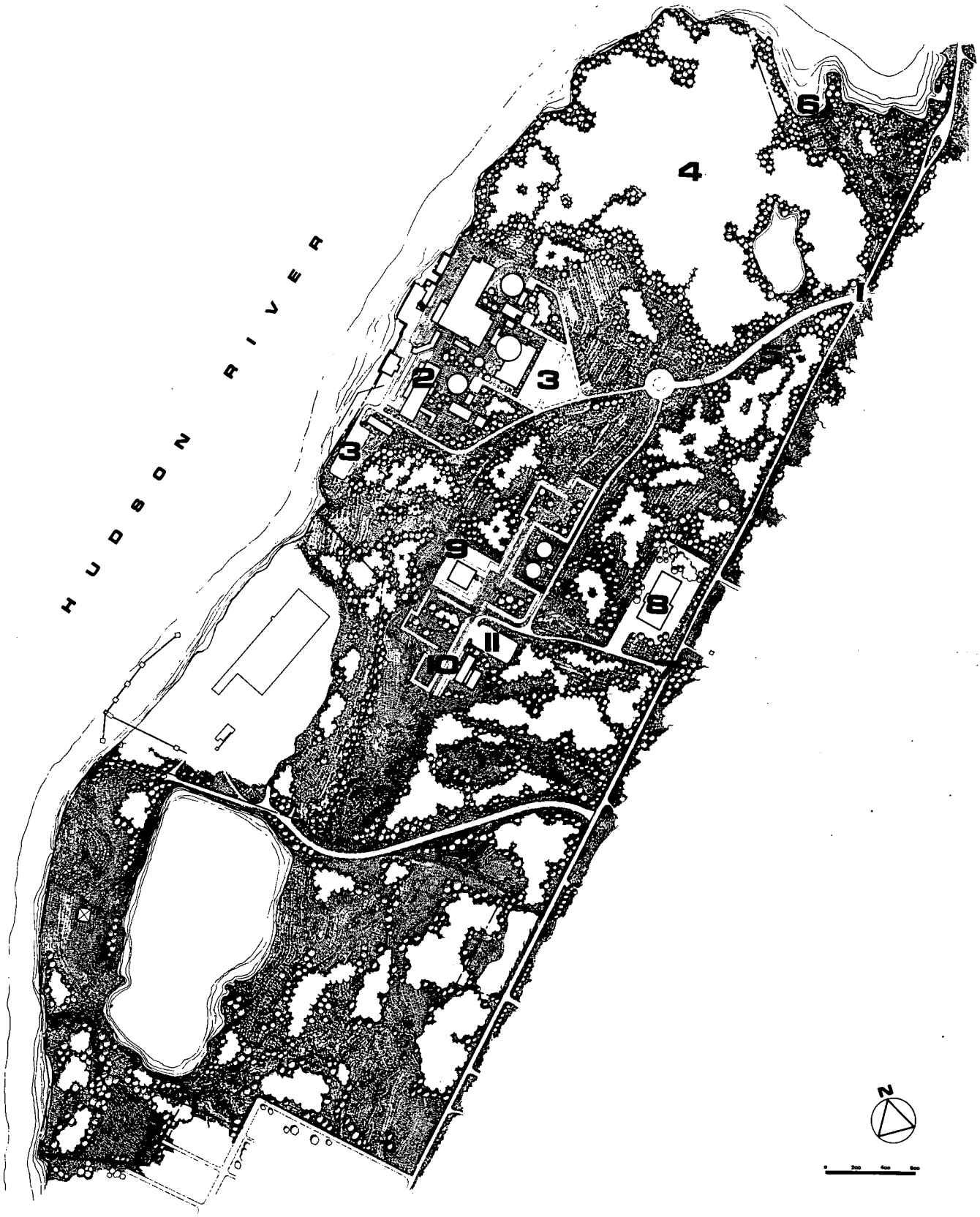
As stated above, no chemical discharges will be required for at least one year. When the piping has been completed, chemicals may be used in cleaning solutions, and other chemicals will subsequently be used during hot functional and other testing when the plant is almost complete. Table 1 contains a listing of these chemicals, their purpose, when they will be used and their proposed concentration limits. At no time will the concentration of any chemical at the confluence with the Hudson River exceed the limits indicated.

TABLE 1

Chemical	Purpose	When Used	Proposed Concentration Limit (ppm)
Phosphate (Di and Trisodium)	Steam Generator pH Control	Hot Functional Testing	1.54
Hydrazine	Control oxygen in Steam Generators and the Primary System	Hot Functional Testing	0.1
Lithium Hydroxide	Primary System pH Control	Hot Functional Testing	0.01
Boric Acid	Reactivity Control	Fuel Loading	50.
Potassium Chromate	Corrosion Inhibitor for Closed Cooling Water Systems	As cooling systems are put into service	0.05 (hexavalent chromium)
Residual Chlorine (Sodium Hypochlorite)	Prevent formation and growth of algae and slime-forming bacteria in the Condenser Cooling Water System	Whenever the circulating water pumps are operated	0.5

The basis for these limits was obtained in part from bioassay work performed by the Raytheon Company and New York University for Con Edison. The proposed limits, are believed to be conservative in nature due to the fact that upon the recommendation of the New York Department of Environmental Conservation, concentrations at the confluence were based on a discharge flow of 100,000 gpm (with all units in operation, discharge flow is in excess of 2,000,000 gpm).

All discharges will be subject to regulation by the New York State Department of Environmental Conservation pursuant to Section 1230 of the Public Health Law. In addition, Con Edison will continue to conduct a continuous environmental monitoring program in the area of its Indian Point site.



1 EXISTING ENTRANCE
2 UNIT NUMBER 3
3 EMPLOYEE PARKING
4 NATURAL AREA
5 PARKING
6 PROPOSED MARINA
7 PROPOSED ENTRANCE
8 WAREHOUSE-STORAGE AND PARKING
9 VISITORS' CENTER
10 TRAINING SIMULATOR
11 PARKING

MASTER SITE AND LANDSCAPE PLAN

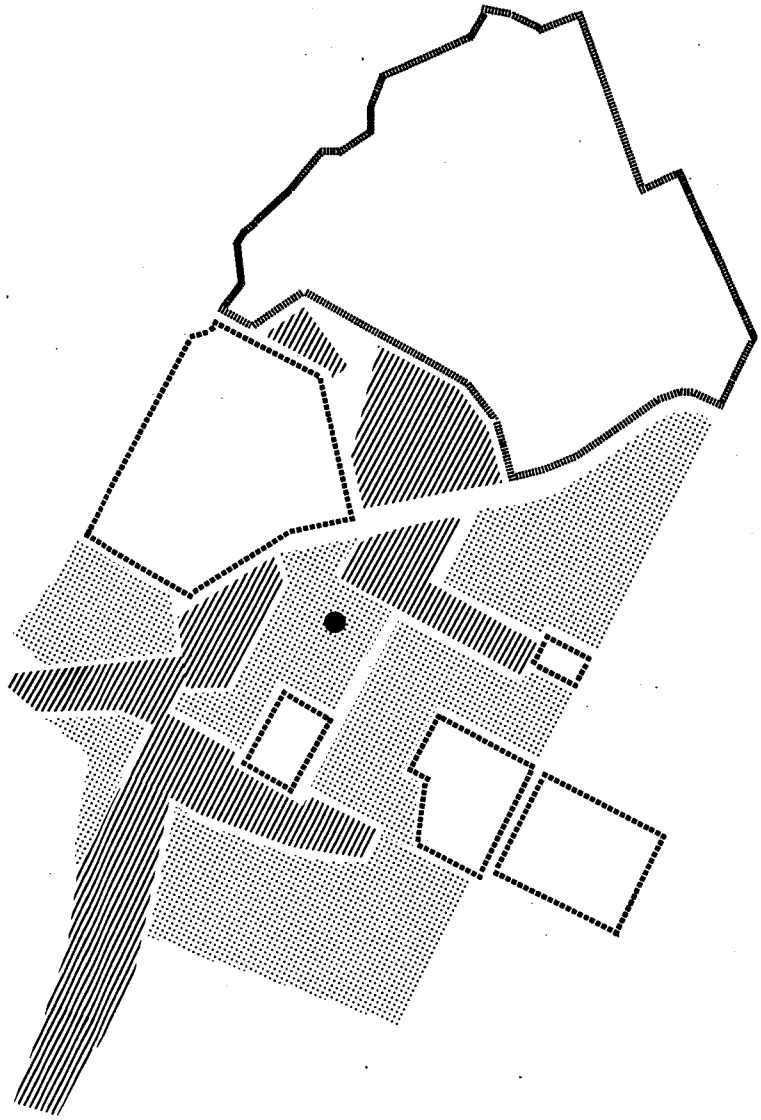
CONSOLIDATED EDISON

INDIAN POINT, NEW YORK

ILLUSTRATIVE PLAN

M. PAUL FRIEDBERG AND ASSOCIATES

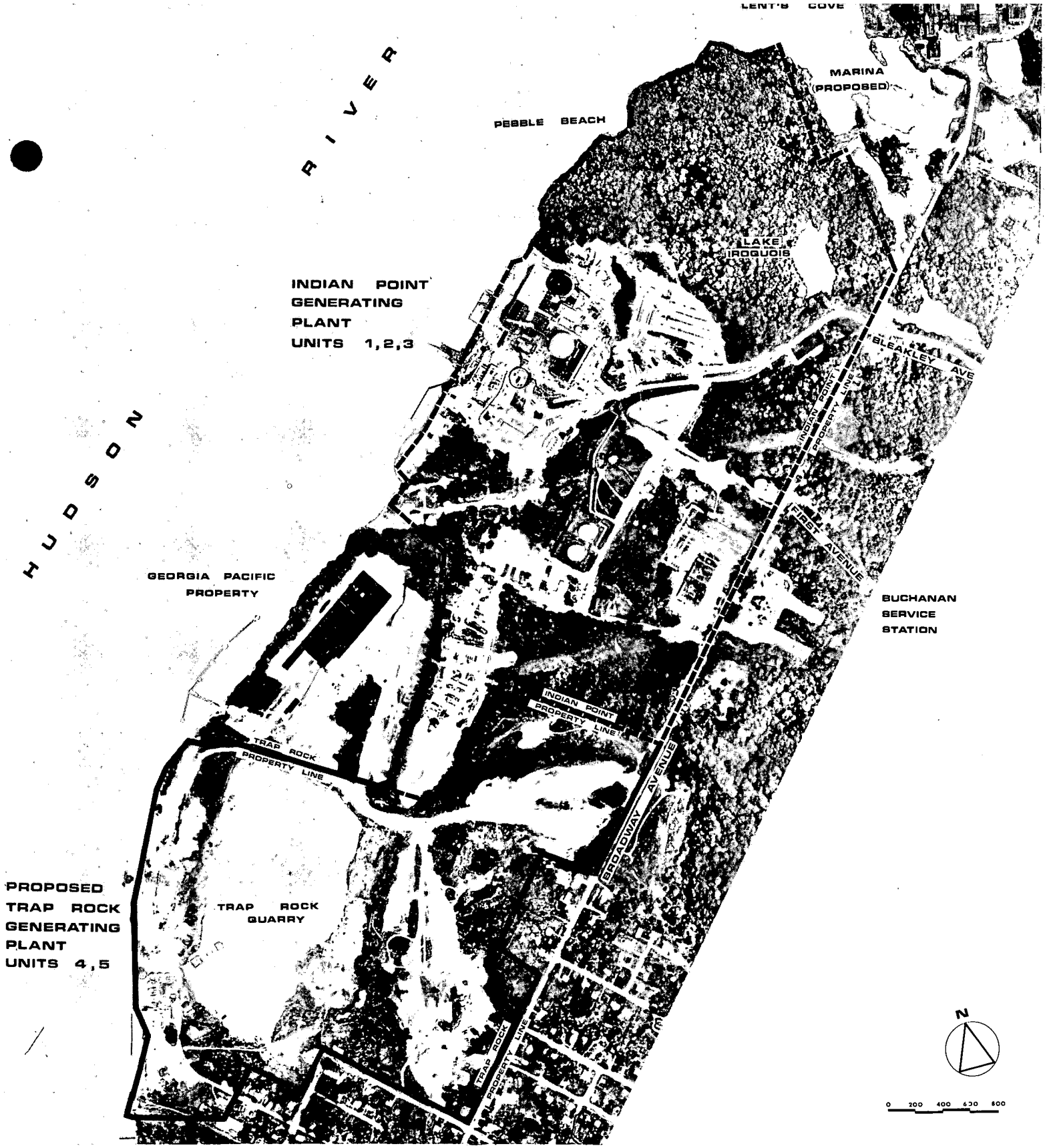
FIG. 13



GENERATING PLANT AND EXISTING FACILITIES
VISITOR'S CENTER
NATURAL AREA
PARKING, STAGING AND SPOILS AREAS
INTERSTITIAL

EXISTING CONDITIONS

FIG. 14



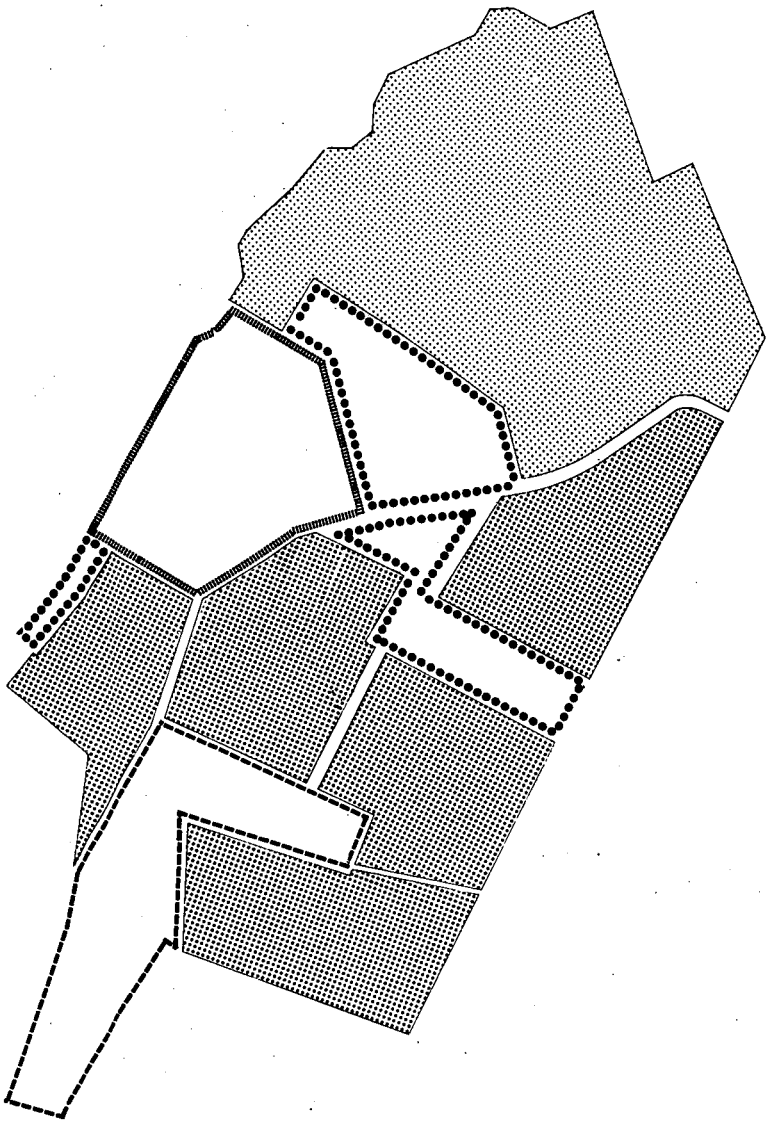
MASTER SITE
AND LANDSCAPE PLAN

CONSOLIDATED EDISON

INDIAN POINT, NEW YORK

INDIAN POINT SITE

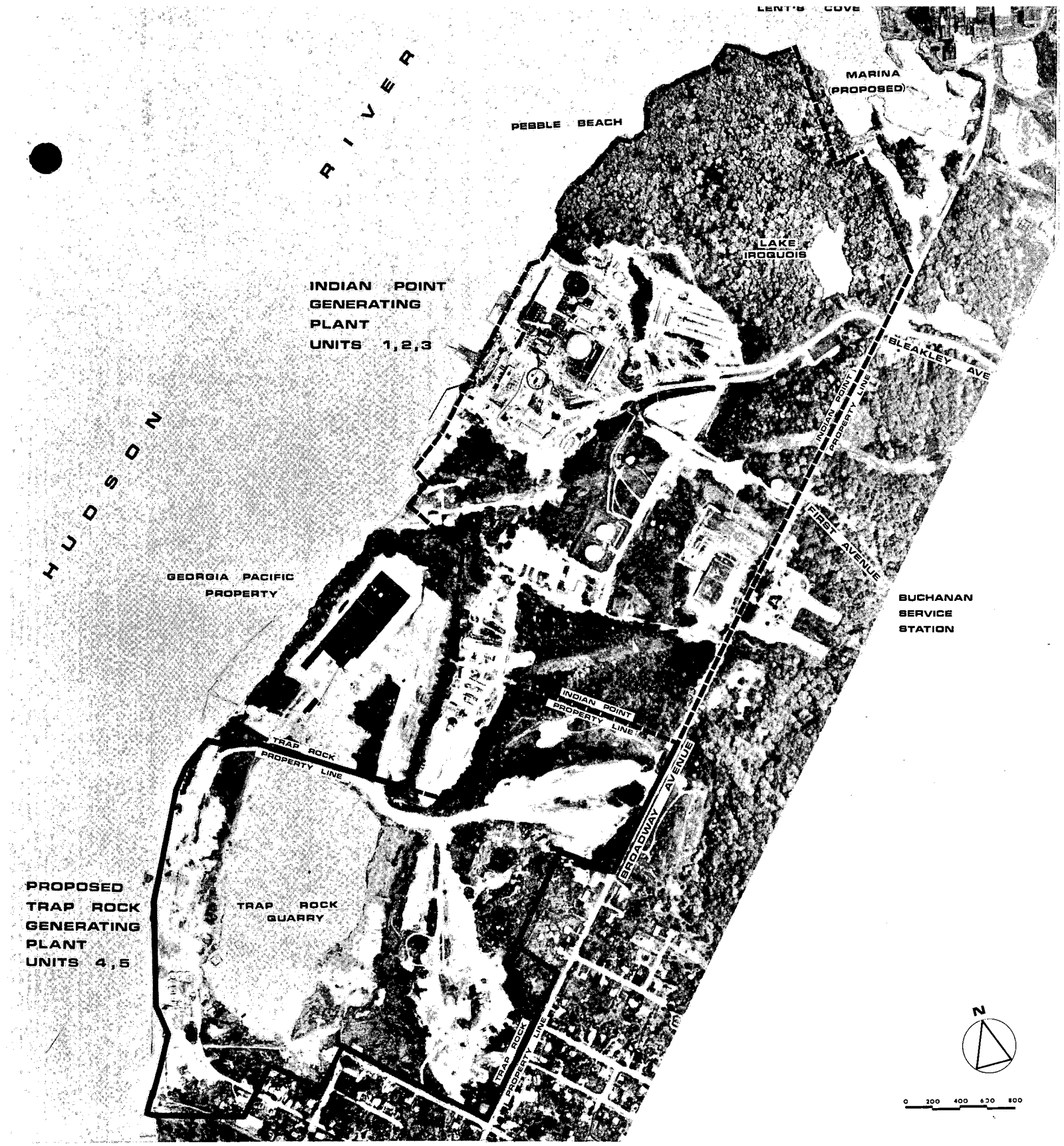
M. PAUL FRIEDBERG
AND ASSOCIATES



JANUARY 1971 - 72
JUNE 1971 - 72
JANUARY 1972 - 73
JUNE 1972 - 73
JUNE 1973 - 73

STAGING PLAN

FIG. 15



MASTER SITE
AND LANDSCAPE PLAN

CONSOLIDATED EDISON

INDIAN POINT, NEW YORK

INDIAN POINT SITE

M. PAUL FRIEDBERG
AND ASSOCIATES

II. FORECLOSURE OF ALTERNATIVES

As previously indicated, the construction of Indian Point Unit No. 3 is approximately 60% complete. Construction in those areas of the plant where environmental concerns have been raised on other plants has progressed even further, as hereinafter discussed, and continued construction would not preclude the subsequent adoption of alternatives to plant design that may arise from an environmental review. Moreover, continued construction of the plant to completion would present no significant difference in backfitting problems than those that exist now.

The analysis presented below in support of this conclusion emphasizes those facets of plant design which are presently being discussed in the environmental arena, namely; condenser cooling water systems, fish protection systems and radioactive waste disposal systems.

A. Condenser Cooling Water Systems

In the condenser cooling water system designed and constructed for Indian Point Unit No. 3, river water is screened of debris as it is drawn through the intake structure, pumped by the circulating water pumps directly through tubes in the condenser where it cools the turbine exhaust steam until the steam condenses, and is then returned to the river through a discharge structure designed to create mixing with sufficient additional river water so as to satisfy applicable water quality criteria of the State of New York.

Work on the major structures and components of the condenser cooling water system has already been completed. The intake structure and the discharge canal have been constructed; the

turbine generator is in place, the condenser has been erected and condenser tubing is nearing completion. The circulating water pumps which were installed have been removed for recoating. Installation of auxiliary equipment is now in process.

If an environmental review were to require the installation of an alternative cooling system, installation of such a system though difficult, will not be precluded by continuing work on the present system. Alternative methods of cooling that have been used or are now being proposed for thermal (steam) electric generating plants are: evaporative cooling towers operating on either closed or open cycles, dry cooling towers, cooling ponds, spray ponds and exhaust waste heat usage.

Evaporative cooling towers are heat exchange structures for transferring the heat in the condenser water to the ambient atmosphere. The structure consists of a finely divided grid over which the condenser water splashes. Atmospheric air is circulated through the structure by fans in the case of mechanical draft towers or by the chimney effect of natural draft towers. The heat transfer is effected by evaporation of a small portion of the condenser cooling water and by a slight increase in the temperature of the air. In closed cycles, the water is gathered in a sump at the bottom of the tower and reused for condenser cooling. Virtually all heat rejection from the plant is thus transferred to the atmosphere with little or no heat going to the river.

In the open cycle, river water is pumped over the tower to cool it before returning it to the river. The water returns to

the river at a higher temperature than the river. In a plant designed for open cycle towers, the heat rejection to atmosphere is about 2/3 of the total heat rejection and about 1/3 to the river.

The function of dry towers is the same as the evaporative towers described above. They differ, however, in the means for effecting heat transfer. In the dry tower, the condenser cooling water is pumped through a radiator-type structure, which is cooled by the atmospheric air without evaporation. Dry towers are not an alternative to existing cooling methods because the turbine generator plant (already in place) is not designed to operate with cooling water at the elevated temperatures resulting from operation of dry towers during peak summer temperatures.

Cooling ponds substitute the surface of the pond for the more compact heat transfer operation of the cooling tower. The pond depends upon natural phenomena to cool it. The size of the ponds are determined by local climatic conditions. For Indian Point Unit No. 3, it is estimated that approximately 3000 acres of land would be necessary to provide the required cooling. Since the total Indian Point site is only 239 acres, cooling ponds are not considered a feasible alternative.

Spray ponds represent a compromise between cooling towers and cooling ponds. The water surface available for heat transfer is effectively increased by spraying the pond water into the air where it breaks up into droplets. However, the air flow is produced by unassisted natural phenomena.

There are adverse environmental effects associated with a spray pond at Indian Point. If scenic wooded area were to be used,

the land would require defoliation and clearing. During winter operation, drift and spray would result in severe local icing. The effect of salt content of the spray is not known, but it is highly likely that the local flora would be severely affected. Under adverse humidity conditions, local fogging can occur.

Finally, an alternative to ambient heat sink cooling is to use the heat available in the turbine exhaust for low grade thermal requirements such as domestic and low temperature process requirements. These uses require temperature levels generally corresponding to condensing pressures and temperatures not compatible with the design of the existing Indian Point Unit No. 3 turbine generator system. Further, there are no potential users of waste heat in the quantity available within reasonable proximity of the plant.

Since the present system has been substantially constructed and is literally "fixed in concrete", no flexibility in the consideration of alternatives would be gained by a suspension of construction at this time. However, sufficient land area exists on site to accommodate the adoption of any of the alternatives except cooling ponds and dry cooling towers (as indicated above). The adoption of any of the proposed alternatives would in essence require an appendage to the present system, that is, a separate independent but connected package inserted between the condenser output and the final deposition of the cooling water into the river.

B. Fish Protection

With regard to fish protection alternatives, the intake and discharge structures have already been constructed and the circulating water pumps which had been installed have now been temporarily removed for recoating. Installation of auxiliary equipment is now nearing completion.

The activities undertaken by Con Edison with regard to alternative methods of protecting fish from the effects of the circulating water system (see Supplement 1, Indian Point Unit No. 2 Environmental Report, Section 2.5) demonstrates that continued work on the Indian Point Unit No. 3 intake structure will not foreclose the adoption of alternatives at a later date.

All of the effective improvements developed by tests on Indian Point Unit No. 1 have been incorporated into the Indian Point Unit No. 3 intake structure design. In addition, with the help of consultants, Con Edison is continuing to explore other possible alternatives, such as different types and arrangements of screens, a common intake structure for all three units, various methods of throttling to reduce the intake velocity; and a newly designed air bubble curtain which will be tested at the completed Indian Point Unit No. 1 intake structure this winter (1971-1972). None of these alternatives would be foreclosed by continuing construction.

C. Radwaste Systems

Continued work on the radwaste system would neither foreclose the adoption of subsequent modifications nor make them significantly more difficult to implement than they would be at the present time.

Currently planned changes (such as adding filters, tightening up the charging pumps and pressurizer spray valves and ensuring that the evaporators achieve the performance stated in the FSAR) to the Indian Point Unit No. 2 radwaste system, which is identical to that in Indian Point Unit No. 3, will also be made on Indian Point Unit No. 3.

If major modifications to the present system were to be required, a separate (but connected) package consisting of a building and internal equipment systems would have to be constructed. Sufficient land area exists on site to accommodate the space requirements of any major modification. Besides the space requirement, the other major consideration in implementing a major modification would be interfacing problems with the present system. However, because of the already advanced state of construction, interfacing problems would not significantly increase in difficulty with continuing work on the system. The Primary Auxiliary Building which houses the major components of the liquid, gaseous and solid waste disposal systems is approximately 75% complete. All of the equipment has been purchased; the piping has been fabricated; space has been allocated for the various system components in the building layout and installation of equipment has already been started.

III. EFFECT OF DELAY IN CONSTRUCTION

A. The Need for Power

The need of the people in Con Edison's service territory for the electric power to be produced by Indian Point Unit No. 3 cannot be overemphasized. The people served by Con Edison have been plagued by power shortages in the last few years, created in large part by delays in the completion of the two nuclear units at Indian Point. Indian Point Unit No. 2 was originally scheduled for commercial operation by June 1, 1969 and is now scheduled for service in 1972. Indian Point Unit No. 3 was originally scheduled for commercial operation by June 1, 1971 and is now scheduled for service in 1974.

Indian Point Unit No. 3 is a large part of a rigorous construction program which Con Edison has commenced in order to meet the rapidly increasing demand for power in the New York City area. The power supply problems of the past few years will only disappear with the completion of this construction program. Any delay in the construction of Indian Point Unit No. 3 postpones the end of the power supply problems.

In order to estimate the significance of this problem, it is important to understand the nature of Con Edison's electric service area, which covers the five boroughs of New York City and most of Westchester County. The population of this service area is approximately 8,650,000. An adequate and reliable supply

of electric power is essential to the life of this key metropolitan area. A lack of such a supply will jeopardize a vast array of critical services and facilities vital to the preservation of the public health and safety such as water supply, fire protection, sewage and garbage disposal, home heating, hospitals, nursing homes, railway and subway transportation, law enforcement, traffic control, drawbridge operation and all forms of local and interstate communications. As a national and international center, a lack of power in this area will have effects beyond its geographical borders.

In recognition of the power supply problems of the next few years, Con Edison has initiated programs to reduce the demand for electric power. Con Edison has discontinued promotion of electric sales and is conducting a program of consumer education on conservation of electricity.

a. Recent Past

Since 1969 Con Edison has been faced with a continuing crisis in supplying electric energy to the communities which it serves. Immediately prior to 1969 the Company's planned reserve capacity, including purchases from others, was 1,532 megawatts or 21% of its anticipated peak load.

In 1969, however, delays in the addition of new capacity by other utilities limited the amount of the firm purchased power actually available in that year at the time of the peak load to 260 megawatts, approximately one-third of the 710 megawatts for which Con Edison had contracted. In addition, there were several equipment outages and deratings* experienced during the summer period, which is the period of peak demand on the Company's system. As a consequence, the Company had to request large customers to reduce load voluntarily, to appeal to the general public to conserve electricity and to institute voltage reductions on eight different days on which the loss of capacity ranged from 800 to over 2,000 megawatts. On two occasions the voltage reduction reached the maximum allowable level of 8%**, after which the only load control device available is to totally discontinue electric service to some of our customers.

Again in 1970 the Company experienced power shortages even though it had planned to increase its capacity resources from 8,882 megawatts to 9,839 megawatts. This would have represented a reserve of 27% of anticipated peak load, and was to be principally achieved by the addition of almost 1,200 megawatts of gas turbine

*"Deratings" result from equipment problems which, while they do not require that a generating unit be completely removed from service, restrict its operation to less than its full capacity.

**Voltage reductions in excess of 8% would cause damage to customers' equipment.

capacity to the system. Construction and start-up delays, as well as a strike which affected one of Con Edison's suppliers, caused slippage in the schedule for adding the gas turbines. The summer, therefore, started with no gas turbines in operation. They came into operation at various times thereafter, and Con Edison had 874 megawatts in operation at the end of the summer. This together with equipment deratings and forced outages, made it necessary for Con Edison to make appeals again for the conservation of electricity by the public and to institute voltage reductions on fifteen days. On one occasion Con Edison had to resort to discontinuance of service to approximately 1% of its customers. Discontinuance of service to any customers is a drastic measure, and every effort must be made to avoid its recurrence.

As far as 1971 is concerned, Con Edison has added 624 megawatts of additional gas turbine capacity and, after re-rating some of its older units, it has a reserve installed on its own system equal to only 9% of the estimated peak load. Con Edison has also contracted for 920 megawatts of firm capacity purchases, thus raising the reserve to 21%. After further adjustment for the requirements of the steam system, the reserve was reduced to 17.3%.

This reserve, considering the re-ratings, is of the same order of magnitude as those with which Con Edison faced the summers of 1969 and 1970, and again Con Edison has had to resort to the frequent use of voltage reduction. Through September 30, 1971, Con Edison has reduced voltages on its system on fifteen occasions during the year. Major problems were avoided because forced outages of large units were less than in previous years and there were no prolonged hot spells.

b. Outlook for 1972

The estimated peak load is 8,550 megawatts, and installed capacity, assuming that Indian Point No. 2 is on-line, is expected to be 9,996 megawatts. This includes 400 megawatts from Con Edison's share of Bowline Point Unit No. 1, scheduled to go on-line in July 1972, and 348 megawatts from barge-mounted gas turbines, also scheduled for July 1972. The Company has, in addition, arranged for 395* megawatts of purchased capacity. This would provide a reserve after steam system requirements of 19.9%, which is substantially less than is desirable. It is at this level of anticipated reserve, and greater, that Con Edison has experienced severe difficulties for the past three years.

*Of this, 125 megawatts are from Orange & Rockland's share of the Bowline Point Unit No. 1.

The New York State Public Service Commission described the scope of the electricity supply problem in our service area in a recent opinion* (page 6), as follows:

> "In the summer of 1971 and, it appears, for a number of summers to come, the New York metropolitan region may be forced to adjust to shortages of electric power serious enough, at least, to cause inconvenience and, at worst, to weaken the capacity of both the city and its surrounding areas to function."

That statement was written on the assumption that new units planned for service in the period 1972 through 1974 would be available as scheduled. These capacity additions will be discussed in later sections.

c. Outlook for 1973

Two 600 MW fossil-fueled generating units are being constructed by Central Hudson Gas and Electric (Roseton Nos. 1 and 2) near Newburgh, New York. The first unit is scheduled for service in the Fall of 1972 and the second for the Spring of 1973. Con Edison is a joint owner, with a total share of 480 MW.

Con Edison anticipates a peak system requirement for 1973 of 8,950 MW. If all the new capacity described above should be

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*Case 25937 - Proceeding on motion of the Commission as to plans and procedures of electric corporations for load shedding in times of emergency. Second Interim Report. August 3, 1971.

available, together with firm purchases of 40 MW and additional purchases of 440 MW now being arranged for the summer of 1973, Con Edison's anticipated capacity would be 10,685 MW. This leaves a reserve, after allowance for steam system requirements, of 19.4%. This is essentially the same level of reserve the system has been forced to operate with since the summer of 1969. Accordingly, the delays already experienced for Indian Point Unit No. 3 from its originally scheduled completion date of June 1, 1971, lead to an undesirable situation for 1973.

d. Outlook for 1974 and Beyond

Indian Point Unit No. 3 is presently scheduled to be in commercial operation to meet the peak load from 1974. Con Edison's latest evaluation of load growth and prospective power supply indicates that Indian Point Unit No. 3 will represent a significant portion of the capacity which must be maintained in 1974 and future years to assure adequate reliability of service to its customers.

The estimated peak load for 1974 is 9400 MW, and anticipated installed capacity, assuming that Indian Point Unit No. 3 is on-line, will be 12,370 MW. This includes 400 MW from Con Edison's share of Bowline Point No. 2, a 600 MW unit scheduled for service in Summer 1974 and 800 MW from Con Edison's Astoria

No. 6 fossil-fueled generating unit in New York City. This also includes 197 MW* of firm purchased capacity for which the Company has negotiated contracts and another 440 MW of firm purchases for which negotiations are now in progress. This would provide a reserve, after adjustment for steam system requirements, of 2931 MW or 31.2%, which would represent adequate reserves to prevent a recurrence of the difficulties which have been encountered since 1969 and allow retirement of older, less reliable generating units which contribute heavily to New York City air pollution.

Without Indian Point Unit No. 3 in service in 1974, anticipated installed capacity will be reduced to 11,405 MW, equivalent to a reserve of only 1966 MW or 20.9%. This would not be significantly greater than the reserves which have been maintained to date.

It must be kept in mind that Indian Point Unit No. 3 is not the only unit subject to possible delay in 1974. The Con Edison capacity program, as already described, includes two other major units which are scheduled for 1974. Both of these units are on tight construction schedules and, at least in the case of Astoria No. 6, will be involved in environmental hearings. While the

*Of this, 157 MW are from Orange and Rockland's share of Bowline Point Unit No. 2.

outcome and impact of these hearings on the service date of the unit cannot be anticipated with certainty, it would be imprudent to delay Indian Point Unit No. 3 by relying on the availability of Astoria No. 6 in 1974. If Indian Point Unit No. 3 and Astoria No. 6 were both delayed, the anticipated capacity for the Summer of 1974 would be only 10,605 MW, which provides a reserve after adjustment for steam system requirements of 1166 MW or 12.4%.

Accordingly, a delay in Indian Point Unit No. 3 would provide no reserve for delays in other units or forced outages of major units such as Ravenswood 3. If Indian Point Unit No. 3 were delayed and if one of these other events occurred, New York City and Westchester County would once again be plunged into a power crisis. Con Edison believes that the public interest requires an end to recurring power crises. That end will come in 1974 if Indian Point Unit No. 3 and the other units referred to are in operation by that date.

e. Need to Replace Obsolete Facilities

In addition to meeting the requirements of load growth, the availability of planned new capacity including Indian Point Unit No. 3, is essential to allow the retirement of units which are now 40 to 50 years old and which would have already been removed

from service were it not for delays already experienced. These units are inefficient and environmentally undesirable. Because of their inefficiency, they will emit substantially more pollutants per MWH than more modern fossil fueled plants. Indian Point Unit No. 3 will not, of course, emit such pollutants.

Moreover, despite substantial expenditures for maintenance, they provide a much less reliable source of capacity than that provided by the newer units, and their reliability has continued to deteriorate. Any delay in the operation of Indian Point Unit No. 3 by relying on the deferral of the retirement of these units scheduled for retirement would be ill-advised because they will be unable to provide dependable output when required. A total of 1442 MW, including three complete generating stations and miscellaneous capacity at five other stations, are planned for retirement through 1974.

f. New York Power Pool

Con Edison is a member of the New York Power Pool (NYPP) which membership includes the eight major operating utilities in New York State. (See Table 2.) Indian Point Unit No. 3 will substantially contribute to the reliability of operation of the New York Power Pool.

TABLE 2

NEW YORK POWER POOL MEMBERS

Consolidated Edison Company of New York, Inc.

Long Island Lighting Company

New York State Electric and Gas Corporation

Orange and Rockland Public Utilities, Incorporated

Rochester Gas and Electric Company

Niagara Mohawk Power Corporation

Central Hudson Electric and Gas Corporation

Power Authority of the State of New York

*Jamestown Municipal Electric System

*Long Sault, Incorporated

*Village of Freeport

* - New York State companies which are not members of the New York Power Pool but which report their Load and Capability as part of the New York State Interconnected Systems.

Date: March 1971

The forecasted electric supply situation for the New York Power Pool prepared in September 1971 indicates that New York Power Pool reserves in 1974, with Indian Point Unit No. 3, Bowline 2 and Astoria 6 in service, will be 6752 MW or 29.9% of estimated co-incident peak load. If Indian Point Unit No. 3 were not in service this reserve would be reduced to 5787 MW or 25.7%. This would represent a substantial reduction in New York Power Pool installed reserves and a corresponding reduction in the reliability of the Pool.

Under the rules of the New York Power Pool, each company is required to secure sufficient capacity to meet its needs including purchases of firm power. Pool resources are available for emergencies, but cannot be used as a substitute for necessary capacity additions.

B. Alternative Sources of Power

Indian Point Unit No. 3 is needed to furnish power during the summer of 1974. Accordingly, it is necessary to consider whether any alternatives would be available in 1974 in the event the unit were delayed as a result of a suspension of the construction permit pending an environmental hearing.

Construction of other new base load plants is not feasible to meet 1974 requirements. Fossil-fueled plants require an estimated 4 to 6 years to complete and an alternative nuclear power plant would require an even longer time.

Gas turbines which could be installed by 1974, are not technically alternatives for a base load plant such as Indian Point Unit No. 3. By 1974 Con Edison will have installed on its system over 2300 MW of gas turbines. Approximately 200 MW of this capacity was expressly planned by the Company to serve as emergency start-up and transit capacity. The remaining 2100 MW were planned to provide peak capacity for the early 1970's as compensation for delays already incurred in the Cornwall Pumped Storage plant and to replace capacity lost due to equipment deterioration at older plants which have been used for peaking purposes.

Peaking capacity supplied by these gas turbines is electricity furnished for a limited number of hours per year when

demand for electricity is unusually high because of the seasonal increases in demand. This is encountered particularly during the summer for air conditioning, or because of short term outages of other generating units. Gas turbine capacity beyond that already planned for the system would be required to operate for more hours than would normally be the case for gas turbines intended solely for peaking capacity. There has been little utility operating experience with gas turbines except for peaking service. It is, therefore, difficult to project their expected performance in providing base load capability where they are relied on for continuous service.

Purchased power is likewise not a feasible alternative for Indian Point Unit No. 3 for the year 1974. Con Edison already has contracts or commitments for an estimated 197 MW of purchased power for the summer of 1974 and is making arrangements to purchase an additional 440 MW. These purchases have been included in the estimates of installed capacity and reserve which were discussed in a previous section and will be necessary even if Indian Point Unit No. 3 is available. Should Indian Point Unit No. 3 be unavailable, the likelihood of purchasing capacity to replace the 965 MW capacity of that unit is remote. While the Company has indications that power will be available for purchase for the summer of 1974, the availability of this power is in large part contingent upon the completion of new facilities which are

scheduled for 1973 or 1974.

Much of the capacity available on this contingent basis depends on the timely completion and licensing of nuclear facilities. The remaining offers are contingent upon the completion of non-nuclear facilities. The generally prevailing experience of slippages in utility construction projects casts serious doubt on the availability of the power involved in these offers. Moreover, the nuclear facilities referred to above are subject to the possible suspension of construction in the same manner as is discussed herein with respect to Indian Point Unit No. 3. To the extent that construction or regulatory delays create capacity deficiencies among members of the neighboring power pools, any excess capacity in such pools is likely to be sold preferentially to their deficient members, thereby further reducing the amount of power which might otherwise be available to Con Edison.

Con Edison has in the past made emergency purchases of energy from outside the system. Such purchases and other short duration purchases will probably be available in varying quantities from day to day as load and system conditions of other utilities permit. However, there is no assurance as to the availability of such power, and it would be extremely imprudent to plan to meet load demands utilizing emergency purchases without any basis to

predict when and how much will be available.

Some additional power might be available by deferring retirement of older stations. As noted in a previous section, much of this capacity was installed between forty and fifty-six years ago and was scheduled to be retired prior to 1970 as part of the Company's plans for the 3838 MW of new capacity that is now delayed (Indian Point Units Nos. 2 and 3 and the Cornwall Pumped Storage Project). These plants have become increasingly difficult to maintain and are no longer dependable. They will deteriorate further each additional year that they remain in service, despite continuing maintenance efforts. Accordingly, deferment of retirements would not produce a reliable source of power.

C. Consequences of Delay

In the event the license to construct Indian Point Unit No. 3 should be suspended, Con Edison will use its best efforts to obtain alternative sources of power for 1974 as discussed in the preceding section. As indicated therein, there are substantial difficulties with each alternative and it may be impossible to obtain alternative power. As stated in the preceding sections, this would lead to a difficult power supply situation and a tremendous financial burden.

The emergency procedures which would be implemented in the event of a power shortage have been prescribed by the New York Public Service Commission in Case 25937 (August 3, 1971). In accordance with the Public Service Commission's order, the Company would make every effort to contract for the purchase of supplemental and emergency capacity from neighboring utilities. The availability of such capacity will depend largely upon two factors: the installation of new capacity in neighboring systems and the transmission capability between systems. Since neighboring systems have experienced delays in meeting service dates and outage problems similar to those of Con Edison, this source of power cannot be relied upon. Also, Con Edison's attempts to strengthen the transmission system have experienced delays caused by local opposition along transmission line routes.

If emergency power were not available, the Company would be required, depending on the severity of the power shortage, to institute load conservation measures such as voltage reductions and disconnection of customers. The number of instances in which the public would be inconvenienced by these measures would depend on the magnitude of the forced outages of generating equipment installed on the Con Edison system and the availability of capacity in other utility systems for sale to Con Edison on an emergency basis.

Distribution voltage on the Con Edison system can be reduced in three steps producing a voltage reduction of 3%, 5% or 8%. Based on the peak load which had been forecasted for the summer of 1971, an 8% voltage reduction would have reduced load by about 500 MW.

If an 8% voltage reduction should be insufficient, load would have to be disconnected. If it should be necessary to disconnect load equal to the capacity of Indian Point Unit No. 3 (965 MW), it would mean the interruption of more than 450,000 customers in the less dense areas of Westchester, Staten Island, northeast Bronx and northeast Queens. This would initially affect approximately 1,400,000 people primarily in private homes and small commercial establishments. If such a load disconnection were required

for more than two hours, additional people would be affected, as Con Edison would rotate the service interruption to different parts of its system. The Public Service Commission in its opinion in Case 25937, after discussing all possible emergency measures, concluded as follows:

> "There can be no doubt, of course, that this great region will face awesome difficulties if Consolidated Edison does not, reasonably soon, acquire additional generating and power import capacity. It is to that solution, however, that all energies should be turned and not to measures that so plainly invite economic disaster."

D. Environmental Costs of Delay

A failure to operate Indian Point Unit No. 3 as soon as it can be available for operation will produce an adverse environmental impact in that it will require the Company to make greater use of older fossil-fueled plants and threaten New York City with power interruptions. The Company has analyzed the dispatch from generating stations which would occur from June 1974 to May 1975, the first year of full operation of Indian Point Unit No. 3, with and without that unit in service. Table 3 indicates the increased energy output and increased sulfur dioxide, nitrous oxides and particulate matter by station that would be emitted if Indian Point Unit No. 3 were not in service as presently scheduled. The increase in the emission of pollutant is expected to be 1,073 tons per year of particulates, 10,390 tons per year of sulfur dioxide and 10,593 tons per year of NO_x.

Power shortages previously discussed also have adverse environmental implications in an area which is dependent on electricity for building ventilation and transportation. These are less susceptible of computation but are nevertheless significant.

TABLE 3

INCREASED GENERATION AND STACK EMISSIONS AT CON EDISON GENERATING STATIONS AS A RESULT OF INDIAN POINT UNIT NO. 3 NOT IN SERVICE FROM JUNE 1974 TO MAY 1975

Station	Increased Generation (10^6 KWH)	Additional Emissions of Particulates (tons)	SO_2 (tons)	NO_x (tons)
Out of City				
Nuclear				
Indian Point (Units 1 and 2)	830	8	69	78
Fossil				
Bowline Point	705	121	1,035	1,160
Roseton	394	137	1,928	648
Total Fossil	1,099	258	2,963	1,808
Total Out of City	1,929	266	3,032	1,886
In City				
Hudson Ave.	1,251	348	3,000	3,360
Waterside	34	10	82	91
74th Street	19	5	46	51
59th Street	6	2	14	16
Astoria	1,092	195	1,748	1,958
Ravenswood	695	124	1,113	1,246
Arthur Kill	347	62	556	622
East River (#s 5,6,7)	257	46	411	461
Gas Turbines	230	15	388	902
Total in City	3,931	807	7,358	8,707
TOTAL SYSTEM	5,860	1,073	10,390	10,593

Notes: Assumes 0.3% sulfur oil for all stations except Roseton, which is 1.0% sulfur oil and gas turbines which are 0.2%. Emissions on nuclear units are from I.P.#1 superheater.

E. Economic Cost of Delay

As has been noted, Indian Point Unit No. 3 is well along in its construction phase. As of the end of 1971, Con Edison will have invested on Indian Point Unit No. 3 approximately $160,000,000 and is committed to pay for the balance of the construction of the plant, leading to a full cost of approximately $260,000,000.

If construction were stopped, all progress payments to contractors would stop. For the actual period of stoppage of construction the cost of additional interest during construction would be $1,000,000 per month. The cost of additional escalation on the job will vary depending on the duration of the suspension. For a period of about six months duration, for example, escalation could be about $200,000 per month.

Con Edison overheads would continue to be paid. The additional cost of engineering would be about $35,000 per month, and the cost of administration and supervision would be about $40,000 per month. Other Con Edison overheads including pensions, payroll taxes and Con Edison labor payroll would be about $75,000 per month. The total of all Con Edison overheads would therefore be about $150,000 per month.

The entire Indian Point Unit No. 3 work force would have to be laid off. The cost to Con Edison of maintaining this large payroll would be eliminated for the duration of the suspension. However, the consequential cost to the community dependent upon the income derived from employment on this project is incalculable. It is estimated that whatever the length of delay experienced, construction would be extended an additional six months in order to rehire a new work force and train the many new men. During this extra six month period, Con Edison would continue to pay its own overheads for the job and to incur the interest during construction and the very large cost of replacement power.

The net additional cost of replacement power is based on the generation of the same amount of energy (as would be produced by Indian Point Unit No. 3) by other units on the Con Edison system. This would be approximately $4.0 million per month.

The economic cost of delaying operation of the plant, therefore, is estimated as approximately $5.35 million per month, consisting of an estimated $4.0 million as the incremental cost of replacement power (if available) and approximately $1.35 million per month as the carrying cost of the idle investment.

Thus, the total cost of the delay would be about $32 million for a six month delay. If the delay were for twelve months, it

is estimated that escalation would increase to $300,000 per month, with the result that the total cost for a twelve month period would become $65 million. These total cost estimates do not include the cost of rehiring and retraining a work force after the suspension is lifted. Nor do they include the cost of purchased power and the carrying charges during that time period. There are no identifiable benefits that would accrue to anyone from this very substantial expenditure.

F. Cost of Alternatives

a. Gas Turbines

As noted previously, gas turbines could be available for service by 1974. However, the use of gas turbines for base load operation would present unusual problems. They have never been so used by an electric utility. This would also be a very expensive alternative. Although gas turbines would have a lower capital cost (estimated to be about $143 per kilowatt excluding transmission) than Indian Point Unit No. 3 (which it is now estimated will cost, when completed, $301 per kilowatt for 965 MW excluding transmission), they would have a much higher production cost (about 16.0 mills per kilowatt hour as compared to approximately 1.9 mills per kilowatt hour for Indian Point Unit No. 3).

By December 31, 1971, Con Edison will already have invested $160 million in the construction of Indian Point Unit No. 3. Thus, the alternative of installing gas turbines to provide capacity in place of Indian Point Unit No. 3 and to produce energy for Con Edison customers as part of the total mix of system capacity resources must be compared to the cost to complete Indian Point Unit No. 3 and to provide energy with that unit in service. As a result of the significantly higher fuel costs, total system annual costs will be greater if a gas turbine alternative were

installed in place of Indian Point Unit No. 3. The total additional annual cost to install gas turbines, rather than complete Indian Point Unit No. 3, and to produce energy from units with higher fuel costs than Indian Point Unit No. 3, would be approximately $43.5 million.

If the gas turbines were only required for a period of time equal to the suspension of construction for environmental review, it would be extremely uneconomic to install them for such a short period.

b. Purchased Power

We do not believe that it would be prudent to rely on purchased power as an alternative to Indian Point Unit No. 3 in the event that unit were delayed. In any case, on the basis of our recent experience the cost of purchased power as an alternative, if such power were available, would be considerably greater than producing equivalent power at Indian Point Unit No. 3. The cost of purchased power varies greatly depending on its source, transmission distance, etc.

The costs for the purchase of firm power are established by negotiations with the seller. In 1970 the cost of firm purchases averaged 8.3 mills per kilowatt hour. During 1971, in which summer 920 MW of firm power was purchased, the

average cost was 11.1 mills per kilowatt hour. Individual purchases ranged from 8.0 to 19.5 mills per kilowatt hour. Costs of power in the future are expected to be greater because they would be based on new plant costs. By comparison, the cost to generate power at Indian Point Unit No. 3 is estimated to be 8.0 mills per kilowatt hour.

Supplemental and emergency purchase of power may be expected to be available for short periods and in varying quantities in the future. However, both forms of purchased power are intended to be of short duration and are available only when the seller's system has capacity in excess of its own requirements. Supplemental power may be scheduled in advance of use where it is known a deficiency will exist. It is usually made available at the seller's cost (which includes start-up and operating charges and fuel and incremental maintenance costs on the seller's highest cost equipment) plus 10%. Emergency purchases are those which are not prescheduled, but rather are requested at the time of an emergency when a company's load carrying capability is in jeopardy. The purchase price for emergency purchase is also usually seller's cost plus 10%. From January 1, 1971 to May 31, 1971, the average cost of supplemental and emergency purchases was 13.9 mills per kilowatt hour, with individual purchases ranging in cost from 8.4 to 23.4 mills per

kilowatt hour. In 1970, the average cost of supplemental and emergency purchases experienced by Con Edison was 11.5 mills per kilowatt hour. This is already considerably higher than the cost of power from Indian Point Unit No. 3 and it may be expected that these costs will increase in the future.

Con Edison has in the past made emergency purchases of energy from outside the system. Such purchases and other short duration purchases are available in varying quantities from day to day only as load and system conditions of other utilities permit. However, there is no assurance as to the availability of such power, and it would be extremely imprudent to plan to meet load demands utilizing emergency purchases without any basis to predict when and how much will be available.

IV. CONCLUSION

The foregoing information can be summarized in the form of costs and benefits of a suspension of the construction permit. This summary constitutes Con Edison's reasons why the construction permit should not be suspended.

The principal point which emerges from Sections I and II above is that no benefit results from a suspension of the construction permit. The plant is sufficiently advanced in construction so that no additional flexibility in the selection of alternatives would be obtained by a suspension of the construction permit. The circulating water system, perhaps the most controversial part of the plant in an environmental review, is almost fully constructed. Continued construction neither forecloses alternatives nor makes them significantly more difficult to install.

Continued construction during the period of the environmental review results in an environmental benefit. The plant site has been disrupted as far as it will be and a suspension of construction would prolong the scenic disturbance of the site. Certain chemical discharges will occur upon completion of the plant, but they are more than one year in the future.

The disadvantages and costs of a suspension of the

construction permit are very great. Primarily, Con Edison requires Indian Point Unit No. 3 to meet the electric power needs of approximately 8,650,000 people in New York City and Westchester County. Con Edison has experienced serious power shortages in the recent past and difficult times are anticipated until completion of Indian Point Unit No. 3 and other new plants scheduled for completion by 1974. Present planning allows for the delay in one of the plants now scheduled for 1974. If this allowance is used in 1971 to permit a suspension of Indian Point Unit No. 3, then Con Edison is placed immediately in the same posture that led to its recent difficulties -- namely, that a construction or regulatory delay in any other individual unit will precipitate a power crisis. The people of New York City and Westchester through their elected representatives and the Public Service Commission have demanded an end to the recurrent power crises. We now see this end as occurring in 1974 upon completion of the plants scheduled for that year. The suspension of the construction permit for Indian Point Unit No. 3 would postpone that most desirable result.

A suspension of construction of Indian Point Unit No. 3 would inevitably lead to increased operation of old units with a corresponding increase in the emissions of air pollutants in

New York City. Con Edison has several old, inefficient, fossil fuel units in New York City which are scheduled for retirement in the years 1972-1974 as new units come into operation. The retirement not only increases the efficiency and reliability of the system but enables Con Edison to achieve goals established by New York City for the reduction of the emissions of air pollutants into the City's atmosphere.

Finally, the economic costs of suspension are considerable. This has been given as approximately $5.4 million per month. If millions of dollars are to be spent for environmental purposes, there would be any number of more desirable uses for the funds than a suspension of the construction of Indian Point Unit No. 3. It would be a strange order of priorities to spend money for this purpose when many other environmental needs are suffering from lack of adequate funding. Also, the economic impact on the community of a loss of 800 jobs must be considered.

In conclusion, Con Edison believes that the Indian Point Unit No. 3 construction permit should not be suspended because such a suspension produces no benefit and involves very serious adverse consequences.

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