Met Ed

Metropolitan Edison Company

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Jersey Central Power & Light Company

ENVIRONMENTAL REPORT
OPERATING LICENSE STAGE

Three Mile Island Nuclear Station Unit 1 and Unit 2

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Three Mile Island
Nuclear Station
Unit 1 and Unit 2

METROPOLITAN EDISON COMPANY

JERSEY CENTRAL POWER & LIGHT COMPANY

ENVIRONMENTAL REPORT

OPERATING LICENSE STAGE

THREE MILE ISLAND
NUCLEAR STATION
UNIT 1 AND UNIT 2

OCTOBER 1, 1970

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LIST OF EXHIBITS

A. INTRODUCTION

I. STATEMENT OF PROJECTS

By an application dated May 3, 1967, and fourteen amendments thereto; and by an application dated May 22, 1968, and ten amendments thereto, Metropolitan Edison Company (Met-Ed) and Jersey Central Power & Light Company (Jersey Central) have applied to the United States Atomic Energy Commission (AEC) for the necessary licenses to construct and operate a two-unit nuclear power station on a site in Dauphin County, Pennsylvania, to be known as Three Mile Island Nuclear Station (Unit 1 and Unit 2). Met-Ed will have complete responsibility for the engineering, design, construction, operation and maintenance of the Three Mile Island Nuclear Station. Jersey Central and Met-Ed will share undivided ownership of the station as tenants in common without right of partition.

This station will occupy part of an 814-acre site consisting of the Three Mile Island and adjacent islands in the Susquehanna River approximately 10 miles southeast of Harrisburg, Pennsylvania. Both units will employ reactors of the pressurized water type to be supplied by the Babcock & Wilcox Company. Unit 1 will have a gross electrical capacity of 871,000 kilowatts, and Unit 2 will have a gross electrical capacity of 845,000 kilowatts. Gilbert Associates, Incorporated is the architect-engineer for Unit 1 while Burns & Roe, Inc. is the architect-engineer for Unit 2. United Engineers & Constructors, Inc. is the constructor and the construction manager for both units. Pickard, Lowe & Associates has been assisting the engineering and environmental staff of Met-Ed and Jersey Central in general nuclear and environmental engineering matters. Experts in meteorology, radiological health physics, marine biology, nuclear fuel technology, and other specialized disciplines have been retained for supplementary assistance.

The applications have been reviewed by the regulatory staff of the AEC's Division of Reactor Licensing and by the Commission's independent Advisory Committee on Reactor Safeguards. After a public hearing was conducted for each application by the Atomic Safety and Licensing Board, the AEC has subsequently authorized construction of both units by permits dated May 18, 1968 and November 4, 1969. Unit 1 is scheduled to begin commercial operation in November of 1972 while Unit 2 is scheduled to begin commercial operation in May of 1974. These units will provide the additional generating capacity required to enable Met-Ed and Jersey Central to meet load conditions and reserve requirements projected for those years.

II. PURPOSE

This Environmental Report, prepared by the applicants, is submitted in response to letter requests from Dr. Peter A. Morris, of the AEC's Division of Reactor Licensing, dated July 15, 1970. This report serves to provide a summary description of the station's environmental features and an assessment of the station's environmental impact. As such, this report reflects the AEC's

proposed statement of general policy as published in the Federal Register on June 3, 1970, as a proposed amendment of Appendix D, Title 10, Code of Federal Regulations, Part 50 (10 CFR Part 50), for implementation of the National Environmental Policy Act of 1969 (NEPA). As requested by the AEC, this report discusses the environmental aspects of the Three Mile Island Nuclear Station as set forth in Section 102(c) of NEPA. Other pertinent information requested by the AEC is also included.

As stated in the AEC's proposed statement of general policy, the Water Quality Improvement Act of 1970 supercedes the more general requirements of NEPA with respect to the water quality aspects of the station. However, a discussion of water quality has been included in this report so that all concerned may be more fully apprised of the effects of the station on the total environment.

B. ENVIRONMENTAL CONSIDERATIONS

I. PROBABLE ENVIRONMENTAL IMPACT

a. General

The Three Mile Island Nuclear Station will have its principal impact on the environment in the areas listed below. All but the second of these items are common to any large thermal power project.

1. Intake and discharge of cooling water.
2. Controlled release of small amounts of radioactive matter to the air and water.
3. Discharge of treated process wastes and treated sanitary wastes into the water.
4. Rejection of waste heat to the atmosphere.
5. Physical presence; i.e., structures, traffic, sound.
6. Land use of the site.

The Applicants intend to abide by all applicable State and Federal standards related to the protection of the environment. The relationship of the Three Mile Island Nuclear Station to its environment with respect to the above areas and its conformance to applicable Federal, State and local regulations in these areas are discussed below. Detailed descriptions of the site and plant systems are included in Part C, entitled "Background Information."

b. Thermal Effects

The operation of the cooling water systems for the Three Mile Island Nuclear Station is as described in Part C, Section II of this report. To reduce the thermal effects on the Susquehanna River, natural draft cooling towers will be used to dissipate to the atmosphere almost all of the waste heat generated by the station.

It is anticipated there will be no increase of ground level fog or ice from the cooling tower operation. The top of the cooling tower will be approximately 400 feet above the river, and because the plume is buoyant due to its large heat content and has momentum as it emerges, the effective height of the cooling tower is even greater. The inversion which normally prevents dissipation of ground fog occurs at a sufficiently low level to be penetrated by the natural draft cooling tower plume.

Since the cooling in the tower is accomplished largely by evaporation, this loss of water must be replaced. Also, due to the evaporation, natural salts and other contaminants in the makeup river water introduced into the circulating water system are concentrated so that some of the circulating water must be bled off continuously as "blowdown" while the tower is in operation in order to maintain an acceptable quality of water in the cooling system. The blowdown from the cooling tower will carry with it some heat. To reduce the slight effect this small flow would have on the river, this blowdown is further cooled in a mechanical draft cooling tower (Exhibit 5).

The temperature of all cooling water released to the river will, except in an emergency, be reduced by natural draft cooling towers and mechanical draft cooling towers. Under most conditions, including the most adverse combination of high river temperature and high ambient temperature, these cooling towers will be capable of reducing the temperature of the water so released to essentially the temperature of the river, and will be operated to that end.

Under the Water Quality Improvement Act of 1970, the applicants are required to provide the AEC with certification from the Commonwealth of Pennsylvania that there is resonable assurance that the construction and operation of the Three Mile Island Nuclear Station will be conducted in a manner which will not violate applicable water quality standards. The applicants are now in the process of obtaining this certification for the water quality standards which already exist. In addition, the Commonwealth of Pennsylvania is proposing water quality standards for the control of thermal discharges. In the absence of existing limits, the design of the cooling water systems has proceeded on the basis of the limits recommended by the Federal Water Quality Administration.

In order to confirm that the aquatic environment will not be significantly affected, the applicants are conducting studies of the local ecology as described in Part B, Section VI. Investigations have been underway since 1967, and encompass various physical, chemical and biological parameters of the Susquehanna River in the Three Mile Island area. Post-operational research will examine these same parameters and will continue to determine what effects, if any, have occurred in this area.

It is the conclusion of the applicants that the intake and discharge of cooling water by the Three Mile Island Nuclear Station will not adversely affect the fish population and migration patterns, populations of other small aquatic organisms, or any other aspect of the aquatic ecology in the area. Further, the applicants will take into consideration the recommendations of the U. S. Fish and Wildlife Service that the applicants:

1. Continue cooperating with the Fish and Wildlife Service, Pennsylvania Fish Commission, Federal Water Pollution Control Administration, the Pennsylvania Sanitary Water Board, and other interested State agencies in developing plans for environmental surveys, initiate these surveys prior to reactor operation, and continue them until it has been demonstrated that no significant adverse conditions exist.

2. Meet with the above named Federal and State agencies at frequent intervals to discuss any new or modified plans and the progress of environmental surveys.

3. Prepare a report on the environmental surveys and provide five copies of it to the Secretary of the Interior for evaluation prior to project operation.

4. Make such modifications to the station as may be determined necessary as a result of the pre-operational and post-operational ecological surveys to preserve the environment and to protect the fish and wildlife resources in the area.

c. Radiological Effects

The radioactive waste processing facilities of Three Mile Island are as described in Part C, Section II. All liquid wastes can be processed through filters, demineralizers, and/or evaporators to remove as much radioactivity as is required to achieve low levels which are consistent with applicable AEC regulations. Solid waste will be packaged in appropriate containers and shipped off-site for disposal at AEC approved storage sites by Department of Transportation licensed contractors. The design of the gas waste system permits retention for a minimum of 90 days under normal conditions to permit decay to activity levels which are well below the limits specified in the applicable AEC regulations.

It is anticipated that during the operation of the Three Mile Island Nuclear Station, the radioactive gaseous and liquid releases will be a very small percentage of the limits as specified in 10 CFR Part 20. The plant operating procedures will be such that radiological releases will be maintained at as low a level as practicable, consistent with safe plant operation. It is expected, therefore, that, at these low levels, there will be no adverse effects on either the land or aquatic environments surrounding the Three Mile Island site.

To provide a basis for determining any possible radiological effects on the environment, the applicants are conducting an extensive pre-operational program of monitoring radiation levels in the Three Mile Island area as described in Part B, Section VI. Samples are taken of surface waters, bottom sediments, aquatic biota, air, soil, food crops, milk, vegetation and general background radiation levels. This program, with minor modifications, will be continued post-operationally to establish the degree of environmental effects.

It is the conclusion of the applicants that there will be no adverse environmental effects as a result of Three Mile Island Nuclear Station operations and that the radiological monitoring program will demonstrate this. Furthermore, the applicants will take into consideration the recommendations of the U. S. Fish and Wildlife Service that the applicants:

1. Continue cooperating with the Fish and Wildlife Service, the Federal Water Quality Administration, the Pennsylvania Fish Commission, the Pennsylvania Sanitary Water Board, and other interested State agencies in developing plans for radiological surveys.

2. Conduct pre-operational radiological surveys of selected organisms indigenous to the station area that concentrate and store radioactive isotopes, such as mollusks and crustaceans, and of the environment including water and sediment samples all collected as near the reactor effluent as possible.

3. Meet with the above mentioned Federal and State agencies at frequent intervals to discuss new plans and to evaluate results of existing surveys.

4. Prepare a report of the pre-operational radiological surveys and provide five copies to the Secretary of the Interior for evaluation prior to project operation.

5. Conduct post-operational radiological surveys similar to those specified in recommendation (2) or as modified under recommendation (3), analyze the data, and prepare and submit reports every three months during the first year of operation and every six months thereafter or until it has been conclusively demonstrated that no significant adverse conditions exist. Submit five copies of these reports to the Secretary of the Interior for distribution to the appropriate State and Federal Agencies for evaluation.

6. Make modifications to the station to reduce the discharge of radioactive wastes to acceptable levels if it is determined in the pre-operational or the post-operational surveys that the release of radioactive effluents permitted under 10 CFR Part 20 would result in harmful concentrations of radioactivity in fish and wildlife.

d. Chemical Releases

Of necessity, all thermal power plants use various chemicals in plant operations. These chemicals include acids and bases for regeneration of chemical resins used in maintaining high purity water in the reactor system and other analytical solutions in the chemical laboratory. The liquid volumes associated with these chemicals are collected and treated in various systems prior to disposal as described in Part E, Section II. This treatment involves neutralization, filtration, demineralization and/or evaporation. The liquid waste disposal processes result in two effluent streams, one a concentrated chemical waste which

will be packaged and shipped off-site for disposal, and a second high purity liquid which would be either recycled into the nuclear plant makeup water system for reuse or discharged from the plant. This latter liquid discharge will contain only trace quantities of neutral inorganic salts, which would be well within the Federal water quality standards for drinking water.

A small portion of the cooling water taken from the river is used to cool auxiliary cooling systems. This water must be treated with chlorine to prevent aquatic fouling of tubes. It is eventually discharged back into the river. However, concentrations of the chlorine are controlled so that at the point of discharge, the residual levels of chlorine will be negligible and well within the Federal water quality standards for drinking water. All liquid releases from Three Mile Island Nuclear Station will be well within the applicable Federal water quality standards for drinking water. Thus, there will be no adverse effect on the environment of the Susquehanna River as a result of chemical releases from the station.

e. Mechanical Effects

The construction of the station intake and discharge structures will result in a temporary disruption of the station environment and the aquatic environment in the immediate vicinity of the structures. However, the effects will be minimal due to the short duration of this construction effort.

The cooling water intake structures are provided with automated trash rakes with 1-inch vertical bar spacings, and with travelling screens with 3/8-inch screen openings. These screens combined with the low inlet velocity of ~~2.0~~ 3.2 fps reduce the possibility of fish and small crustaceans being drawn into the cooling water intake.

f. Physical Presence

i. Asthetics

The Three Mile Island Nuclear Station employs a clean, functional design as can be seen in Exhibit 1, which is an architectural rendering of the installation. Because of the lack of bulk fuel storage and handling facilities, the station will be improved in appearance by comparison to fossil fueled stations. The dominant features include the natural draft cooling towers; the reactor buildings which house the nuclear reactors and the steam supply systems; the turbine buildings which house the turbine-generators, the condensers, feedwater heaters, heat exchangers, water treatment facilities, and other supporting equipment; the fuel water treatment facilities, and other supporting equipment; the fuel handling buildings; the auxiliary buildings; the diesel generator buildings; and a service building.

The natural draft cooling towers are almost 400 feet tall and will be visible for some distance from the Station. The operation of the cooling towers will create a visible, white water vapor plume aloft which will disperse as it is transported downwind. Under less favorable meterological conditions, the plumes may remain visible for a considerable distance downwind. Under no condition, however, could a region-wide, semi-permanent cloud cover ever occur from operation of these cooling towers.

ii. Noise

The typical sounds from traffic, heavy equipment and work accompying a large construction project would be produced during a period of approximately seven years.

Nuclear power plants are relatively noise free. Some noise could be expected from operation of the station, but the noise level would be substantially less than that associated with thermal generating plants using conventional fuels.

iii. Regional Development

Three Mile Island was purchased in 1905 as part of a regional power development plan. There is no known conflict between the land use of this island and any regional development plan.

The northern portion of the island lends itself to station expansion. However, the applicants have no present plan for further power development on the island.

iv. Population and Traffic Patterns

Construction activities require a substantial work force at the site, which is typical of any large construction project. Operating nuclear power plants require a relatively small plant operating force, and traffic and other side effects of the station, once it is in operation, will not be significant. Therefore, no significant change in population trends or character of the activities in the surrounding area on either side of the Susquehanna River at Three Mile Island would be expected as a result of this Station.

v. Recreational Land Use

The Three Mile Island Station will not adversely affect the recreational uses of this area. On the contrary, the recreational uses of the area will be enhanced as described in Part B, Section VIII of this report. The land surrounding this site is rural and used primarily for farming and some hunting. The streams in the vicinity are used for boating, sport fishing, and other recreational activities.

vi. Non-Recr[illegible] Land Use

The land in the vici[illegible]y of the site is used primarily for farming. The streams in the vicini[illegible] water supply, both public and private, and power generator. Com[illegible]ial [illegible]ing is not conducted in the area.

Operat[illegible] of the station will not interfere with the public, private, and industrial fresh [illegible] supply and the quality of the water will be maintained. Because of the lack of physical disruption of the surrounding area, the lack of increased traffic flow and other operational side effects, and the relatively small plant operating force needed, the rural character of the land and the land use activities will not be affected.

vii. Archaeology

Archaeological activity on Three Mile Island was completed by scientists of the Pennsylvania Historical and Museum Commission during the latter part of 1967. The Metropolitan Edison Company has given its cooperation and financial support to the archaeological salvage excavations on Three Mile Island for the purpose of recovering such ancient Indian artifacts as might be found on the island. As a result of these investigations, over 1000 artifacts have been recovered. These remains represent some 6000 years of human occupation of the island.

viii. Historical Landmarks

The general area of the Three Mile Island site has been examined for the presence of historic landmarks in accordance with the requirements of the Historic Preservation Act. The nearest historical landmark as listed in the National Register of Historic Places is over 17 miles from the site. This is the Cornwall Iron Furnace located in Lebanon County.

A candidate for inclusion in the National Register of Historic Places is St. Peter's Evangelical Lutheran Church in Middletown, approximately three miles north of the site. The site is not visible from the church and the Three Mile Island Nuclear Station will in no way interfere with the church.

ix. Conclusion

It is, therefore, the conclusion of the applicants that the physical presence of the Three Mile Island Nuclear Station will have no significant adverse effect on the enjoyment and use of the surrounding area.

g. Other Areas of Possible Environmental Impacts

Shipments of solid wastes and spent fuel from the Three Mile Island Nuclear Station are expected to have no environmental impact either during shipment or at the point of storage or reprocessing. The activities are performed in conformance to strict Federal and State regulations designed to ensure the health and safety of the public under all conditions. It is the opinion of the applicants based on the standards specified in these requirements, that there will be no adverse environmental impact from these operations.

II. POSSIBLE ADVERSE ENVIRONMENTAL EFFECTS

The Federal and State regulations applicable to the Three Mile Island Nuclear Station are designed to protect and to enhance the environment. The applicants have complied and will continue to comply with these regulations and expect no adverse environmental effects to result from the operation of this station. The design intent of the station is to provide flexibility to accommodate changes, if necessary, in waste and cooling water systems.

III. ALTERNATIVES TO THE STATION

a. Not Providing the Power

The public service laws of the Commonwealth of Pennsylvania and the State of New Jersey, under which the applicants operate as public utilities, mandate that the applicants make adequate provision for the supply of electricity to their customers. Because of the long lead times involved in the planning and construction of major power facilities, electric utilities have no option but to base their plant expansion programs on demand forecasts. In order to maintain a reasonable reserve, 15% to 20%, it is necessary for the applicants to provide generating facilities timed to provide this reserve. Recent voltage reductions, sometimes referred to as "brownouts," are the result of insufficient generating reserve in the area. To meet the growing demand for electrical energy, and provide for the reliability the public expects, the applicants have no option but to make firm provisions for this additional power supply, and it is this requirement which the Three Mile Island Nuclear Station must satisfy.

b. Importing Power

Purchasing power from other utilities in the amounts necessary to satisfy, or even partially satisfy, the above indicated need is not a practical alternative (1) because the utility systems upon which the applicants might conceivably draw for such a purpose are currently hard pressed to keep pace with their own demands, (2) because the purchased power is uneconomical, usually priced at the supplier's top cost increment, and (3) because of

transmission limitations. The applicants are members of the Pennsylvania, New Jersey, and Maryland interconnection (PJM), a power pool existing for the most economical interchange of power under normal and emergency conditions. However, no member is expected to consistently depend on the pool for firm power supply.

c. Alternatives to Nuclear Power Generation

The alternatives to nuclear power generation at Three Mile Island are fossil fuel or hydroelectric generating units.

Gas turbines are inappropriate because of their high fuel cost and low operating efficiency, which more than outweigh their low capital cost advantage.

Hydroelectric plants are discounted as there is no river in the Commonwealth of Pennsylvania or in the State of New Jersey which can produce electricity in the quantities to match the Three Mile Island generation due to lack of suitable river flows and elevations.

Of the fossil fueled generation alternatives, natural gas, although the best fossil fuel from an environmental standpoint, cannot be relied upon for providing any significant capability due to its limited availability. Oil fuels (either regular or low sulfur content) are expensive and are not readily available. Bulk barge shipments of fuel oil would be needed at frequent intervals. The Conowingo Dam on the Susquehanna River near Port Deposit, Maryland, has no locks and thus prevents any barges from reaching the Three Mile Island site. The alternate to this would be to construct an oil pipeline to an eastern coast port. Both of these alternates make the use of oil an unacceptable alternative to nuclear power generation at this site.

Coal is the most reasonable fuel alternative to nuclear power generation, but large quantities of coal and/or low sulphur content coal are not readily available. Moreover, coal has certain environmental disadvantages. It is the applicants' opinion that, from an environmental point of view, a nuclear station is a more favorable alternative.

d. Possible Cooling Alternatives

Of necessity, all steam power plants require large quantities of water for cooling purposes in the station condensers. Therefore, in the interest of protecting the water environment of the Susquehanna River, natural draft cooling towers were chosen as the cooling method for the condenser circulating water system. The only feasible alternative to these cooling towers are cooling ponds. However, it is estimated that a cooling pond of about 850 acres would be required for each unit, more than twice the acreage available at the site.

It is the opinion of the applicants that the natural draft cooling towers used for the condenser cooling water system designed in accordance with applicable regulations will have the least environmental impact.

e. Alternatives to the Site

In the course of selecting a site for installation of one or more large thermal generating units, the applicants initially considered 20 different locations. This list of sites was narrowed to six locations for more intensive study. The Three Mile Island site was finally chosen after considering such factors as availability of cooling water, transmission capability, planning and service area growth pattern, and environmental considerations.

IV. RELATIONSHIP BETWEEN SHORT-TERM USES OF MAN'S ENVIRONMENT AND LONG-TERM PRODUCTIVITY

The short-term use of man's environment to provide an adequate and reliable source of electric power to an area of this country experiencing a critical shortage of electric energy is unquestionably essential to the health, welfare, safety, and economy of the public involved. Industrial, residential, and recreational activities in the surrounding areas will not be curtailed or even noticeably affected. The production of electric power by the Three Mile Island Nuclear Station will enhance the long-term productivity of the area with no adverse environmental effects.

V. IRRETRIEVABLE AND IRREVERSIBLE USES OF THE ENVIRONMENT

The construction and operation of the Three Mile Island Nuclear Station will involve the commitment and use of a certain amount of land, air, and water, with only the land being unavailable for other types of activities. At the end of the useful life of this station, there is no intrinsic reason why then all can not be returned to their original state; hence, these commitments are not irreversible. Thus, the land and its resources will be available for the use of future generations.

The only resourse at Three Mile Island that is irretrievable is the Uranium-235 portion of the fuel consumed in the station. In this act of consuming fuel, the Three Mile Island Nuclear Station draws on a natural resource. This use of a natural resource is not intrinsically different from that at any other power station, either fossil fueled or nuclear.

It is the opinion of the applicants that the presence of the Three Mile Island Nuclear Station will not adversely affect the environment in terms of irretrievable and irreversible commitment of resources.

VI. ENVIRONMENTAL STUDIES

a. Aquatic Environmental Studies

A biological survey of the Susquehanna River in the vicinity of the Three Mile Island site was started in 1967 and will continue through 1970. This survey is under the direction of Dr. Charles B. Wurtz, consulting biologist of LaSalle College, Philadelphia, Pennsylvania.

The survey conducted by Dr. Wurtz consists of a study of the macro-invertabrate fauna (bottom organisms) at a series of sampling stations located in a stretch of the river extending from above Three Mile Island downstream to the Haldeman Riffle. Water quality characteristics are also being monitored during the survey.

In addition to the survey being conducted by Dr. Wurtz, an expanded survey will be undertaken by Dr. G. Hoyt Whipple of the School of Public Health, University of Michigan. Dr. Whipple will be aided by personnel from Millersville State Teachers College.

The survey will consist of the following items:

1. A fish population study to determine population density, number of species, and condition factors.

2. A study of macro- and micro-invertebrate fauna conducted in the water and sediments to determine composition, relative abundance, and general distribution.

3. A study to analyze the area for some twenty chemical elements (stable isotopes) in conjunction with the biological phases of the survey. The objective of the stable isotope study is as follows:

    a. To "map" the area with respect to the distribution of the elements in the water sediments, suspended material, and living organisms.

    b. To develope a routine sampling program that will represent the area.

    c. To determine if areas of high and low inputs of these elements exist and the concentration gradients in those locales relative to Three Mile Island.

    d. To determine the ratios of some of the elements in the water, sediments and indicator organisms.

    e. To determine a correlation between the data obtained in this phase and the biological population data from the other phases of this survey.

It is anticipated that this will be conducted for at least a five- year period.

b. Radiological Monitoring Program

A pre-operational environmental monitoring program has been in progress since January 1968 in the vicinity of the Three Mile Island site. This pre-operational phase of the program will be utilized to assess measurement techiques, to train personnel, and to measure backg ound radioactivity levels. The monitoring program is also based on consideration of potential radiation sources from the station, potential modes of radioactive material transport in air, water, and food and significant modes of human exposure. The pre-operational program will be continued until Unit 1 achieves initial criticality, at which time an operational program will commence.

In addition to the Susquehanna River samples being analyzed by the Met-Ed personnel, duplicate samples are sent to the Commonwealth of Pennsylvania Radiological Health Department. Meetings have been held with representatives of the Commonwealth of Pennsylvania to discuss instrumentation, fish sampling, and to solicit comments on environmental monitoring activities.

An outline of the pre-operational program currently being conducted is as follows:

1. Well water is sampled and analyzed for gross alpha and gross beta-gamma activity. Four locations within a five-mile radius are sampled every 12 weeks.

2. River water is taken from the Susquehanna River on the west side of Three Mile Island with 500 feet of the outfall every four weeks. The samples are analyzed for gross alpha and gross beta-gamma activity.

3. River sediment is taken from the Susquehanna River within 500 feet of the outfall every four weeks. The samples are analyzed for gross alpha and gross beta-gamma activity.

4. Fish samples are collected from the Susquehanna River within 500 feet of the outfall every 12 weeks and analyzed for gross alpha and beta-gamma activity.

5. Soil samples, one on-site and four off-site at locations north, south, east, and west of the site, are collected and analyzed for gross alpha and gross beta-gamma activity every 12 weeks.

6. Vegetation samples are collected at one on-site and four off-site locations every 12 weeks. The samples are analyzed for gross alpha and gross beta-gamma activity.

The following additional samples will be collected during the operational phase when the reactor plant achieves criticality:

1. Air particulate samples will be taken continuously at strategic locations both on and off site. The locations will be selected following review of the meteorological data.

2. Direct radiation will be measured with either film badges or thermo-luminescent dosimeters at strategic locations to be selected.

3. Milk samples will be collected periodically from dairy herds in the Three Mile Island vicinity.

4. Clams or snails will be sampled within 500 feet of the plant outfall.

5. Crops will be sampled at strategic locations in the Three Mile Island vicinity during the growing season.

Throughout the environmental monitoring program, an effort will be made to coordinate the applicants' activities with the Commonwealth of Pennsylvania Radiological Health Department. Additionally, samples will be sent to an outside consultant for a third party analysis on a quarterly basis.

VII. POLLUTION CONTROL MEASURES WHICH WERE INSTITUTED OR WHICH ARE EXPECTED TO BE INSTITUTED DURING CONSTRUCTION AND SUBSEQUENT OPERATION OF THE FACILTY

During construction of the facility, a portable septic system and septic tank and tile drain field are employed to control sanitary wastes. Solids which might be retained in the septic tank will be pumped out and removed by a contractor.

Earth fill required for construction will be excavated from a portion of the island. Dredged materials from construction of the intake and discharge structures will be used as fill for these excavated areas.

Subsequent to operation of the station, sanitary wastes will be treated as described in Part C, Section II.

Natural draft cooling towers will be utilized for dissipation of waste heat, thereby preventing any adverse thermal effects in the Susquehanna River. Also, the design and operation of the radioactive waste systems and the chemical wastes will reduce to a minimum the amount of pollutants released to the environment.

VIII. RECREATIONAL USES OF THE SITE

a. Recreational Facilities

After completion of the Three Mile Island Nuclear Station, the applicants plan to construct recreational facilities on the southern portion of the island as a part of the over-all York Haven Power Project to enhance the Susquehanna River area. The recreational facilities contemplated at present include picnic sites, landscaped ground picnic sites, shelter and comfort stations, a marina, a recreation building, boat slips, baseball fields, basketball and tennis courts, a playground, roads and parking areas, trails, and other supporting facilities.

b. Observation Center and Park

A visitor observation center and park have been constructed along State Highway Route 441 North and face the east side of the island. A motion picture-slide program traces the history of the island, explains the beginning of the electric industry, explains how the nuclear station will generate electricity and at the same time protect the environment, and explains the impact of electricity on our modern way of life.

A balcony on the observation center contains telescopes for viewing the construction of the facilities. A park adjoining the center contains picnic tables for visitor use.

C. BACKGROUND INFORMATION

I. DESCRIPTION OF THREE MILE ISLAND SITE

a. Location

The Three Mile Island Nuclear Station is located on Three Mile Island in the Susquehanna River about 10 miles southeast of Harrisburg, Pennsylvania. It is in Londonderry Township of Dauphin County, about 2½ miles north of the southern tip of Dauphin County, where Dauphin is coterminal with York and Lancaster Counties. Its location with respect to the surrounding topographic and cultural features is indicated on Exhibit 2.

Three Mile Island is one of the largest of a group of several islands in the Susquehanna River and is situated about 900 feet from the east bank. It is elongated parallel to the flow of the river, with its longer axis oriented approximately due north and south. Upstream, the southeasterly flowing Susquehanna River makes a sharp change in direction to nearly due south in the vicinity of Middletown. After this directional change just north of Three Mile Island, the channel widens to approximately 1.5 miles.

The island is about 11,000 feet long and 1700 feet wide. The generating units will be in the northern one-third of the island. Exhibit 3 is an aerial photograph of the site showing the location of the plant buildings, cooling towers, and the character of the immediate surroundings.

The site is an 814-acre tract owned by Met-Ed consisting of Three Mile Island and several adjacent islands. A permanent access bridge for Met-Ed personnel connects State Highway Route 441 with the north end of the island across Sand Beach Island. A temporary wood access bridge connects the south end of the island with Route 441. This bridge is used for other site personnel, visitors, and construction equipment. Route 441 is a two-lane, black top road, which runs north and south parallel to Three Mile Island on the east bank of the Susquehanna River and is more than 2000 feet from the reactors at the closest point.

The site property is relatively flat land and wooded on the periphery and on the southeast portion of the island. The river is transected east and just south of the site by the York Haven Dam, which does not have locks. There is no commercial water transportation on the river adjacent to this site. On the east bank of the river there is a Penn-Central Railroad one-track line adjacent and parallel to Route 441. On the west bank there is a multitrack Penn-Central line at the river's edge about 1¼ miles west of the site and a black top, two-lane road parallel to it. There is a one-track spur across the bridge on the north end of the island to be used for site related activities.

b. Demography

Exhibit 4 shows estimates of 1967, and projected (1987 and 2011) population in the 16 directional sectors for 0-50 miles radii around the site centers. The population estimates were made based on a study of the area by Met-Ed personnel. During this study, developers and planning boards for local and county political units were contacted in an effort to obtain first-hand knowledge of future trends in population growth and migration. Two trends were apparent:

1. The population of the anthracite coal regions is decreasing with migration southward to surrounding regions.

2. The population of nearby city centers and boroughs is decreasing with migration to the outlying districts of these population centers.

The population figures reflect these trends and were obtained by extrapolating the 1960, 1970, and 1980 population curves. These curves included appropriate growth factors and are considered to be conservative estimates. The estimates are also expected to reflect other factors such as the effects of birth and death rates. In the immediate area of the site, summer cottage population is included as if permanent.

Another factor considered is the concentration of population in the vicinity of highways. For example, the completion of U. S. Interstate Route 80 through the anthracite region could attract industry to the area resulting in a slowing of present migration out of the area and a possible reverse of the present trend in later years. The possibility of such a trend has been accounted for in the projection study.

Population within a one-mile radius is estimated to be about 650 people. The nearest population center with more than 25,000 people is Harrisburg, about 10 miles northwest. Middletown, with a population of approximately 12,000, is three miles north. The nearest residence is about 2200 feet east of the reactor building.

c. Land Use

Land within a ten-mile radius of the site is used primarily for farming. Farm produce includes dairy, tobacco, poultry, vegetable, fruit, alfalfa, corn, wheat, and other products. A summary of land use for Dauphin County, in which the site lies, and for the two other nearest counties (York and Lancaster) is as follows:

Percent of Land Used

Use	Dauphin	York	Lancaster
Forest and woodland	45.2	22.6	13.7
Crops	31.9	49.8	62.5
Pasture	4.8	10.1	9.4
Urban	8.6	6.5	7.8
Water area	0.6	0.4	0.4
Federal	0.2	0.2	0.1
Other	8.7	10.4	6.1

There are two airports in the site region, Olmsted State Airport 2½ miles northwest and Harrisburg-York Airport eight miles WNW. The former handles primarily commercial and the latter primarily private aircraft.

d. Geology

The site lies within the Gettysburg Basin section of the physiographic division known as the Piedmont Province. The topography of the area immediately surrounding Three Mile Island is of a slightly undulating natur , maximum relief of about 200 feet and highest elevation seldom above 500 feet. From the east, drainage is largely represented by the southwesterly flowing Swatara Creek, which has its mouth near Middletown and by the more westerly flowing Conewago Creek, which empties into the Susquehanna River at the south end of Three Mile Island. Fishing Creek flows into the Susquehanna west of the site, and the northwesterly flowing Conewago Creek terminates at York Haven. Three Mile Island has very little relief, with elevations ranging from about 280 feet at the water's edge to slightly more than 300 feet in the north-central portion.

The site is located in the Triassic lowland of Pennsylvania, one of a series of long narrow basins of Triassic deposits which extend in broken patches from Connecticut to North Carolina. The Triassic lowland in the vicinity of the site is referred to as the Gettysburg Basin. North and west of the Triassic lowland are the folded and thrust faulted Paleozoic rocks which comprise the Appalachian Mountains. Southeast of the Triassic lowland is the Piedmont, of Pre-Cambrian and Early Paleozic Age, composed of granites, gneisses, and schists.

The site is underlaid by the sedimentary rocks of the Gettysburg shale. The bedrock surface, at the site, is essentially flat and lies at approximately elevation 277 feet. One to three feet of weathered rock occurs at the overburden-bedrock interface.

No evidence of faulting transects the island as seen in the field from available rock exposures along the east bank of the river, or along the western periphery of the island. Aerial photographs as well give no suggestion of faulting through the island. A comprehensive evaluation of major tectonic elements in south central Pennsylvania has been prepared. It is concluded that the site is not deleteriously affected by faulting, and further, that regional tectonic elements are inactive and present no threat to the structural integrity of the local geology.

The island, as a whole, is composed of fluvially stratified sand and gravel containing varying amounts of silt, clay, and clean sand. Density values range from loose to very dense, as established by Standard Penetration Tests. Boulders are present at depth and are mainly confined to the lower portions of the soil zone on the north end of the island. Soil depths vary from approximately 6 feet at the south end of the island to a maximum of 30.0 feet near the axial intersection of the island. Depth of soil is relatively constant at about 20 feet in the vicinity of the plant site. From one- half to one foot of topsoil, composed of sandy silt with much organic material, covers the island. The island has been cultivated and planted into corn fields for the past several years.

e. Hydrology and Groundwater

i. Hydrology

From the standpoint of geography, the Three Mile Island groundwater conditions are unique, but relatively constant, and predictably controlled by the Susquehanna River, itself. The drainage area of the Susquehanna River extends from its source at Otsego Lake, Cooperstown, New York, for a distance of 444 miles, across the States of Pennsylvania and Maryland, and terminates in the Chesapeake Bay. This major water course collects surface runoff and groundwater seeps as well as their respective contaminants from a watershed of approximately a 27,400 square mile area, of which 21,000 lies within the State of Pennsylvania. This consitutes approximately 46 percent of the total area of the state, embracing all of 21 and a portion of 22 other counties. Approximately 6200 square miles of the drainage area is in New York State and 200 square miles in western Maryland. Three Mile Island is located about midway along the course of the river and therefore is influenced by the quantity and quality of that portion of the water from the Susquehanna River watershed upstream from the island. Average annual rainfall at the site is 40 inches.

Characteristics of Strear.. .n Vicinity

The drainage basin lies in the three main topographic divisions of Pennsylvania: the northern portion of the Allegheny Plateau, the central portion of the Allegheny Mountains, and the lower portion of the rolling Piedmont Plateau. The main tributaries in the vicinity of the site are the following:

Stream	Drainage Area	Average Flow (sq. mi.)
Conodoguinet Creek	483 sq. mi.	1.20 cfs
Yellow Breeches Creek	227	1.26
Swatara Creek	567	1.66
Conewago Creek (East)	52	-
Conewago Creek (West)	510	1.10

The Juniata River enters the Susquehanna River about 25 miles upstream from the site. Its drainage area is about 3426 square miles and its average flow per square mile is 1.26 cfs.

The plant site on Three Mile Island is located approximately 11 river miles downstream from Harrisburg gaging station, which has a continuous period of record since 1890. The drainage area of the Susquehanna River at the Harrisburg gage is 24,100 square miles. The average river flow per square mile at Harrisburg is 1.41 cfs. All the data for the Harrisburg gage are assumed to be applicable to the site, which has an estimated drainage area of 25,000 square miles.

The Susquehanna River is rather extreme in its flow characteristics, as is evident in the following summary of recorded data at Harrisburg:

Minimum daily flow	1,700 cfs
Average annual discharge flow	34,000 cfs
Average runoff per square mile	1.41 cfs
Mean annual flood	300,000 cfs
Maximum flood of record (1936)	740,000 cfs

No large dams or reservoirs exist immediately upstream from the site, nor are there any proposed at the present time. The Corps of Engineers is proposing a new dam for flood control on the Raystown Branch of the Juniata River. The project will also be used for low-flow augmentation and for recreation. Data from the Corps indicate that the project, as it is presently planned, would reduce the stage of a repetition of the flood of record (March 1936) by approximately two feet at Harrisburg. For low flow control the project will increase dependable flow at the Raystown dam site to 480 cfs. This benefit will also be felt at the plant site.

ii. Groundwater

The bedrock underlying the general area is composed of shales, sandstones, and siltstones belonging to the Gettysburg shale of Triassic Age. A wide range in yields occurs within the formation, the sandstone facies normally being the

best aquifers. However, in closely jointed or fractured shales, relatively high yields can occur. The alluvial deposits are not believed to be a major scurce of groundwater in this area.

Groundwater was studied at the site by means of:

a. Stand pipes to record elevation and fluctuation of water levels.

b. A pumping out test to determine permeability of the saturated soil.

c. A falling head permeability test to determine permeability of soil above the water table.

Groundwater at the site occurs under water table conditions. The water table reaches its maximum elevation at the highest topographic point in the center of the island and falls off toward both the east and west shores. A variation of only about 5 feet occurs from either side to the center, producing a gradient of approximately 0.6 percent toward the river. At observation points in and surrounding the plant area, water levels occurred generally at a depth in excess of 15 feet and ranged from 14 to 19 feet. The groundwater level occured at a maximum of 6.2 feet above the top of rock with less than 1 foot of head existing above the soil-rock interface at one point of observation.

The water level of the Susquehanna River, which normally flows at elevation 277 feet, controls Three Mile Island groundwater levels. Since a positive head exists on the island, any movement of groundwater from the plant site would be toward either channel of the river, and would eventually enter the stream. The river would act as a natural boundary, limiting the dispersal of groundwater from the island to the river. Two factors are important in considering the possibility of infiltration of groundwater into the underlying Gettysburg shale and transmission to onshore water supplies:

a. A maximum positive head of six feet exists above the impervious (relative to the soils) Gettysburg formation.

b. Groundwater levels are higher on either shore of the river, with hydraulic gradients sloping toward the river.

In order for groundwater to move from Three Mile Island to the mainland, it would be necessary to reverse the hydraulic gradient on the mainland, which would necessitate partial dewatering of the Susquehanna River. Further, it is unlikely that river water would ever significantly infiltrate rocks on either shore, except under sustained high capacity pumping, creating induced infiltration. A natural condition of river water flowing into the ground would not be normal to this climate and geography.

f. Meteorology

i. General

General climatic conditions in the site region are characterized by a continental type climate, modified and protected somewhat from more severe weather by the Appalachian Mountain Ridge to the north. Summers tend to be warm and humid, and winters are cool, with frequent periods of precipitation.

An on-site meteorological data collection program has been in operation since May 1967. Wind speed and direction have been continuously recorded 100 feet above grade on Three Mile Island and 2½ miles north 25 feet above grade at Crawford Station. A two-year period of record has been analyzed, ending May 1969, to provide a basis for evaluation of routine gas release limits.

ii. Severe Weather

In more than seventy-five years of record at the Harrisburg-York Municipal Airport and at the Weather Bureau offices in Harrisburg, the highest and lowest temperatures recorded were 104 and -14 F. Maximum monthly rainfall was 9.07 inches; maximum 24-hour rainfall 4.36 inches, and a maximum 24-hour snowfall 21.0 inches. Maximum snow accumulation was 81.3 inches.

During the 92-year period 1871 through 1963, thirty-three hurricane or tropical storm center paths passed within about 100 miles of the site. Most of these were in dissipation stages. The most severe was "Hazel," the center of which passed just west of Harrisburg on October 15, 1954. A peak gust of 80 miles per hour was recorded at the Harrisburg-York Municipal Airport during the passage of "Hazel."

g. Seismicity

The seismicity analysis indicates that Pennsylvania is relatively inactive seismically, based upon 200 years of historical data and 40 years of instrumented data. Earthquakes in the greater Pennsylvania area, which have or might have affected the site, were studied and the intensity at the site was determined by attenuation of the earthquake with distance.

Earthquakes which have effected the site were studied in two categories, those within a 50-mile radius of the site, and those beyond this radius. Nearly all the earthquakes considered were felt over very limited areas, which are generally elliptical in shape, and aligned with the general structural trend of the area. The high attenuation of these earthquakes indicates that their foci must have been close to the earth's surface.

An estimate of the maximum expected intensity of an earthquake was predicated on the assumption that the activity which would affect the site would originate along the border fault of the Triassic Lowland, five to six miles north of the site. The highest intensity earthquake to occur on this fault has been modified Mercali VI. The intensity of such an earthquake at the site would be V, based upon the rapid attenuation of similar earthquakes in the area and along the fault. A conservative estimate of the maximum earthquake intensity to be expected at the site is a low intensity VI.

II. DESCRIPTION OF PLANT EFFLUENT AND WASTE SYSTEMS

a. Condenser and Equipment Cooling Water System

i. Condensate Cooling

Three Mile Island Nuclear Station utilizes four natural draft cooling towers for dissipating the major portion of the heat rejected from the plant steam cycle (Exhibit 5). All latent heat from turbine exhaust steam condensation is dissipated to the atmosphere through these towers. Expected maximum evaporation rate, with both units at rated load, is 5000 gpm per tower, or 20,000 gpm total for the plant. This evaporation is replaced by water from the Susquehanna River. The consumption of 20,000 gpm, when compared with the mean annual average river flow of 34,000 cfs (15,300,000 gpm), is only 0.13 percent of the total river flow. Even under the most adverse combination of conditions of maximum evaporation, and minimum recorded river flow of 1700 cfs (765,000 gpm), the consumption is only 2.6 percent of total river flow.

ii. Equipment Cooling

River water is also utilized for equipment cooling. Expected average quantity utilized for this purpose for both units is 30,000 gpm. Prior to returning this water to the river, it is cooled by two mechanical draft cooling towers, one serving each unit (Exhibit 5). Expected performance of these towers will result in the capability to cool this water, under most atmospheric conditions, to at least the same temperature as the river. To enable the plant operator to determine the amount of cooling required, and to select, therefore, the proper combination of fans and pumps, indication is provided in the control room of river temperature, cooling water temperature entering and leaving the mechanical draft cooling towers, and flow through the mechanical draft towers. The design of these units, utilizing the above combination of natural and mechanical draft cooling towers, results in a minimal effect on the plant environment.

b. Radioactive Waste Disposal Systems

i. General

The radioactive waste holdup and processing equipment for liquid, gaseous, and solid wastes is located within thick- walled, reinforced concrete structures which are designed to withstand such things as the maximum hypothetical earthquake postulated for the location of the plant, tornados, tornado- driven missiles, and the impact of large aircraft. The individual items of waste holdup and processing equipment are designed, fabricated, and erected in conformance with codes and standards applicable to equipment containing radioactive materials and are located in thick-walled, reinforced concrete "cells" within the structures described above. Each cell is provided with its own floor and equipment drain, which routes any liquid leakage to below grade stainless steel lined sumps, which are a part of the reinforced concrete foundation structures of the buildings and are located in firm bedrock.

Fresh outside air is continuously supplied to the structures indicated above. This air flows from the normally occuppied areas of the buildings, through the cells containing the equipment holding or processing radioactive wastes, to a ventilation exhaust discharge system. This system consists of fans, "roughing" and high efficiency particulate air filters, and charcoal filters. The discharge of this system is routed to the plant vents past a gas and particulate radiation monitor, which will automatically shut down the ventilation system and terminate any radioactive waste gas discharge which might be in progress in the event its setpoint is exceeded. The capacity of the exhaust ventilation system is higher than that of the fresh air supply system so that the air pressure inside the buildings is slightly below that of the environment, thus preventing any inadvertant "leak" of building air to the environment.

All tanks and processing equipment containing liquids which might evolve radioactive gases are served by a common waste gas vent header system to prevent radioactive gases from escaping to the building atmosphere. All other tanks and equipment are vented to the atmosphere of the cell in which they are located.

ii. Liquid Waste Disposal

The radioactive liquid waste disposal system has been designed to collect, store, and process all radioactive liquid wastes for disposal or reuse. In addition, this system provides operating service functions to the primary system and the spent fuel pool. The radwaste system consists of tanks, coolers, filters,

demineralizers, a mixer, evaporators, floor and equipment drains and sumps, pumps and valving. The system has been designed to recycle water and boric acid solution reclaimed from the radioactive liquids produced within the plant. The recycle capability is provided in order to minimize the total activity disposed to the environment from the station during its service life. Tanks with ample storage capacity have been provided to ensure that the letdown of primary coolant, packaging of waste, or the disposal of wastes to the environment may be accomplished in a convenient and timely manner.

The system has been designed such that the collection and processing of the liquid wastes is divided into two separate chains, dependent upon the quality of the waste. The primary chain is used to process the high purity wastes which are reactor coolant, refueling water, and spent fuel water. The second (miscellaneous) chain is used to process the miscellaneous wastes from (a) radioactive laboratory drains, (b) building and equipment drains and sump, (c) regeneration of deborating resins, (d) filter and demineralizer flushing, and (e) radioactive laundry and shower drains.

The system piping is arranged such that all liquids collected must be routed through an evaporator and condensate (mixed-bed) demineralizers prior to collection in the condensate storage tank for reuse or disposal. The primary coolant stream, however, will be further decontaminated, prior to evaporation, by recycling it through filters and/or demineralizers (as required) in order to ensure a low activity level in the reclaimed boric acid concentrate from the evaporator. If it meets the quality requirements for these uses, the condensate may be transferred to the reclaimed water tank (Chemical Addition System) for miscellaneous uses throughout the radwaste systems or to the reactor coolant bleed tanks for feed to the primary system rather than being discharged into the river. Any liquid stored in the evaporator condensate storage tanks, concentrated radioactive waste storage tanks, or the reclaimed boric acid tanks may be reprocessed through the evaporator for further decontamination or concentration, if this is required.

Processed liquid wastes will be released into the river on a batch basis. Prior to release, each batch will be sampled to determine the activity content. Based upon the activity analysis and the flow rate from the mechanical draft cooling towers, a maximum flow rate for the batch discharge is established.

Batches of liquid radioactive wastes will not be released to the effluent of the mechanical draft cooling tower if its flow rate is less than 5000 gpm, and dilution credit will not be taken for more than 38,000 gpm of cooling tower effluent. The discharge rate will be selected such that the activity in the cooling tower effluent to the river is within 10 CFR Part 20 limits.

The radioactive liquid waste being discharged into the cooling tower effluent and the mixture of radwaste and cooling tower effluent are surveyed by separate monitors. In the event that the setpoint of either monitor is exceeded, the flow of radwaste to the cooling tower effluent will be automatically terminated, and an alarm will warn the operator so that he can determine what is wrong and correct it. The monitor surveying the mixture of radwaste and cooling tower effluent is located sufficiently downstream of the point at which the radwaste is introduced to the cooling tower effluent so that it sees a homogenous mixture. The cooling tower effluent enters the Susquehanna River a sufficient distance downstream of the water intake structures so that there can be no possible recycling (and inadvertant concentration) of the activity being discharged to the river.

iii. Gas Waste Disposal

The gas waste disposal system consists, in part, of the gas spaces of the liquid holdup tanks and processing equipment that are served by the common waste gas vent header system previously mentioned. The gases collected by the vent header system are routed to the suction of two rotary, water sealed gas compressors which sequentially compress the gases collected into waste gas decay tanks. These tanks provide a long holdup time for the decay of the radioactive constituents in the gases occupying them.

After a waste gas decay tank is filled, its contents are sampled and analyzed. Based on the gas analysis, the contents of the tank may be used as makeup to the low pressure waste gas vent header system or may be released under controlled and monitored conditions to the environment after a suitable delay period for the decay of radioactive constituents. If the gas is recycled, the effect is to increase the time (above that nominally specified) for decay of its radioactive constituents.

If the contents of a waste gas decay tank are to be discharged to the atmosphere, a second sample is taken of them and analyzed after the period specified for decay has elapsed. Based on this analysis, the waste gases are discharged at a controlled and monitored rate to the inlet of the building exhaust ventilation system previously mentioned. The activity level of this gas discharge is also continuously monitored, both at its point of release from the waste gas decay tanks and in the mixture of building ventilation air and waste gases being discharged to the plant vents. In the event the setpoints of either radiation monitor and/or the waste gas flow rate monitor are exceeded, the discharge will be automatically terminated, and an alarm will warn the operator to check to determine what is wrong and correct it prior to re-initiating the release.

iv. Solid Waste Disposal

Radioactive solid wastes will consist of such things as: "lay-down" paper, wiping rags, protective clothing, resins, filter pre-coat material, and filter chartridges that have become contaminated with radioactivity during use. These materials are collected in appropriate containers (tanks, drums, or cardboard cartons) until sufficient quantities have accumulated to warrant "packaging" them for shipment to an off-site burial ground. The storage areas and packaging equipment for these items are all located within the building structures previously described. The waste packages produced are appropriately shielded and sealed, after filling, to protect station personnel and the general public from radiation and the escape of their contents. These packages are then placed in high integrity containers for shipment from the plant to the burial location by a carrier who is licensed by the Department of Transportation to transport such materials.

v. Summary

Double barriers, in the form of high integrity equipment and high integrity building structures in which this equipment is located, ensure against accidental releases of radioactive liquids or gases from the radioactive waste processing systems at the Three Mile Island Nuclear Station.

Redundant and high reliability radioactive liquid waste processing equipment, coupled with generous storage capaticy, ensure extremely low liquid activity releases on a timely basis from the Three Mile Island Nuclear Station into the Susquehanna River. Basically, all radioactive liquid discharges are in the form of distilled water that has subsequently been demineralized.

Generous waste gas storage capacity coupled with the ability to recycle waste gases to the vent header system minimize radioactive gas activity discharges to the environment by providing long hold-up times for radioactive decay prior to release.

Strict administrative procedures coupled with double monitoring of all routine releases of radioactive liquids and gases to the environment ensure that all such releases do not exceed the release rates or quantities to be released that were established at their initiation.

c. Nonradioactive Waste Disposal Systems

i. Potable Water System

The potable water system is derived from the makeup water and is chlorinated as necessary to meet the requirements of the Pennsylvania Department of Health.

ii. Sanitary Waste System

Sanitary waste that does not contain radioactive material is directed to the sanitary sewer treatment facilities. The treatment facilities consist of an extended aeration treatment plant with phosphate removal facilities. In addition, all solids will be processed through an aerobic digester to remove organic matter and produce an inert sludge which can be disposed of in sanitary landfills. Waste from the sanitary system will be chlorinated prior to discharge into the Susquehanna River, and such discharge will be well within the applicable Federal water quality standards for drinking water.

iii. Decontamination Shower and Laundry Waste System

Waste from the decontamination shower and the laundry room will be collected and tested for radioactivity. After testing and verification that the waste does not contain radioactivity of quantities larger than those specified by the Pennsylvania Department of Health, the water will be discharged into the sanitary sewer system. If the waste does contain radioactive materials above that specified, it will be disposed of as a radioactive waste.

iv. Industrial Waste

The Three Mile Island Nuclear Station discharges two types of industrial wastes: river water used for cooling and waste derived from the water purification for makeup water to condensers and steam generators. The cooling water after leaving the natural draft cooling tower circuits is cooled by mechanical draft cooling towers so as not to exceed the requirements of the Pennsylvania Department of Health for discharge into the stream. The waste from the water purification facilities will be filtered, and all suspended and settleable solids will be removed prior to discharge into the Susquehanna River, and will be well within the applicable Federal water quality standards for drinking water.

III. LICENSES, PERMITS, AND APPROVALS REQUIRED FROM FEDERAL, STATE, AND LOCAL AGENCIES

The Federal, State and local licenses, permits and approvals which are necessary for the construction and operation of the Three Mile Island Nuclear Station are listed below:

a. Federal

Atomic Energy Commission - Nuclear Plant
Federal Aviation Administration - Cooling Towers
Federal Power Commission - Amendment to York Haven Power Project License
U. S. Army Corps of Engineers - Intakes and Bridges

b. Commonwealth of Pennsylvania

Department of Forrest and Waters - Intakes, Bridges, and River Water Use

Department of Health - Air Pollution, Industrial Waste, Nuclear Waste, and Sanitary Waste

Department of Labor and Industry - Boiler and Building

State Police Fire Marshal - Outdoor Fuel Oil Tanks

Department of Highways - Highway Connection and Bridges

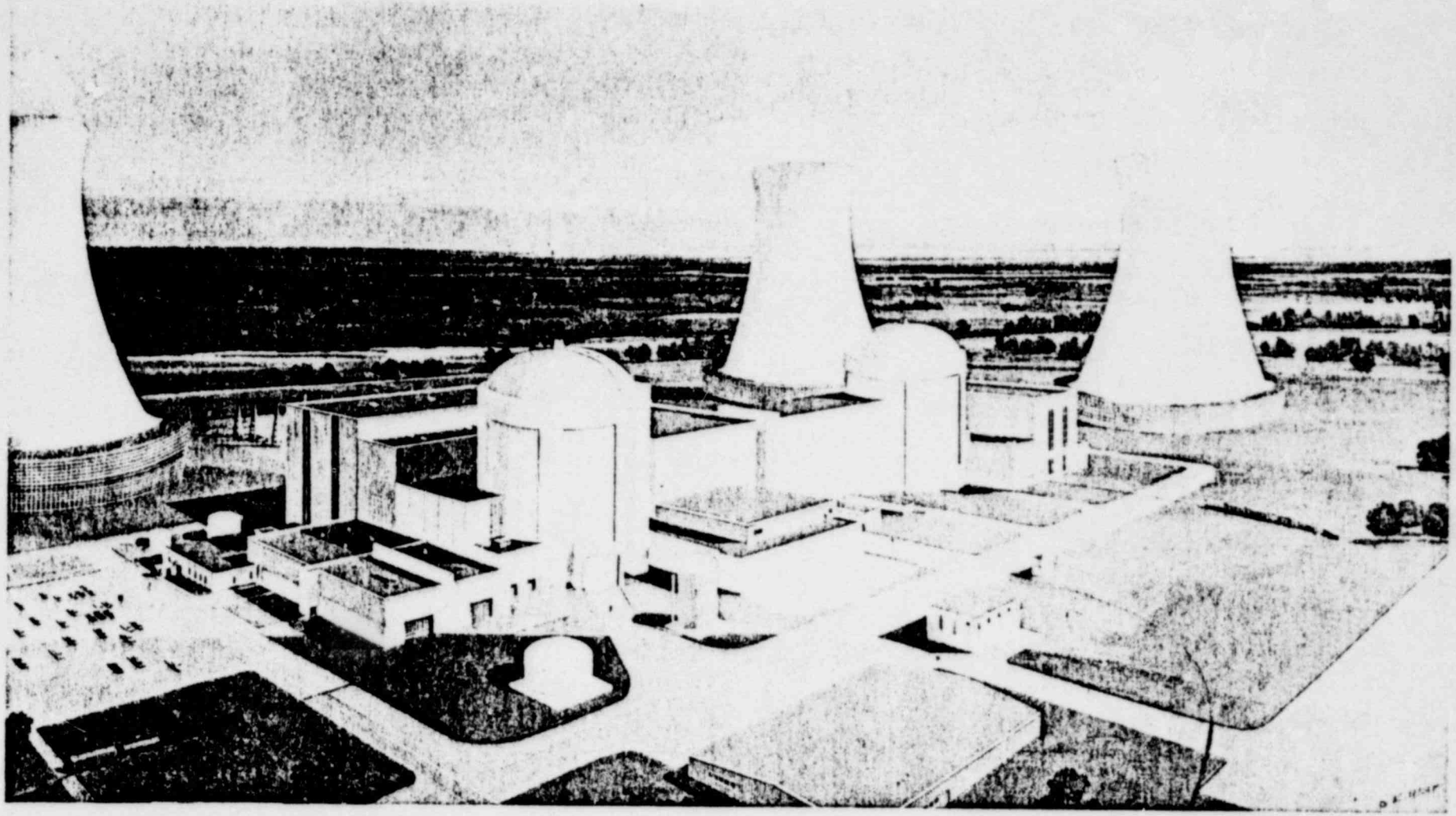
Fish Commission - Intakes

c. Local

Londonderry Township - Building Permit

Dauphin County Sanitarian - Sewage Facilities and Water Supply

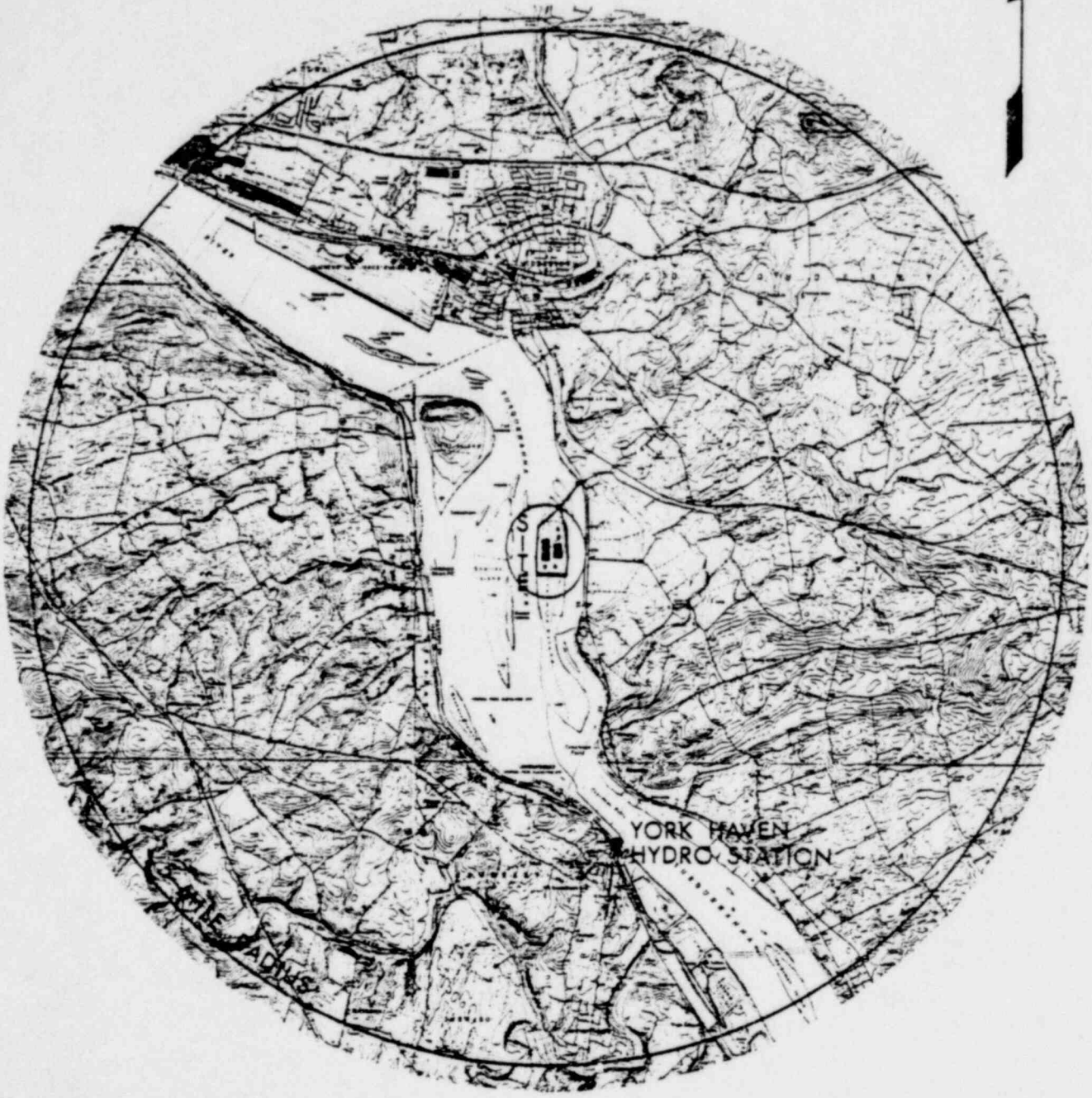
EXHIBITS



ARCHITECTURAL RENDERING
THREE MILE ISLAND NUCLEAR STATION

MetEd JCPL

EXHIBIT 1



CONTOUR INTERVAL 20 FEET

1 ½ 0 1 MILE

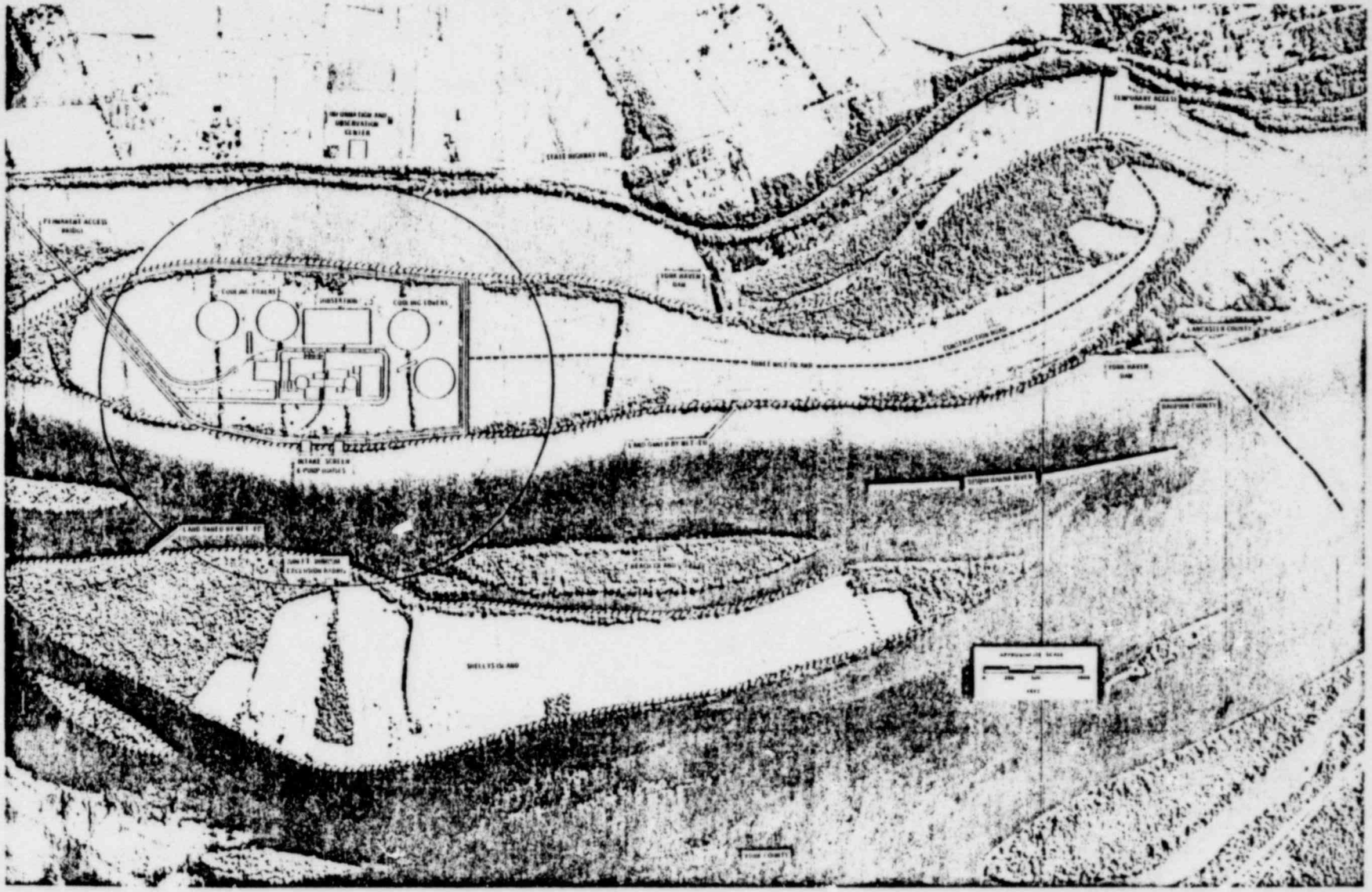
0 4000 8000 FEET
2000 6000

APPROX. SCALE

SITE TOPOGRAPHY 5 MILE RADIUS
THREE MILE ISLAND NUCLEAR STATION

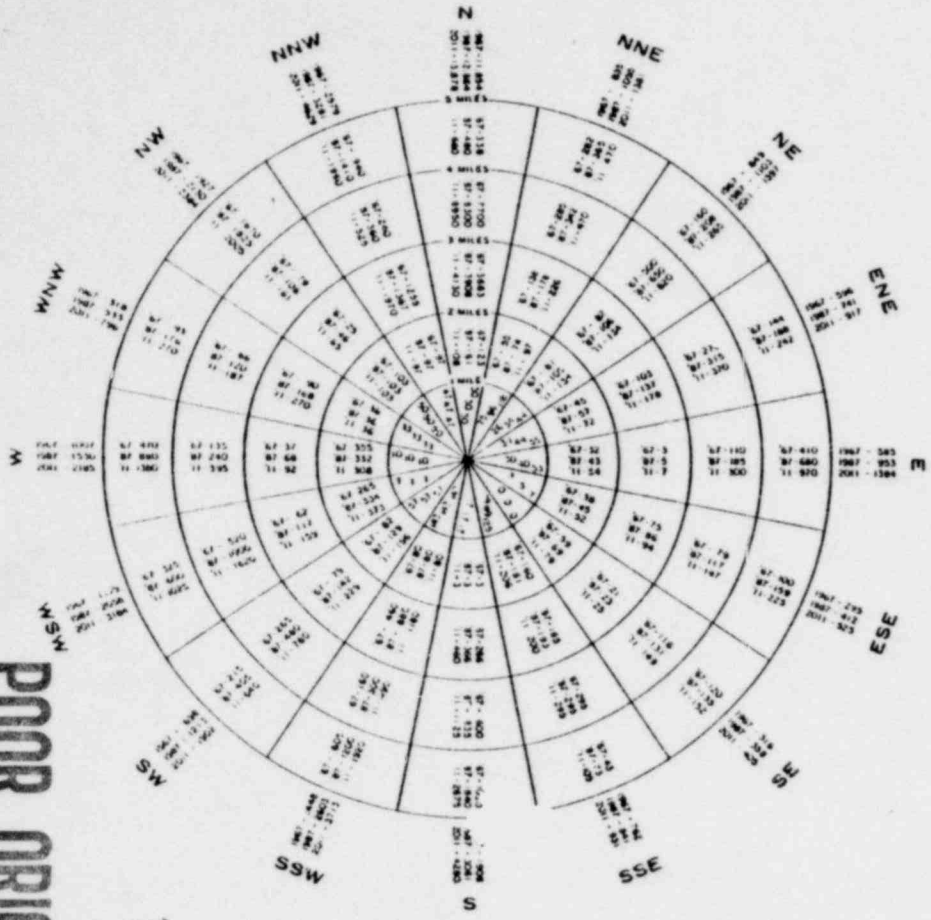
Met Ed

EXHIBIT 2

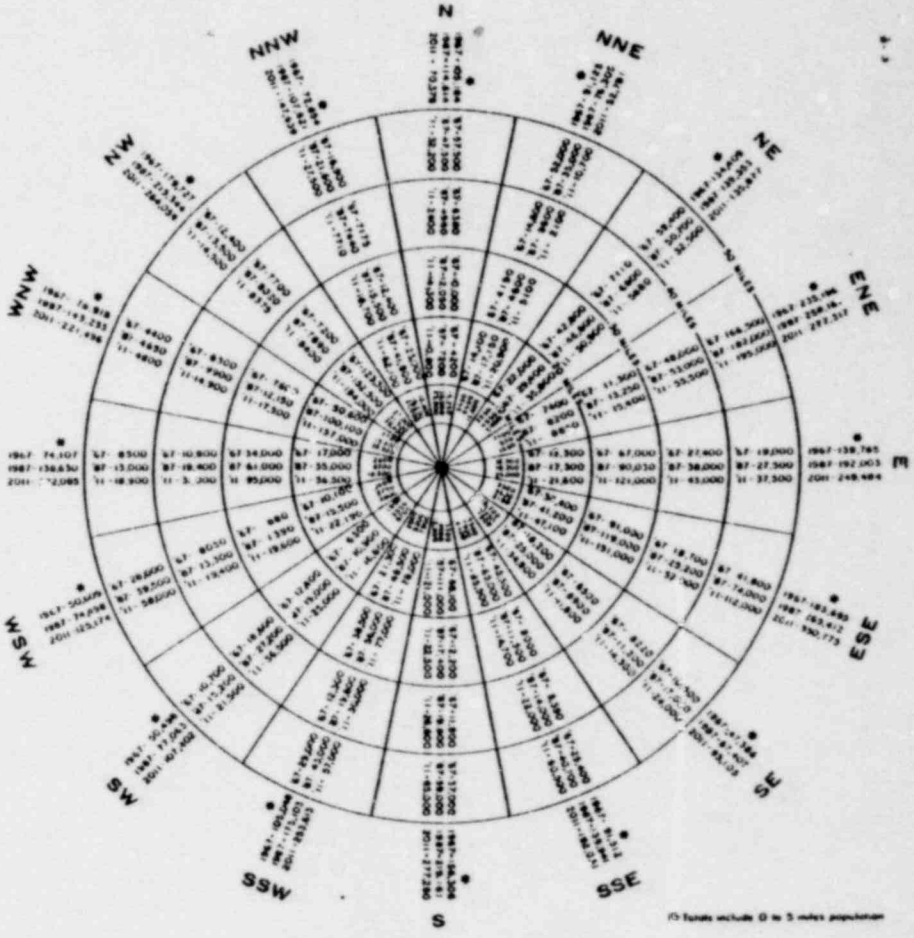


AERIAL PHOTOGRAPH
THREE MILE ISLAND NUCLEAR STATION

EXHIBIT 3



0 TO 5 MILES DISTRIBUTION



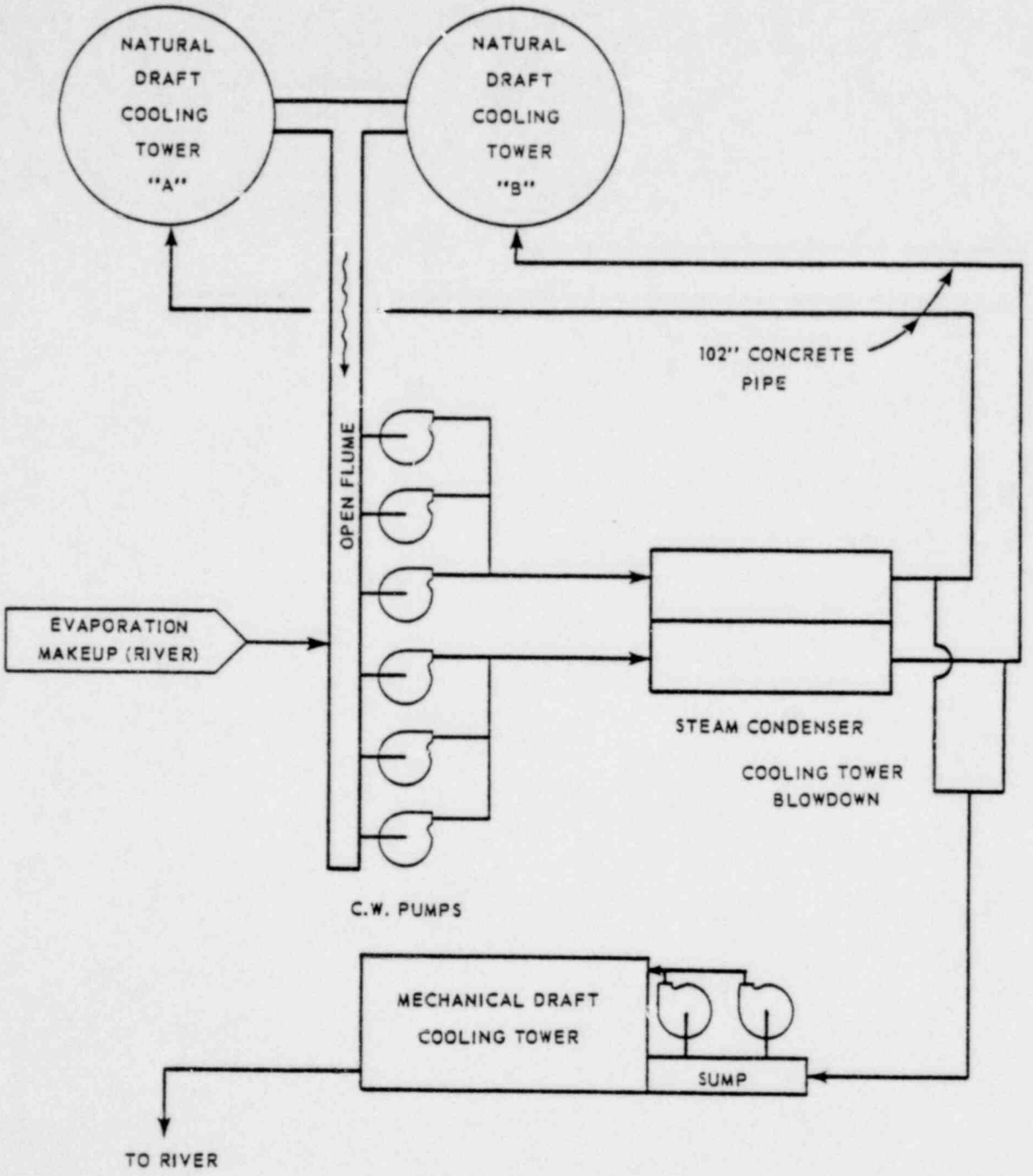
0 TO 50 MILES DISTRIBUTION

POOR ORIGINAL

1590 041

POPULATION DISTRIBUTION
THREE MILE ISLAND NUCLEAR STATION

EXHIBIT 4



CONDENSER CIRCULATING WATER SYSTEM

THREE MILE ISLAND NUCLEAR STATION

EXHIBIT 5