DOE/EA

Environmental Assessment

The New York State Electric & Gas Corporation Milliken Station Demonstration Project

Clean Coal Technology Program

Milliken Station
Town of Lansing
Tompkins County, New York

March 1993

U.S. Department of Energy
Assistant Secretary for Fossil Energy

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List of Abbreviations

CAAA	Clean Air Act Amendments
CCT	Clean Coal Technology
CEQ	President's Council on Environmental Quality
CFR	Code of Federal Regulations
CO	Carbon Monoxide
DOE	U.S. Department of Energy
EA	Environmental Assessment
EIS	Environmental Impact Statement
EIV	Environmental Information Volume
EPA	Environmental Protection Agency
FGD	Flue Gas Desulfurization
gpd	gallons per day
MW	Megawatt
NEPA	National Environmental Policy Act
NH_3	Ammonia
NO_x	Nitrogen Oxides
NYSEG	New York State Electric & Gas Corporation
OSHA	Occupational Safety and Health Act
ppm	parts per million
PON	Program Opportunity Notice
RCRA	Resource Conservation and Recovery Act
S-H-U	Saarberg-Holter Umwelttechnik GmbH
SNCR	Selective Non-Catalytic Reduction
SO_2	Sulfur Dioxide
SPDES	State Pollutant Discharge Elimination System
U.S.	United States
VOCs	Volatile Organic Compounds

INTRODUCTION

This environmental assessment (EA) was prepared by the U.S. Department of Energy (DOE), in compliance with the National Environmental Policy Act (NEPA) of 1969 and DOE NEPA regulations, to evaluate environmental issues associated with a proposed clean coal technology demonstration project to be cost-shared by DOE and the New York State Electric & Gas (NYSEG) Corporation under the Clean Coal Technology (CCT) Program.

The CCT Program is a $5 billion technology demonstration program that was legislated by Congress to be funded jointly by the federal government and industrial or other sector participants. DOE manages this program, and selects the best and most promising of the advanced coal-based utilization, processing, and emission control technologies for demonstration. Over the next decade, the CCT Program will advance the technical, environmental, and economic performance of these advanced technologies to the point where the private sector will be able to introduce the demonstrated technologies into the commercial marketplace. These demonstrations are on a scale large enough to generate sufficient design, construction, and operation data for the private sector to judge the technology's commercial potential and to make informed, confident decisions on the technology's commercial readiness.

The goal of the CCT Program is to make available to the U.S. energy marketplace a number of advanced, more efficient, reliable, and environmentally responsive coal utilization and environmental control technologies. These technologies are intended to reduce or eliminate some of the economic and environmental impediments that limit the full consideration of coal as a future energy resource.

The strategy being implemented to achieve the goal of the CCT Program is to conduct a multiphase effort consisting of at least five separate solicitations for projects, each with individual objectives that, when integrated, will make technology options available on a schedule consistent with the demands of the energy market and responsive to the relevant environmental considerations.

On October 23, 1989, Public Law 101-121, "An Act Making Appropriations for the Department of Interior and Related Agencies for the Fiscal Year Ending September 30, 1990, and for Other Purposes" (the "Act") was signed into law. This Act, among other things, provided funds to conduct cost-shared CCT projects for the design, construction, and operation of facilities that would demonstrate the feasibility of future commercial applications of technologies capable of replacing, retrofitting or repowering existing facilities. Subsequently, Public Law 101-512 was signed into law on November 5, 1990. This Law, among other things, directed DOE to issue a "general request for proposals" for CCT Round IV by no later than February 1, 1991, and to select projects for negotiations no later than eight months after the date of the general request for proposals. On January 15, 1991, DOE issued a Program Opportunity Notice (PON) for Round IV of the CCT program, soliciting proposals to conduct cost-shared CCT projects to demonstrate innovative, energy-efficient clean coal technologies capable of being commercialized in the 1990s. The technologies proposed in response to this PON were to be capable of (1) achieving significant reductions in the emissions of SO_2 and/or NO_x from existing facilities and/or (2) providing for future energy needs in an environmentally acceptable manner. NYSEG was selected along with eight other projects from among the 33 proposals received by DOE.

To comply with the environmental review requirements of NEPA, the CCT Program has developed a three-level strategy that is consistent with the President's Council on Environmental Quality (CEQ) Regulations for implementing NEPA and DOE regulations for compliance with NEPA (10CFR1021). The strategy includes the consideration of both programmatic and project-specific environmental impacts during and subsequent to the project selection process. For the first level of environmental review, DOE prepared a programmatic environmental impact statement (PEIS). The PEIS, issued by DOE as a public document in November 1989 (DOE/EIS-0146), addressed the potential environmental consequences of the widespread commercialization of each of 22 successfully demonstrated clean coal technologies in the year 2010. The PEIS evaluated (1) a no-action alternative, which assumed that the CCT Program was not continued and that conventional coal-fired technologies with flue gas desulfurization controls would continue to be used for new plants or as replacements for existing plants that are retired or refurbished, and (2) a proposed action, which assumed that CCT Program projects were selected for funding and that successfully demonstrated technologies undergo widespread commercialization by 2010.

The second element of DOE's strategy for NEPA compliance involved preparation of a preselection, project-specific environmental review based on project-specific environmental data and analyses that offerers supplied to DOE as a part of each proposal. This review summarized the strengths and weaknesses of each proposal in compliance with the environmental evaluation criteria in the PON. It included, to the extent possible, a discussion of alternative sites and processes reasonably available to the offeror, practical mitigating measures, and a list of required permits. This analysis was provided for the consideration of the Source Selection Official in the selection of proposals.

The third element of DOE's NEPA strategy provides for the preparation and public distribution of site-specific NEPA documents for each of the projects selected for financial assistance under the Program Opportunity Notice. This EA provides a site-specific analysis of the expected environmental impacts of the proposed action, the NYSEG demonstration project. The sources of information for this EA include the technical proposal for the project submitted by NYSEG to DOE in response to the CCT, Round IV, PON; discussions with NYSEG staff; discussions with federal and state agencies; the Environmental Information Volume (EIV) for the project provided by NYSEG to the DOE; attendance at one of the five public meetings held by NYSEG; and four site visits to the proposed project site.

The scope of the EA includes consideration of (1) the nature and extent of construction and installation activities for the NYSEG project; (2) changes in emissions, effluents and wastes that would be generated by facility operation; and (3) any changes in resource requirements for the facility. To fulfill the requirements of Section 1508.9 of the CEQ regulations, the following sections are provided:

- 1.0 Purpose and Need for the Proposed Action,
- 2.0 Alternatives Including the Proposed Action,
- 3.0 Environmental Impacts of the Proposed Action and the No-Action Alternative
- 4.0 Permits and Regulatory Requirements
- 5.0 List of Agencies and Persons Contacted.

1.0 PURPOSE AND NEED FOR PROPOSED ACTION

DOE entered into a cooperative agreement with NYSEG under which DOE proposes to provide cost-shared funding to design, construct, and operate a high-efficiency flue gas desulfurization system (FGD) to demonstrate innovative emissions-control technology proposed for Units 1 and 2 of NYSEG's Milliken Station, located in the Town of Lansing, Tompkins County, New York. The proposed demonstration project is a combination of several different technologies designed to reduce sulfur dioxide (SO_2) emissions while burning a high-sulfur coal and reduce nitrogen oxides (NO_x) emissions while producing marketable, wallboard-grade gypsum and chloride salt as by-products.

Successful future application of the technologies proposed to be demonstrated at Milliken Station could result in reduced SO_2 and NO_x emissions from both new and existing coal-fired plants. Therefore, this proposed demonstration project has the potential to contribute significantly toward achieving the objectives of the Clean Coal Technology demonstration program. Passage of the Clean Air Act Amendments (CAAA) of 1990, in which more stringent measures have been mandated to control emissions of the principal acid rain precursors, SO_2 and NO_x, increased the need for development of these control technologies.

From an industrial perspective, NYSEG must bring its entire generating system, including Milliken Station, into compliance with the emission reductions mandated by the 1990 CAAA. The two units at Milliken Station are among the targeted units that are required to reduce SO_2 and NO_x emissions during Phase 1 of the new law. Initial reductions must be made by 1995, with further reductions required by 2000. To determine the approach which best meets the CAAA requirements, NYSEG identified and evaluated options to form a compliance plan. Options analyzed by NYSEG included switching to fuels with lower sulfur content, retiring existing generating stations, installing new generating technologies, buying allowances, and installing pollution control devices. The results of the study conducted by NYSEG showed that from an environmental standpoint as well as a cost effectiveness standpoint, the best method to reduce SO_2

emissions from the Milliken Station units is the installation of a flue gas desulfurization system.

The innovative technologies proposed for Milliken Station are expected to achieve reductions in annual SO_2 emissions which greatly exceed that required by the CAAA. Additionally, with the technologies proposed to control NO_x emissions, compliance with both Phase 1 and Phase 2 of the CAAA of 1990 will be fulfilled.

The goals of the proposed demonstration project include:

- Demonstration of up to 98% SO_2 removal efficiency while burning high-sulfur coal;
- 40 to 70% NO_x reductions through combustion modifications and selective non-catalytic reduction technology;
- Production of marketable commercial-grade gypsum and chloride salt by-products to minimize solid waste disposal;
- Continued beneficial reuse of ash;
- No discharge of wastewater;
- Maintenance of maximum station efficiency using a high-efficiency air heater system and low-power consuming scrubber system; and
- Space saving design.

2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 THE PROPOSED ACTION

It is proposed that DOE provide funds through a cooperative agreement with NYSEG to share in the costs of construction and three-year demonstration of an advanced Saarberg-Holter Umwelttechnik GmbH (S-H-U) FGD system with associated NO_x controls (combustion modifications and Selective Non-Catalytic Reduction (SNCR)) at NYSEG's Milliken Station. The proposed demonstration project would last approximately 69 months, with construction beginning April 1, 1993 after the completion of the NEPA process. Following construction, the three-year demonstration operation would begin in July, 1995 and end June 30, 1998. After the demonstration period, NYSEG intends to continue operating the advanced FGD system at Milliken Station on a commercial basis into the year 2015 and will determine from the results of the demonstration project whether or not to continue operation of the SNCR system.

2.1.1 Project Location

NYSEG's Milliken Station is located north of Milliken Station Road in the Town of Lansing, on the eastern shore of Lake Cayuga, approximately 14 miles northwest of Ithaca, New York (Figure 1). Milliken Station is situated on a 1,100-acre parcel of land in a rural area of the Town of Lansing, in the northwestern corner of Tompkins County. The property boundaries extend north to Cuddeback Road and east to Lake Road. Milliken Station Road is the Southern property boundary and Cayuga Lake bounds the property to the west (Figure 2). The surrounding region is a sparsely populated agricultural area.

2.1.2 Milliken Station

Existing Facilities

Milliken Station comprises two coal-fired boiler units, Units 1 and 2, and two steam turbine generators nominally rated at 150 MW each. Both units feature tangentially fired boilers manufactured by Combustion Engineering, with four elevations of burners at each of the corners. Each unit has separate generating and control equipment, and exhaust

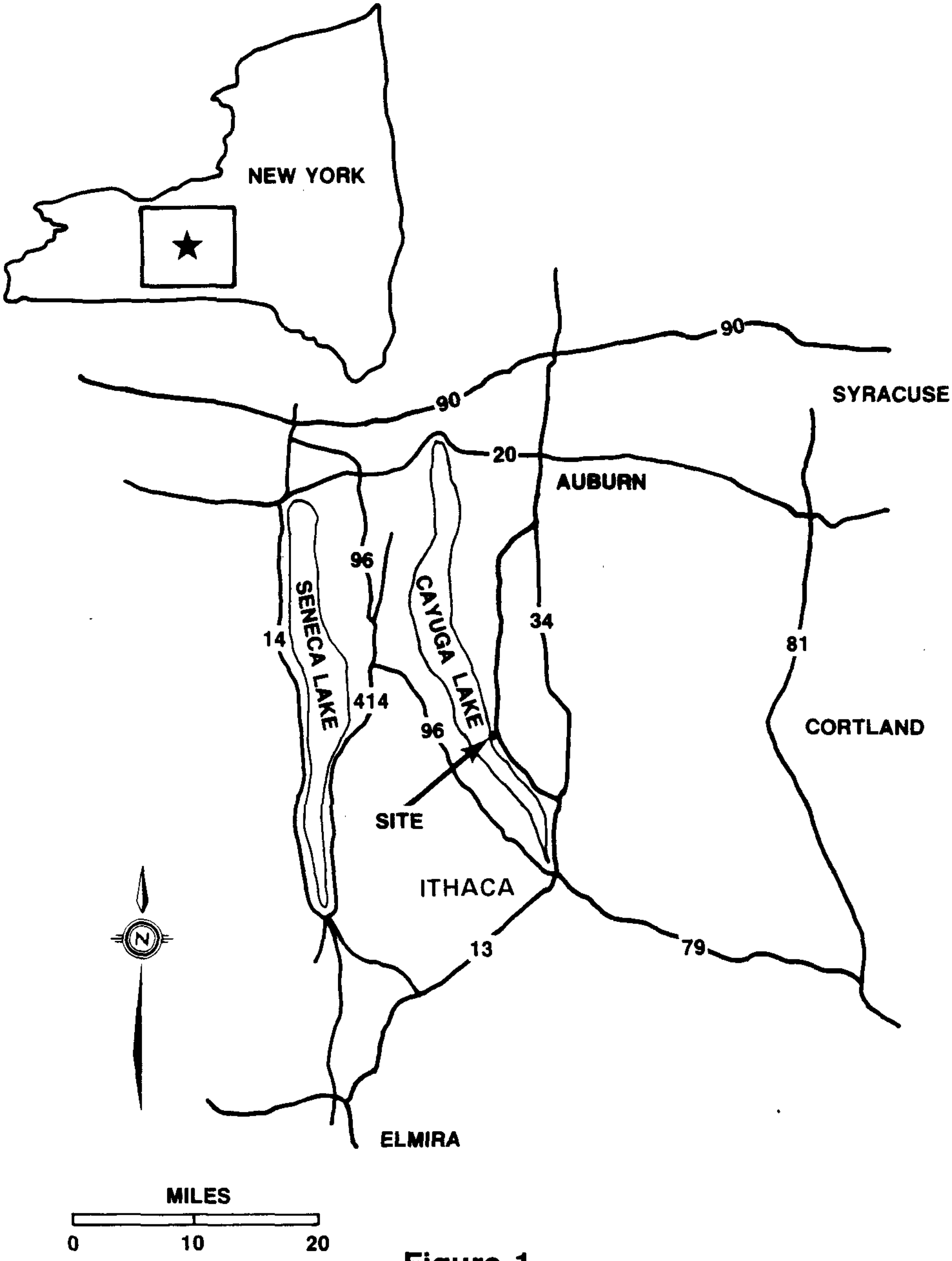


Figure 1
Regional Location Of The Proposed Milliken Station Technology Demonstration Project

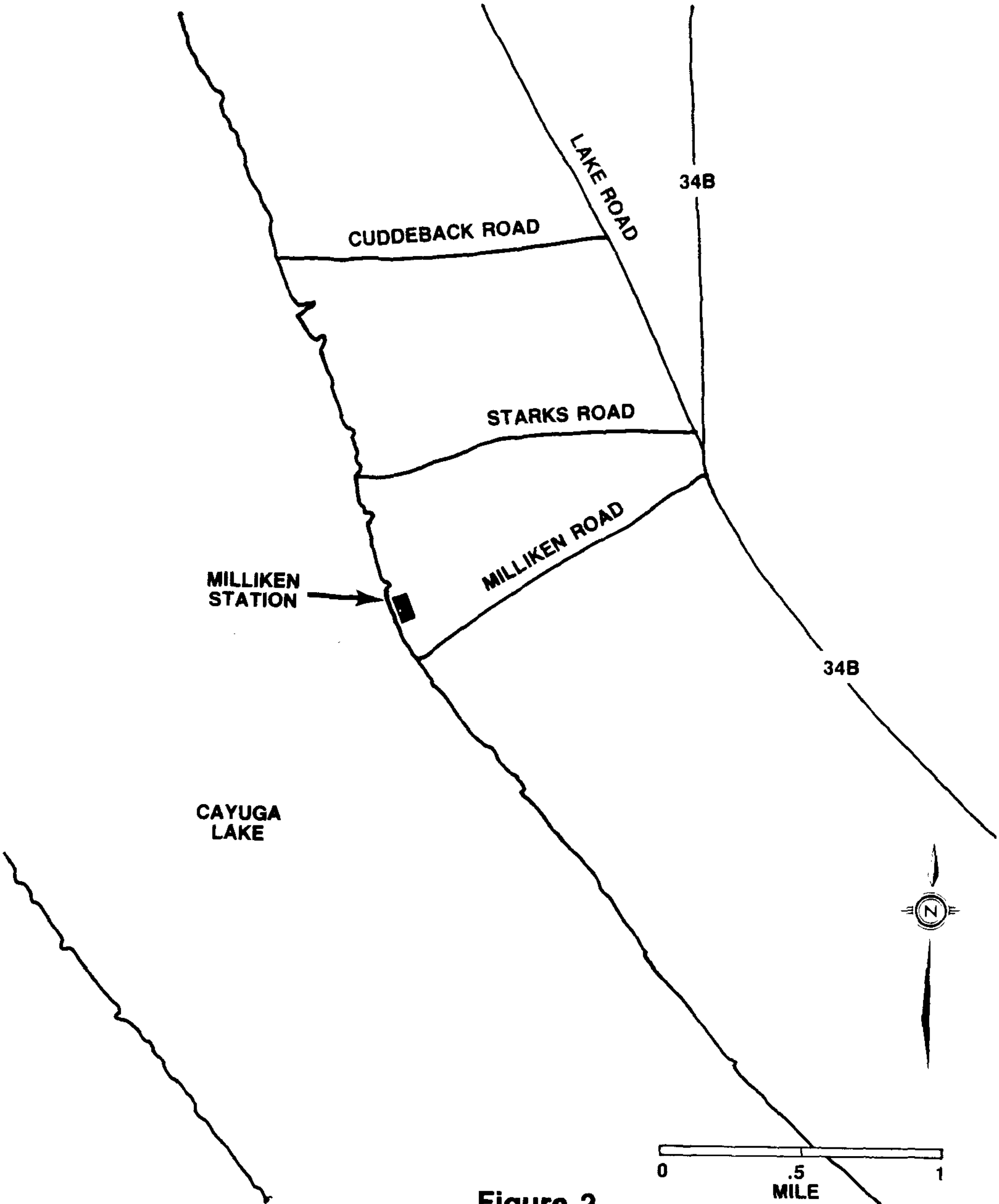


Figure 2
The Site Of The Proposed Milliken Station Clean Coal Technology Project

gases are vented to separate 250 foot stacks. Milliken Station began generating electricity in 1955 with the completion of Unit 1. Unit 2 was completed in 1958. Additional electrostatic precipitators were installed in 1972 and a wastewater treatment plant was added to Milliken Station in 1976.

Components of the existing facility include the main power plant building and a number of ancillary buildings and structures, including a six acre coal storage area and associated transfer equipment and railroad spurs, an electrical substation and overhead transmission lines, fuel oil and water storage tanks, and a wastewater treatment building (Figure 3). An ash landfill area encompasses approximately 44 acres and is located on the Milliken Station property east of the power plant.

Current Operations

Bituminous coal mined from various suppliers in Pennsylvania is Milliken Station's primary fuel. Coal is typically transported to the facility by train. Typically, two to three freight trains arrive at Milliken Station per week, accessing the facility via Conrail railroad tracks that extend north from Ithaca along the eastern shore of Cayuga Lake. The trains usually contain 80 to 100 cars with each car having a carrying capacity of approximately 80 to 100 tons. Occasionally, coal delivery is supplemented by truck. Under these conditions, approximately 25 deliveries per day are made, with each truck carrying roughly 25 tons of coal. Approximately 2,700 tons of coal per day are consumed at Milliken. Table 1 displays the characteristics of the coal burned at Milliken Station.

Figure 3
Site Layout For Milliken Station Clean Coal Technology Project (New Components Shaded)

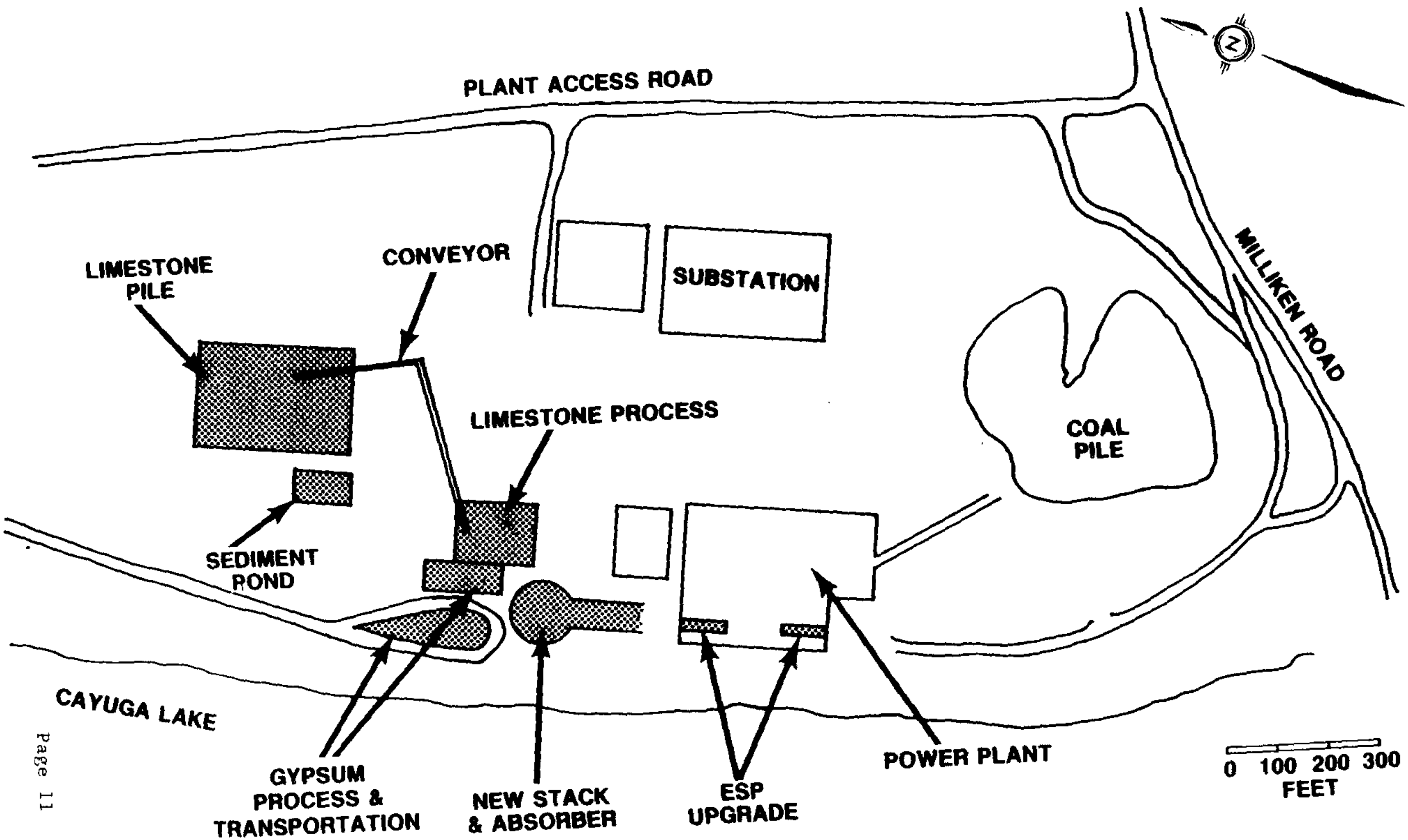


Table 1

Characteristics of Coal Burned at Milliken Station

Characteristic	1990 Average	1991 Average
Sulfur, %	1.94	1.89
Ash, %	12.04	11.57
Moisture %	7.00	6.51
Volatile Matter, %	27.55	27.49
Heating Value, Btu/lb	12,292	12,519

Existing Emissions, Water Use and Wastes

Each year, Milliken Station emits approximately 31,000 tons per year (3.0 lbs/MMBtu) of SO_2, 6,900 tons per year of NO_x, and 410 tons per year of particulates in the course of generating electricity. Milliken Station operates under a permit issued by the New York State Department of Environmental Conservation. This permit limits Milliken Station air emissions to a maximum of 5.0 lb SO_2/MMBtu, a 3-month average of 3.8 lb SO_2/MMBtu, annual emissions of 3.4 lb SO_2/MMBtu and 0.1 lb particulate/MMBtu. Currently, Milliken Station is not constrained by any NO_x emission limitations. Section 4 of this EA describes the permits and permit modifications issued for the proposed project.

Water is used for three general functions at Milliken Station: to generate steam, provide facility service water, and remove waste heat. Water (approximately 216 million gallons per day) is withdrawn, via four circulating pumps, from Cayuga Lake through a submerged intake.

Steam is produced by heating boiler feedwater in steam generators through the combustion of pulverized coal. Approximately 35,000 gallons per day of water are demineralized and used for boiler feedwater make-up. About 2,500 gallons per day of water, after being treated in the plant make-up treatment system, is used for potable and sanitary purposes. An additional 4,000 gallons per day are used for maintenance cleaning washes.

A once-through, non-contact cooling system is used to condense steam. The bulk of the water drawn from Cayuga Lake (216.3 million gallons per day) is circulated through the steam condensers prior to discharge back to the lake through a shoreline outfall. Approximately 600,000 gallons of water per day are used for equipment cooling purposes.

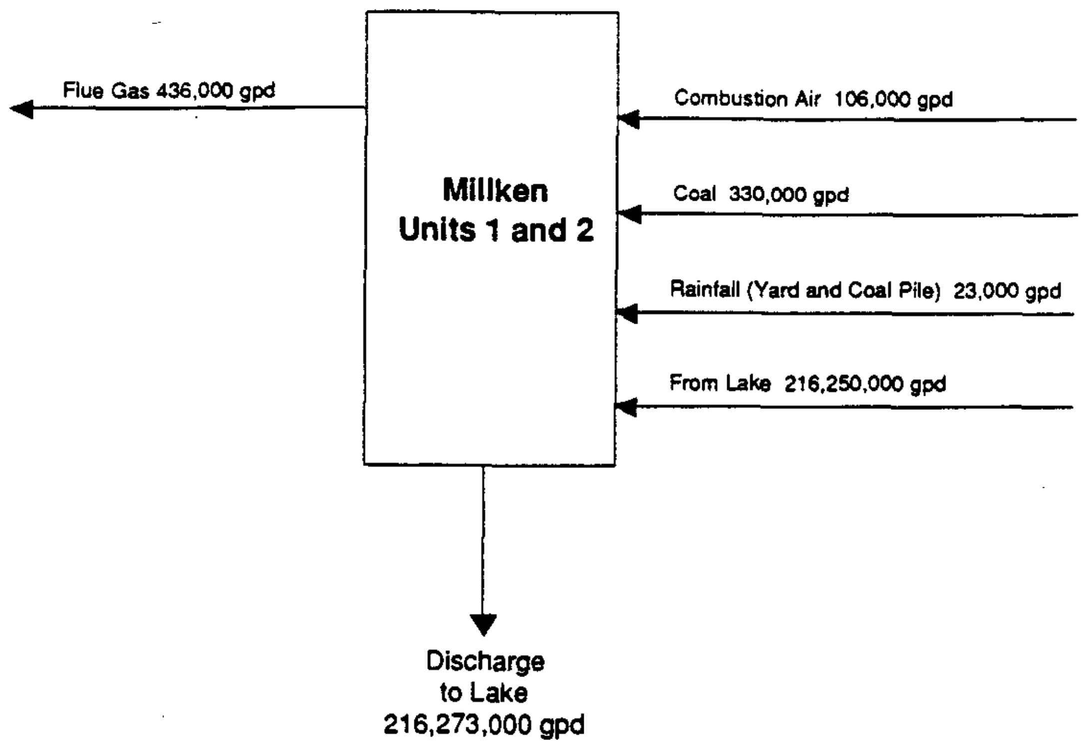
Coal-pile runoff and maintenance cleaning wastewater is treated and discharged to Cayuga Lake. Process water from plant, yard, and roof drains and accessory equipment cooling is collected and treated in a process water reclamation facility and discharged to Cayuga Lake.

Leachate and surface water runoff from Milliken Station's landfill is currently collected in a 3.8 million gallon sedimentation basin designed to hold runoff from a 10-year, 24-hour storm event. After sedimentation, water is discharged to Cayuga Lake.

Figure 4 is a general water balance diagram for Milliken Station's current operations.

Coal combustion produces about 80,000 cubic yards of fly ash per year. Two electrostatic precipitators (ESPs) are used to control particulate emissions from Milliken Station's boilers and to collect fly ash. After passing through the ESPs, flue gases are discharged through the two 250 ft stacks with an exit velocity of about 45 ft/sec at a temperature of about 280° F.

In addition to fly ash collection from the ESPs, ash is also collected from the furnace bottom, economizer hoppers, and air heater hoppers. NYSEG has been successfully marketing most of the fly ash for use in concrete production, and bottom ash as an anti-skid material. In the year 1990, NYSEG sold 70% of the fly ash and 100% of the bottom ash produced.



Assumptions:

Air @ 77°F 60% relative humidity

Coal 4.7% moisture as fired

Rainfall 36 inches/year; 100% runoff coefficient

Unit 1 and Unit 2 at 296 MW net total

Approximately 300,000 gpd of water is generated during coal combustion

Evaporation is neglected (except flue gas calculations)

All flows are annual daily averages

Figure 4. Water Balance Diagram - Existing Conditions

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Description of Proposed Technology

The demonstration project would involve the installation and implementation of new emissions controls, monitoring equipment, and ancillary machinery. All demonstration features, retrofits, and upgrades would be integrated into Unit 2. The sulfur control process proposed for Unit 2 would be shared with Unit 1. Unit 2 would also be modified with additional control and monitoring technology. A site plan showing the proposed location of the demonstration project components is presented in Figure 3; project equipment and systems are tabulated in Table 2; and a flowchart of the process is depicted in Figure 5.

The proposed FGD system is Saarberg-Holter Umwelttechnik GmbH (S-H-U) formic acid-enhanced flue gas desulfurization system and would be the first demonstration of the S-H-U technology in North America. The proposed FGD system consists of four sections: the S-H-U scrubber system, limestone reagent preparation, gypsum by-product processing, and the FGD wastewater treatment system.

S-H-U Scrubber System

In the S-H-U desulfurization process, limestone slurry reacts with and removes SO_2 from flue gas. It is anticipated that the S-H-U system would demonstrate an SO_2 emissions reduction potential of up to 98%.

The scrubber system would be constructed within the base of a new 374-foot facility stack, which would replace the two existing 250 foot stacks, and would incorporate a Stebbins tile-lined split module absorber. Installation of a single split FGD absorber is proposed to be installed to provide separate absorber modules for Units 1 and 2. The absorber would be a concrete vessel, lined with abrasion- and corrosion-resistant tile, and would have a common center dividing wall to provide each unit with its own absorber. Each side of the absorber vessel would operate independently, thereby allowing flue gas from each boiler to be individually treated and discharged. Locating the absorber and ancillary equipment within the scrubber stack base would reduce the space requirements

Table 2

Milliken Clean Coal Technology Demonstration

Project Components

Generation Process	Modification/Upgrade
Coal Processing	Change to higher sulfur Eastern U.S. coal Change coal mills to enable processing of new coals
Coal Combustion	Combustion modifications for primary NO_x emission control
Emissions Control	In-stack S-H-U FGD system, with Stebbins tile absorber NO_xOUT™ Process (Unit 2 only) High-efficiency air heater system (Unit 2 only) Induced draft fans Electrostatic precipitator upgrades Associated ductwork from boiler to stack
FGD By-Product Processing	Limestone receiving, handling, storage, and processing equipment Blowdown/wastewater treatment facility Gypsum processing and pelletizer
Auxiliary Equipment	Power feeds to new equipment Control system upgrades Electrical System upgrades

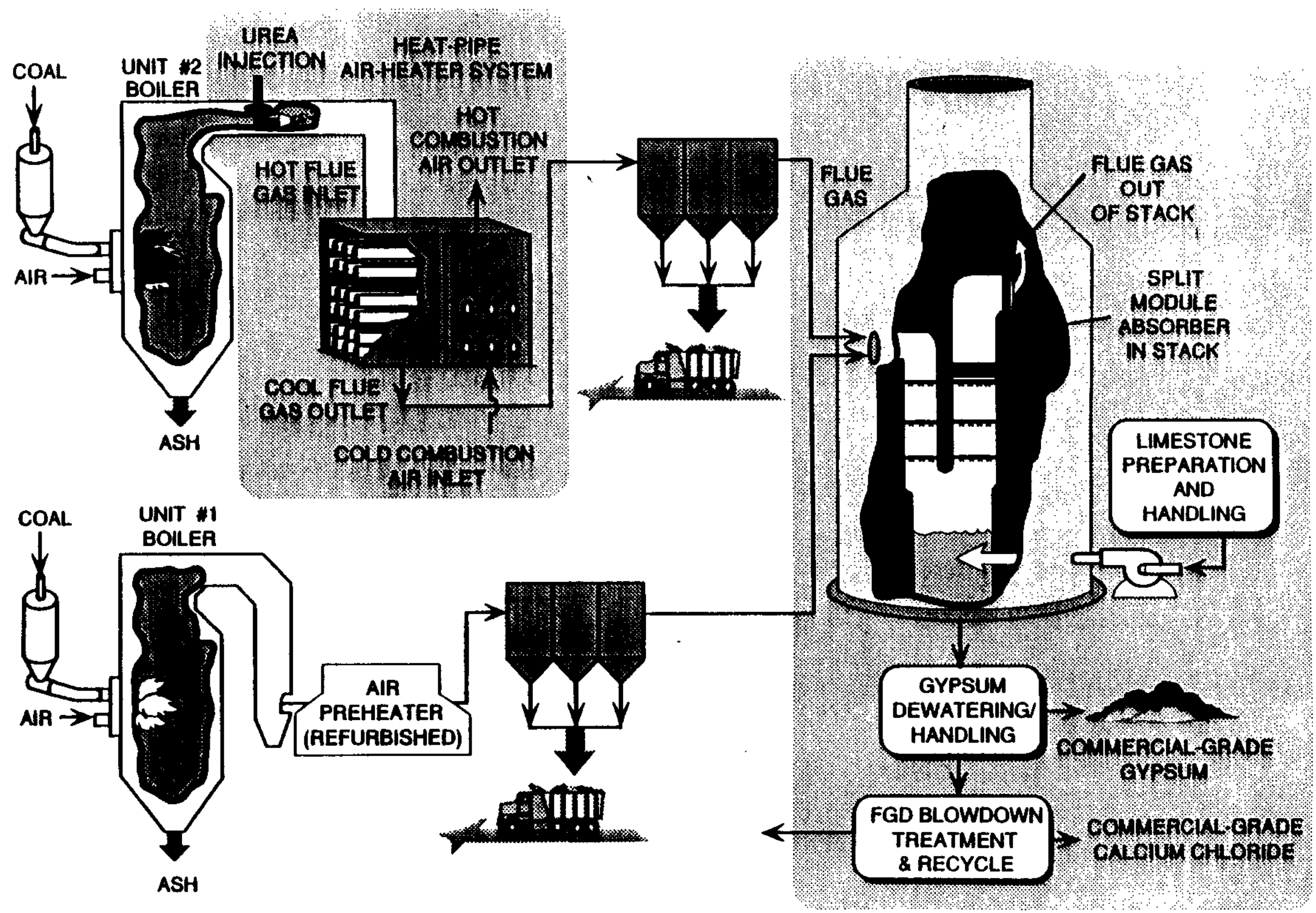

Figure 5. Flow Chart of Proposed Project

of the proposed project. In addition, the potential for plugging would be significantly reduced because the absorber will not contain any packing or gridwork.

In the proposed process, flue gas from the existing boilers enters at the top of the cocurrent section of the absorber (section of the absorber where the flue gas travels in the same direction as the limestone recycle slurry spray) and contacts with the limestone recycle slurry to absorb a minimum of 90% of the SO_2 in the flue gas. The limestone recycle slurry is introduced by spray nozzles at four separate levels in the cocurrent section of the absorber (three levels plus a spare level). The limestone recycle slurry collects in the absorber sump located at the bottom of the absorber. The flue gas continues to pass to the countercurrent section of the absorber (section of the absorber in which the flue gas passes upward through the limestone slurry which is being sprayed downward) where it again comes into contact with the limestone recycle slurry from spray nozzles at three separate levels for residual SO_2 absorption (two levels plus a spare level). The flue gas then passes through two-stage mist eliminators to remove entrained water droplets before exiting the new stack.

Recycle slurry from the absorber sump would contain approximately 800 ppm formic acid, and would be continuously pumped to the absorber spray nozzles by the recycle pumps. The benefits of formic acid use in conjunction with the S-H-U absorber design include control over pH drop in the recycle fluid, allowing low pH absorption and elimination of scaling and plugging. The stability of this system would permit substantial changes in inlet SO_2 concentration without affecting performance.

Limestone Reagent Preparation

Addition of a limestone FGD system would require new plant equipment. A storage pile, processing building, and wet grinding mill would all be part of this limestone equipment. Limestone from the storage pile would be conveyed to the reagent preparation building. Approximately 161 gallons per minute of clarified water, which would be supplied from the gypsum dewatering system and stored in a clarified water tank, would be used during the limestone grinding and dilution process.

Approximately 91 gallons per minute of limestone slurry product would flow by gravity to the fresh slurry feed tank, from where it would be continuously pumped to the absorber vessel. Slurry not required by the absorber would flow back to the fresh slurry feed tank to complete the loop.

Gypsum By-Product Processing

Calcium sulfate (gypsum) is one of the marketable by-products of this FGD process; however, some processing and equipment is necessary to upgrade the raw by-product to commercial-grade gypsum. An absorber sump would act as a back-mixed reactor to oxidize the product of absorption (bisulfate) to calcium sulfate. Oxidation would also occur in the absorber due to excess oxygen in the flue gas. Slurry in the absorber sump would contain approximately 10% gypsum, which provides seed crystals for the formation of gypsum particles. The gypsum slurry would be pumped at a rate of approximately 536 gallons per minute from the absorber sump to a filter feed tank in a dewatering/pelletizing building to be located adjacent to the absorber area. A vacuum filter system would be used to separate the formed gypsum from the water, creating a gypsum cake of 90% solids by weight. At full station capacity, approximately 25 tons per hour of gypsum would be produced. The decanted water would be recycled back to the scrubber system.

Should the gypsum produced not meet commercial specifications or the demand for the gypsum not meet production levels, the gypsum would either be landfilled on the site or sent to NYSEG's Kintigh Station.

FGD Wastewater Treatment System

NYSEG plans for all of the FGD system liquid wastestreams to be treated and recycled for reuse in the system.

Approximately 15 gallons per minute of blowdown water from the scrubber would be discharged to a blowdown treatment system to maintain the dissolved chlorides in the FGD system. The blowdown would be treated for removal of suspended solids and metals. The treated effluents would then be pumped at a rate of approximately 48 gallons per minute to a brine concentrator/spray dryer system. Prior to processing in the brine concentrator, water would be treated to adjust pH and remove dissolved gases. In the brine concentrator, 90% (or about 43.2 gallons per minute) of the feed would be recovered as condensate (distilled water) which would be returned to the FGD system as make-up water. The remaining 10% of the water would be a brine with high concentrations of calcium, magnesium, sodium, and chlorides. From this brine, a salt consisting primarily of calcium chloride, but also including magnesium chloride, sodium chloride, other alkali chlorides and inerts, would be produced at a rate of 450 pounds per hour. The chloride salt would be used as a dust suppressant on roads or as an alternative to rock salt as a road de-icer. Should the demand not exist for the salt product or the product not meet specifications, it would either be sent to nearby salt mines, sent back to the FGD system for removal of impurities, or landfilled on the site.

Runoff from the limestone storage area would contain dissolved limestone and suspended solids. This runoff would be collected and discharged to a sedimentation basin. After the solids settle out, the water would be used as make-up to the FGD system.

NO_x Controls

The proposed project would also include technologies designed to reduce NO_x emissions. New low-NO_x cell burners and windboxes would be installed on both Units 1 and 2. The system would include an integral over-fire air system that would lower NO_x

emissions from both units through the enhancement of staging the air flow during the combustion process.

Additional NO_x controls for Unit 2 would include the NO_xOUT^{TM} selective non-catalytic reduction (SNCR) system. The SNCR system would be a chemical and mechanical system offered by Nalco Fuel Technologies. The objective of demonstrating the SNCR system would be to achieve a reduced NO_x rate while maintaining marketable quality fly ash. The NO_xOUT^{TM} process would reduce NO_x through urea (NH_2CONH_2) injection into the post-combustion zones of the Unit 2 boiler. The ensuing chemical reaction following the urea injection would convert the NO_x to nitrogen, carbon dioxide, and water.

2.2 ALTERNATIVES ELIMINATED FROM CONSIDERATION

Other technologies that could be demonstrated as part of the CCT Program were considered through all three elements of the NEPA strategy as presented in the "Introduction". The no-action alternative was considered in the programmatic analysis as well as in the preparation of this EA. Alternative sites and technologies available to the CCT program were considered during the project selection process. These alternative sites and technologies are not considered further in this EA.

As part of NYSEG's technology selection process, NYSEG had a task force review 32 separate options to demonstrate reductions in SO_2 emissions. The benefits to NYSEG of each option were considered and the optimal technique, considering emissions, land use, disposal requirements, costs, and the overall impacts to the NYSEG network of power plants was to demonstrate the S-H-U FGD system at Milliken Station under the CCT program. Additional discussions on the alternatives considered by NYSEG are available to the public in the Environmental Information Volume (EIV).

2.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative whereby DOE does not provide cost-shared funding support, the NYSEG S-H-U FGD project would not be demonstrated at Milliken Station. NYSEG would instead install a more conventional FGD system at the Milliken Station in order to comply with the emissions reductions mandated by the CAAA.

Proceeding with the "No-Action Alternative" would not contribute to the objective of the CCT program which is to make a number of advanced, more efficient, economically feasible, and environmentally acceptable coal technologies available to the United States energy market place.

3.0 ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION AND THE NO-ACTION ALTERNATIVE

3.1 THE PROPOSED ACTION

3.1.1 Air Resources

Construction-Related Emissions

Construction of the FGD system and ancillary equipment would result in atmospheric emissions of particulate matter in the form of fugitive dust from earthwork and vehicle exhaust. Gaseous emissions from the internal combustion engines of construction equipment would include SO_2, NO_x, CO, and volatile organic compounds (VOCs). Since vehicular exhaust and fugitive emissions are emitted close to the ground level, impacts due to these emissions typically occur within or very close to the construction area boundaries, with rapidly decreasing impacts beyond this point. Due to the buffer area that surrounds the project site, residential areas near Milliken Station are not expected to be adversely affected by construction-related air emissions. Due to the relatively small area of land potentially disturbed (approximately 10 acres) and because emissions from construction would be limited to a 27-month period and would be localized, any changes in ambient levels of particulate matter, SO_2, NO_x, CO, and VOCs would be minimal and temporary. Engineering controls would be utilized to minimize any impacts from these construction-related emissions.

Operational Emissions

The proposed FGD system and combustion modifications would significantly reduce Milliken Station's SO_2 and NO_x emissions. SO_2 emissions would be reduced by the addition of the S-H-U process while NO_x emissions would be reduced by changes to the combustion process. In addition, NO_x emissions would be reduced further through utilization of the SNCR NO_xOUT^{TM} injection process.

SO_2 Emissions

Current uncontrolled emissions from Milliken Station average approximately 31,000 tons of SO_2 each year while burning a 1.9% sulfur coal. With the proposed flue gas desulfurization system, SO_2 emissions would be reduced to about 2,565 to 5,130 tons per year while burning a 3.2% sulfur coal.

Acid Deposition Analysis

One of the goals of the SO_2 reductions mandated by the CAAA of 1990 is to reduce acid deposition in sensitive areas. Milliken Station's current impact on selected sensitive receptors in New York State has been modeled and compared with Milliken Station's proposed project impact on those areas. Sulfate deposition in the Adirondacks and Catskills mountain regions was estimated using the Ontario Ministry of the Environment (OMOE) acid deposition model. Modeled impacts attributable to existing and future operations of Milliken Station, expressed in kilograms of sulfate deposition per hectare per year (kg/ha/yr), were compared with impacts that the New York State Department of Environmental Conservation (NYSDEC) has determined to be associated with all major New York State sources at each receptor.

Results of the sulfate deposition analysis are presented in Table 3. It is estimated that Milliken Station currently contributes 0.095 kg/ha/yr of sulfate deposition to the Adirondacks, or 1.74% of the contribution of all New York State sources. Implementation of the demonstration project would reduce this estimated impact to 0.015 kg/ha/yr, or 0.27% of the contribution from all New York State Sources. Similarly, it is estimated that Milliken Station currently contributes 0.23 kg/ha/yr of sulfate deposition to the Catskills, or 4.94% of the contribution from all New York State sources. Implementation of this demonstration project would reduce this impact to 0.045 kg/ha/yr, or 0.97% of the contribution from all New York State sources.

Table 3

Sulfate Deposition Analysis Results for Milliken Station

Sensitive Receptor	New York State Impact (kg/ha/yr)	Current (kg/ha/yr)	% NYS Impact	Future (kg/ha/yr)	% NYS Impact
Adirondacks	5.4636	0.095	1.74	0.015	0.27
Catskills	4.6587	0.23	4.94	0.045	0.97

NO_x Emissions

Based on stack tests and heat input calculations, Milliken Station currently emits about 6,900 tons of uncontrolled NO_x per year. NYSEG plans to reduce NO_x emissions per pound of coal burned by improving station efficiency and modifying the combustion process through the installation of low-NO_x burners, windboxes, and an integral over-fire air system. As a result of these efforts, NO_x emissions would be expected to decrease to 4,700 tons per year or lower. NO_x would further be reduced by a minimum of 20% through the demonstration of the NO_xOUT™ process, a selective non-catalytic reduction system, on Unit 2 for the three-year demonstration period.

One of NYSEG's objectives is to determine the NO_x reductions that can be achieved with an SNCR system without increasing the levels of ammonia in the fly ash, which would detrimentally affect fly ash marketability. Ammonia is a by-product of the reaction between NO_x and urea that can be formed under certain conditions. Ammonia production is generally undesirable because of the possibility of forming ammonium sulfate and bisulfate in the presence of sulfur trioxide. Ammonium bisulfate is known to cause fouling of regenerative air heaters and, when excessive amounts of the ammonium compounds contaminate the ash, ash disposal or sale of ash can be adversely affected.

After completion of the proposed three-year demonstration project, NYSEG would evaluate the effectiveness of continuing the NO_xOUT™ process during commercial operation until the year 2015 based upon the data collected during the demonstration project. This data would indicate NO_x removals and fly ash marketability.

Air Toxics

Title III of the CAAA of 1990 targets air-toxic emissions for reduction. EPRI, in its publication "Power Plant Integrated System: Chemical Emissions Studies" (PISCES program), reports that FGD systems have been shown to reduce air-toxic emissions. The lower flue gas temperatures of wet FGD systems cause compounds (such as metals, chloride and mercury) with low vapor pressures to condense and collect in the scrubber. Results indicate that FGD systems contribute to removal of chloride and mercury. Through operation of the FGD system at the lower pH associated with the S-H-U process, metal removal rates should be increased as the solubility of metals increases at lower pH values. The S-H-U FGD system would be enhanced further by treatment of the FGD liquid blowdown stream, which would settle metals out of the liquid and remove metal hydroxides in solid form.

New Emissions and Increased Emissions from Proposed Project

The only new emissions would be related to the ammonia slip (approximately 11 tons per year) from the demonstration of the selective non-catalytic reduction technology for additional control of NO_x emissions.

Emissions of CO_2 would increase slightly as a result of the proposed project due to additional power consumption by the scrubber and scrubber chemistry. Additional CO_2 emissions resulting from increased fuel consumption to meet the FGD system's power requirements would be minimized through plant heat rate improvements. It is projected that with the S-H-U FGD system, Milliken Station's CO_2 emissions will increase by approximately 5.8 tons per hour, or less than 2%.

Overview of Emissions

A comparison of the existing emission rates and the projected annual emission rates due to implementation of the proposed project are shown in Table 4. The emission rates shown are based on actual average fuel use at Milliken Station from 1988 to 1990. Emissions of particulate matter and associated trace elements would likely be reduced through the planned efficiency enhancements of the existing electrostatic precipitators. In Table 4, emissions of these pollutants were conservatively assumed to remain unchanged, since achievable efficiency enhancements cannot be fully quantified.

Table 4

Comparison of Existing and Projected Annual Emission Rates

(tons/year)

		Proposed Action	
Pollutant	**Existing Emissions**	**Estimated Future Emissions**	**Net Change**
SO_2	31,000	2,565 to 5,130	-28,435 to -25,870
NO_x	6,900	4,700[1]	-2,200
TSP	410	410	0
Lead	0.3	0.1	-0.2
NH_3	0	+11	+11
CO	260	260	0
HC	30	30	0
CO_2	2,676,000	2,727,000	+51,000

As shown in Table 4, the FGD system and associated NO_x controls would reduce SO_2 emissions by more than 25,000 tons per year while NO_x emissions would be reduced by 2,200 tons per year. These reductions have been compared to the new emissions expected from additional trucks transporting materials to and from Milliken Station. As will be discussed later in this EA, approximately 112 to 117 trucks would enter and leave the site each day. Based on an average SO_2 emission factor of 1.38 g/mile, the annual amount of SO_2 that would be emitted from trucks would be 14.9 tons SO_2/year. Based on an average NO_x emission factor of 11 g/mile, the annual amount of NO_x emitted from trucks would be 119.2 tons NO_x/year.

[1] This estimate does not include the reduction expected through the demonstration of the NO_xOUT^{TM} process on Unit 2.

As shown by these values, the increase from trucks represents less than 0.06% of SO_2 emission reductions and only 5.4 percent of NO_x emissions.

3.1.2 Air Quality

The U.S. EPA has established primary air quality ambient standards to protect public health and secondary standards to protect public welfare. These National Ambient Air Quality Standards (NAAQS) have been adopted by the NYSDEC. Ambient standards exist for sulfur dioxide (SO_2), particulate matter with an aerodynamic diameter of less than 10 micrometers (PM_{10}), nitrogen dioxide (NO_2), carbon monoxide (CO), photochemical oxidants (as ozone, O_3), and lead (Pb). In addition, the NYSDEC has retained the total suspended particulate (TSP) ambient standard which was replaced on the Federal level with the PM_{10} standard. Additional ambient air quality standards have been established by the NYSDEC for fluorides (F), beryllium (Be), and hydrogen sulfide (H_2S). Each standard has an associated averaging time, as shown in Table 5.

NYSDEC operates air quality monitoring sites throughout New York State. These stations are used to verify compliance with State and Federal AAQS. Data from monitoring stations close to the proposed project site were used to provide a description of baseline air quality in the area. Syracuse (approximately 40 miles from Milliken Station) is the NYSDEC monitoring site closest to the proposed demonstration project. The most recent year of ambient monitoring data for SO_2. TSP, PM_{10}, Ozone (O_3), CO and Lead (Pb) are is 1989. The most recent data for NO_2 was provided in 1979, after which monitoring of NO_2 was discontinued. Ambient air quality data confirms that all pollutant levels (with the exception of CO) measured by the NYSDEC monitors in Syracuse are below the applicable state and National Ambient Air Quality Standards (NAAQS). The 8-hour average for CO of 11 microgram/m_3 in Syracuse exceeds the NAAQS. Concentrations of CO vary considerably over short distances because of the influence of local sources. It should be noted that Syracuse is an urban area with a high density of congested vehicular traffic. Therefore, CO measurements from Syracuse would not be

Table 5. Summary of National Ambient Air Quality Standards (NAAQS) and New York State Standards[1]

Pollutant	Averaging Period	National AAQS[(2)]		New York AAQS[(2)]
		Primary	Secondary	
Carbon Monoxide	8-hour 1-hour	10 40	10 40	10 40
Lead	3-month	1.5	1.5	--
Nitrogen Dioxide	Annual	100	100	100
Ozone[(3)]	1-hour	235	235	160
Particulate Matter less than 10 µm in diameter	Annual 24-hour	50 150	50 150	-- --
Total Suspended Particulates (TSP)	Annual 24-hour	-- --	-- --	65 250
Sulfur Dioxide	Annual 24-hour 3-hour	80 365 --	-- -- 1300	80 365 1300
Fluorides	6-month 24-hour 3-hour	-- -- --	-- -- --	40 60 80
Beryllium	1-month	--	--	0.01
Hydrogen Sulfide	1-hour	--	--	14

(1) National and New York standards, other than those based on annual averages or annual geometric means, are not to be exceeded more than once per year.

(2) All values are in µg/m³ except CO, which is in mg/m³, and fluorides, which are in ppm.

(3) The ozone standard is attained when the expected number of days per calendar year in which the maximum hourly average concentrations is above the standard is less than or equal to one. New York AAQS currently being revised to coincide with Federal standard.

Sources: 40 CFR 50 and 6 NYCRR 257.

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applicable to the Town of Lansing since the density of congested vehicular traffic in the area is not high. The ambient air quality near Lansing is expected to be better than that near Syracuse because fewer emission sources exist near Lansing. This is verified by the results of air quality monitoring performed in 1975-1976.

Ambient SO_2 and NO_x concentrations resulting from the operation of Milliken Station during the proposed demonstration project are expected to be lower than existing concentrations because of the reduction of emissions of SO_2 and NO_x. Emissions of NH_3 are not expected to have a significant air quality impact. Additionally, the higher stack will allow greater dispersion of pollutants before the plume intercepts the ground. New York ambient guidelines for NH_3 do not require the consideration of background levels.

As a condition of a New York State Department of Environmental Conservation permit for the project, NYSEG plans to install a monitoring system to collect data about ambient air quality.

NYSEG conducted a dispersion modeling analysis to assess air quality impacts from fugitive dust emissions resulting from on-site storage and handling of limestone. The FGD system would use about 13 tons/hour of pulverized limestone as a reagent. An on-site storage pile sized to maintain approximately 160 days supply (33,000 to 50,000 tons) would be located north of the proposed FGD system. The pile is expected to be 200 feet by 300 feet in area and 30 feet high. A covered conveyor system would transport the limestone from incoming trucks (or trains if rail transport would be used in the future) to the top of the pile. A second conveyor system would transport the limestone to the reagent preparation building.

Fugitive dust (TSP/PM_{10}) would be emitted through various activities associated with the storage pile, including material loading, vehicle movement in the storage area, wind erosion, and loadout from the pile. Fugitive dust emissions for the above activities are provided in Table 6.

Ambient concentrations of TSP and PM_{10} were predicted using the Fugitive Dust Model (FDM). Receptors were placed at the facility property line at 50-meter intervals. Additional receptors were located downwind to ensure that maximum impacts were considered. Since the FDM did not simulate terrain effects, elevations used for each

Table 6
Limestone Pile Fugitive Dust Emissions

Activity	Dust Emissions[1] (lbs/hr)
Loading to Pile	0.57
Vehicle Traffic on Pile	1.82
Limestone Unloading	0.70
Wind Erosion	2.77
Total	5.86

[1]Based on: Activity Factor ($K_{1,2,3}$) = 1.0; Thoronthwaite's precipitation-evaporation index (PE) = 0.99; Silt content of aggregate material (S) - 1.6% (USEPA 1985); duration of material in storage (D) = 160 days.

Source: USEPA

receptor were the same as the base elevation of the proposed limestone pile. Maximum air quality impacts from limestone storage and handling activities were added to conservative background levels to derive total expected TSP and PM_{10} concentrations. A comparison of expected impacts with ambient air quality standards is presented in Table 7. As shown in Table 7, ambient air quality concentrations would be in compliance with applicable standards.

3.1.3 Visual Impacts

The visual impacts associated with the proposed project would fall into two categories. The first would be the FGD system buildings and stockpiles and the second would be the new 374-foot stack and associated saturated plume. The FGD system buildings would be designed to match the current power plant buildings in size, shape and color. This planning would minimize most visual impacts from the new buildings. The limestone storage pile located north of the existing plant would match the size of the coal pile located south of the plant. This would allow balance to the view of the new plant. Figure 6 is a view of the current plant from Cayuga Lake. Figure 7 is a computer rendering of the plant after the installation of the FGD system viewed from Cayuga Lake.

Currently, the site includes two 250-foot stacks which are 20 feet in diameter at the top. These two stacks would be removed and replaced with a single stack approved by the Federal Aviation Administration (FAA), 374 foot high and 60 feet in diameter at the top.

As a condition of a New York State Department of Environmental Conservation permit for the project, NYSEG plans to install a monitoring system to collect data about ambient air quality. In order to collect necessary meteorological data in conjunction with air quality information, a 328-foot tall, FAA-approved tower would be installed and operated for approximately three years.

Visual impacts were assessed based on a description of the most visibly dominant modifications proposed for Milliken Station (new stack and vapor plume), and an analysis of sensitive views of the site. Existing views toward the site from receptors to the north and east of Milliken Station are obstructed by the rising topography that characterizes the site surroundings. Those utilizing Cayuga Lake for recreational resources and those traveling by vehicle on the western bank of Cayuga Lake would have full view of the new

Table 7
Fugitive Dust Modeling Results

		Concentration (μg/m)				
Pollutant		NYSEG Milliken Station[(1)]	Ambient Background Level	Total	AAQS	Percent of AAQS
TSP	24-hr Annual	78.7 8.21	82 35	161 43	250 55	64 79
PM_{10}	24-hr Annual	15.7 1.64	63 29	79 31	150 50	52 61

[(1)]Facility inpacts are highest and second-highest for 24-hour periods and maximum predicted for annual averages.

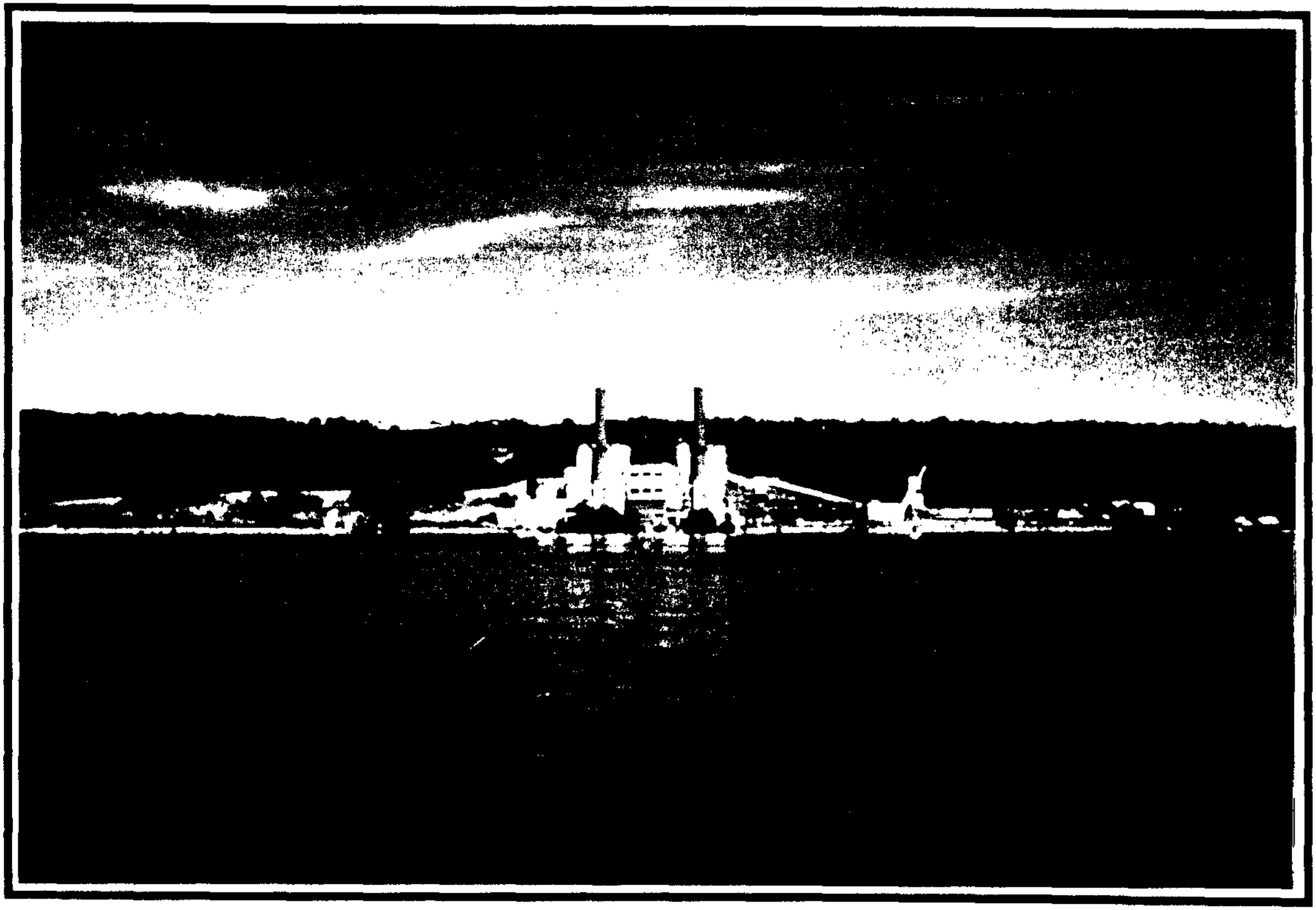


Figure 6. View of Current Plant from Cayuga Lake

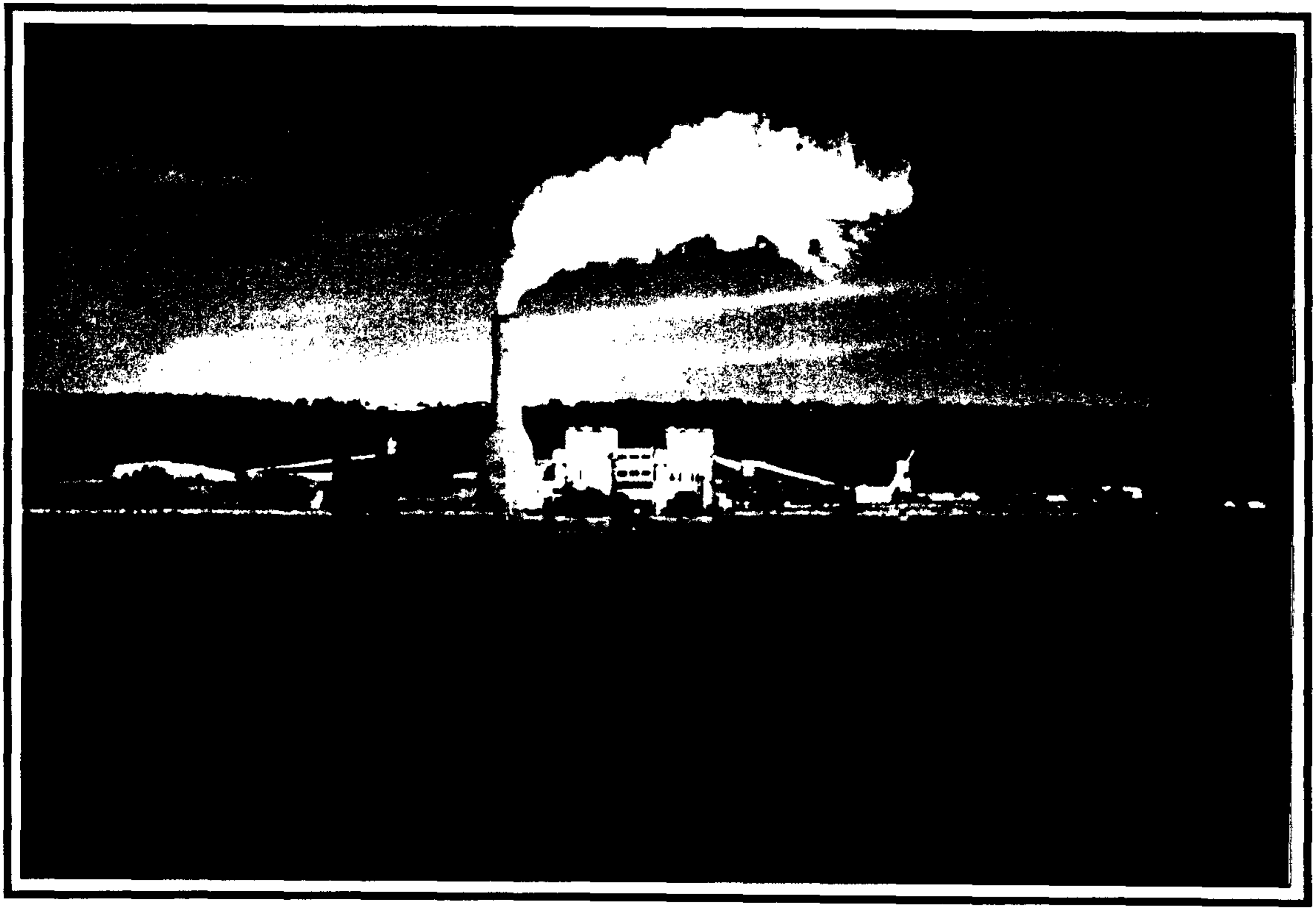


Figure 7. Computer Rendering of Proposed Plant from Cayuga Lake

stack. Figure 7 represents the view of the proposed project from the middle of Cayuga Lake which is adjacent to the facility. Views of Milliken Station would be unobstructed from this location and locations from an extended area of the lake and western shore. The FGD system components would be entirely visible from this location; thus the proposed modifications would represent a moderate change in the existing area landscape. The new stack would break the horizon from this receptor; the existing facility stacks do not. The closest residential receptors on the western shore of the lake, at Little Point, are approximately 1.7 miles west of Milliken Station, and approximately 3,750 feet west of this viewshed. From the viewsheds of this residential area, the new stack would break the horizon; however, given that the site is already industrial, the new stack would not change the character of the area's viewsheds.

The visual impact of the modified Milliken Station when viewed from the residential areas further to the northwest and southwest (e.g., Cold Springs and Osgood Landing) would diminish with distance. The quality of the viewsheds at these locations would not be changed from the existing condition.

Under existing conditions, water vapor plumes from Milliken's stacks are visible only on days of very low temperatures and high relative humidity. Exhaust gases currently emitted from Milliken contain relatively low levels of water vapor and are discharged at high temperatures. The FGD system proposed for Milliken, however, would discharge much greater quantities of water vapor, at lower temperatures, into the atmosphere. To determine the frequency and appearance of vapor plumes from the proposed FGD system, dispersion modeling was used to simulate visible stack plume incidence under a variety of meteorological conditions at the site. The results of the model indicate that a visible plume of 656 feet (approximately 1/8 mile) would be visible about 80% of the time. Figure 8 depicts isopleths illustrating the percentage of time the visible plume would extend to various points around Milliken Station.

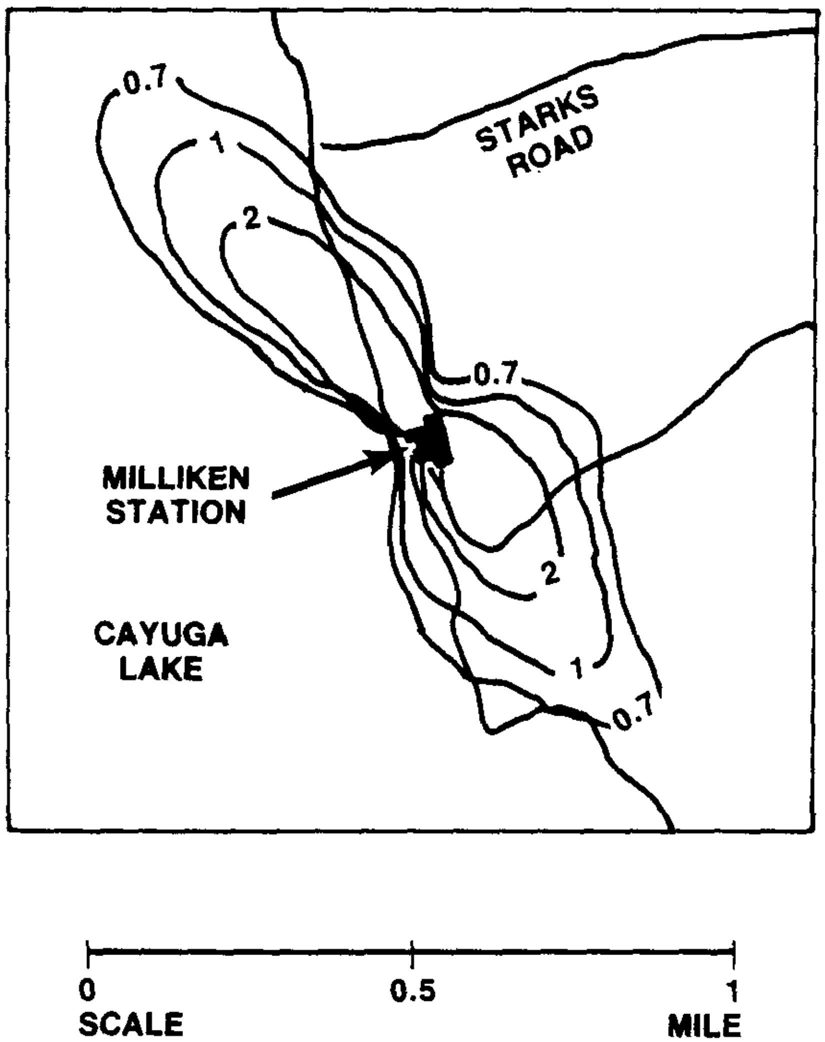


Figure 8
Isopleths Illustrating The Percentage Of Time The Visible Plume Is Predicted To Extend To Various Points Around Milliken Station

When visible, the stack vapor plume would be noticeable on the horizon, and would appear as a white cloud rising from the stack and traveling downwind before dissipating. The plume would extend to its longest lengths during the winter months. Under certain winter conditions, it could extend for a distance of 6,560 feet (1.2 miles), though this condition is predicted to occur 16.7% of the time during winter or 9.0% of the time on an annual basis.

During the summer, visible plumes would be shorter. In addition, the atmospheric conditions conducive to plume formation typically occur during nighttime hours. Thus, the time when the vapor plume is most likely to be seen from viewshed receptors on and along Cayuga Lake (i.e., a warm, clear summer day) would also be the time when a plume would be the shortest. The presence of a vapor plume from the new FGD scrubber system is not anticipated to diminish the quality of the viewscapes toward the project site.

In addition, dispersion modeling was done to assess the potential for plume-induced fogging or icing on or around any roads or residences in the area. The modeling results indicate that no plume-induced fogging or icing is predicted to occur.

3.1.4 Land Resources

Land resource impacts were assessed by considering potential impacts to geology, terrestrial ecology, hydrology and other environmental systems that may result from facility construction and operation. The area of land required for the proposed demonstration project is approximately 10 acres.

Construction-Related Impacts

Site topography was previously altered and is relatively flat in the area proposed for the new stack and associated ductwork. Construction of these project components would involve minor site preparation such as the excavation necessary for foundations for the new stack building, which would not appreciably alter existing topography.

Limestone storage piles and conveyor equipment would be located in steeper areas and would require excavation, leveling and grading. On the slopes which would require cut and fill or in areas of unstable slopes or rock outcrops, pre-construction features would not be restored. Construction of the limestone runoff sedimentation basin would also alter topography and drainage patterns in that area. The impact on topography in these areas would be long-term but generally minor.

Principally, construction would involve short-term or minor impacts to soil resources. These would result from the excavation and compaction of soil by the movement of heavy construction equipment. Some erosion and sedimentation may occur during construction in the areas of steep slopes (generally those greater than 25%).

All construction activities would adhere to guidelines approved by NYSDEC prior to construction for erosion and sedimentation control. Erosion would be minimized by beginning cleanup and revegetation operations as soon as practical after construction operations.

Operational Impacts

Following construction activities, operation, and maintenance of the modified Milliken Station would not significantly affect any existing earth resources. Seeding and plantings to be done after construction would improve soil stabilization and minimize the potential for soil erosion.

3.1.5 Water Resources

Construction-Related Impacts

Construction of the proposed FGD system is not expected to negatively impact existing surface water or groundwater resources. A soil erosion and sedimentation plan has been developed to ensure that the water quality of Cayuga Lake would be protected during construction activities.

The erosion and sediment control measures for the FGD system site would manage runoff from construction parking areas, laydown areas, the limestone storage area, and the FGD system construction area. Runoff from these areas would be directed to a sediment trap or sedimentation basin.

Two sediment traps would be used to control sedimentation in the FGD system construction area immediately north of the existing station. These sediment traps would be flow-through structures sized to control sediment from the first half inch of rain and would be designed to maintain their integrity during a one-hundred year storm.

One of the sediment traps would be located on the south side of the FGD system construction area and would extend the full east-to-west length of the area to be excavated. On the west side of the FGD construction site, all runoff would be intercepted, collected, and drained by pipe into a second sediment trap on the north side of the work site.

The total surface area of the two sediment traps would be approximately 6,000 square feet. They would handle flow from a 6.3 acre area and would be designed to handle the first half-inch flush, which is about 11,600 cubic feet of water. The traps' total storage area would be about 5,000 cubic feet, an area of two feet deep in each sediment trap.

Runoff from the limestone storage and unloading areas, construction parking areas, and laydown areas would be controlled through a system of ditches which would intercept runoff and direct it to a sedimentation basin. The basin would have a surface area of 15,000 square feet. It would hold flow from a 16.7 acre area with an expected flow of 14 cubic feet per second. The basin would provide two feet of storage for sediment, totalling about 14,300 cubic feet.

All disturbed areas would be seeded and mulched after the construction was completed. All permanent ditches and channels would be loamed, fertilized and seeded when final grades and alignments have been achieved. Immediately following seeding, ditches would be covered with hay or a temporary stabilizing cloth and staked to ensure adequate germination.

Runoff from all undisturbed areas would be diverted around the construction site to the north and would be discharged into an existing intermittent stream that empties into Cayuga Lake.

Operational Impacts

As discussed in the existing emissions, water use, and wastes section of this EA, water is used for three general functions at Milliken Station: to provide steam, facility service water, and waste heat removal. Water (approximately 216 million gallons per day) is withdrawn from Cayuga Lake through a submerged intake. Currently, Milliken Station uses a once-through, non-contact cooling system to condense steam. The bulk of the water drawn from Cayuga Lake is circulated through the steam condensers prior to discharge through a shoreline outfall. Approximately 215.3 million gallons per day of water circulate through the condenser. Table 8 presents a comparison of existing and proposed water flows, and Figure 9 shows the water balance for the proposed project.

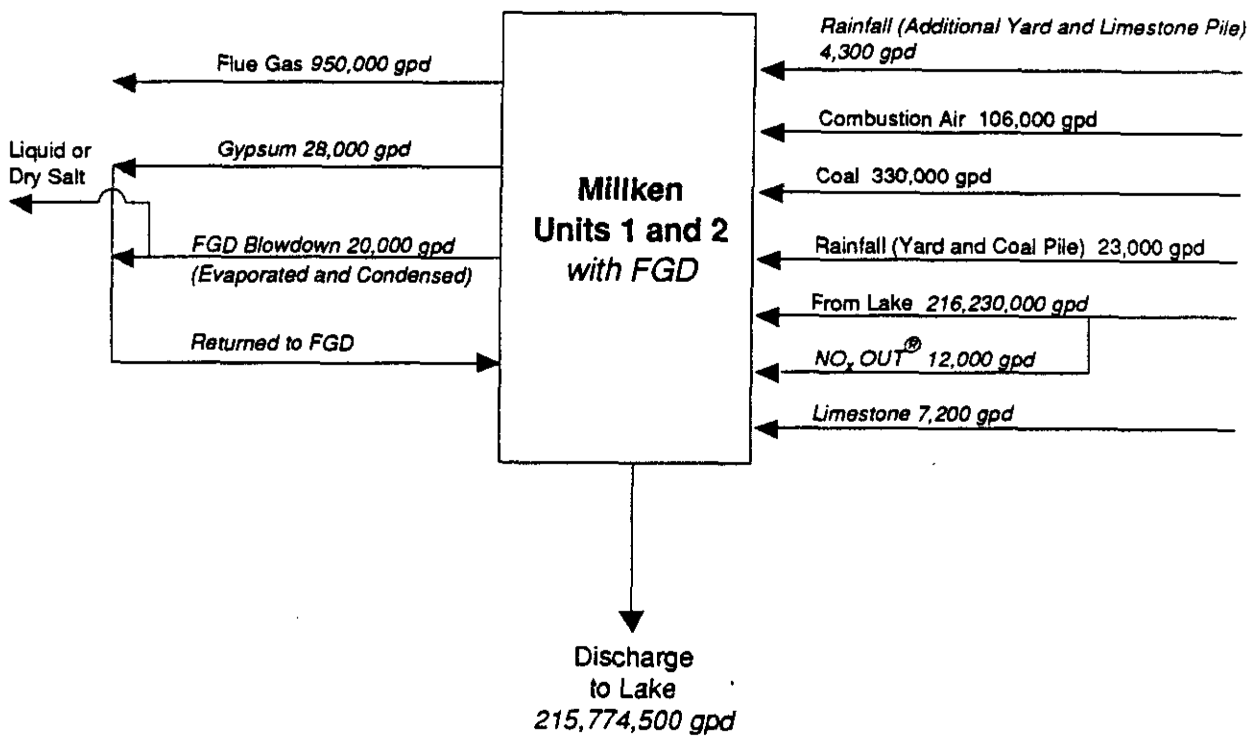
Table 8

Comparison of Existing and Proposed Water Flows

Component	Existing Conditions (gpd)	Proposed Project (gpd)
Intake from Cayuga Lake	216,250,000	216,250,000
Discharge to Cayuga Lake	216,273,000	215,970,500
Flue Gas Water Vapor	436,000	750,000
Gypsum Filtrate (recycled to FGD)	----------	28,000
FGD Blowdown (recycled to FGD)	----------	20,000

No impacts to surface water or groundwater hydrology would result from operation of the modified Milliken Station. Modifications would not result in an increase in potable water consumption for sanitary or drinking water purposes. Any minor increase in potable water demand due to the additional staff required for construction and operation of the proposed FGD project would not exceed current capacity.

The anticipated process water demand for Milliken Station would continue to be supplied from Cayuga Lake. Although the proposed project would result in a net increase in facility water consumption of approximately 314,000 gallons per day, no additional water would be drawn from the lake over the present withdrawal amount. While 279,500 gallons per day of water drawn from the lake would be consumed by the FGD system, part of the additional water consumption would be provided by the limestone (7,200 gpd), additional runoff (4,300 gpd), and existing yard and coal pile runoff (23,000 gpd). Most of the water needed would be drawn from the existing quantity of lake water circulated through the plant. The result would be less water returned to the lake. This amount is an insignificant fraction of the safe yield of Cayuga Lake (as agreed upon by NYSDEC during the permitting process) as it is equal to less than 0.1% of the lake's annual throughput (water drained into and out of the lake). The water supply intake and discharge system presently in place would be used to transport water to and from various



Assumptions

1. Same as Figure 2.1.4-2
2. Limestone @ 4.7% moisture as received
3. Additional yard, buildings and limestone pile is 1.6 acres with 36 inches rain/year and 100% runoff coefficient
4. Evaporation (except FGD blowdown loss and flue gas (calculations) is neglected

Note: Italics denotes changes in quantities due to FGD system addition

Figure 9. Water Balance Diagram - Proposed Project

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facility components. New intake/discharge structures would not be required. Thermal properties of the discharge to Cayuga Lake would remain unchanged, therefore, no new thermal effects would result from the demonstration project.

NYSEG presently operates a sedimentation pond associated with the Milliken Station ash landfill located on Milliken Station property to the east of the power plant. The sedimentation pond currently receives surface runoff and leachate from the landfill area. The existing ash landfill sedimentation basin has a compacted soil liner. The discharge from this sedimentation pond to Cayuga Lake is regulated under NYSEG's current State Pollutant Discharge Elimination System (SPDES) permit for the landfill. The basin's capacity and water quality are monitored weekly. There are 37 groundwater monitoring wells located throughout the landfill area.

The existing ash landfill has an 18-inch compacted clay soil liner with a permeability of 1×10^{-7} cm/sec. A 50-mm PVC geomembrane lines the top of the clay layer and a 36-mm hypalon liner lines the bottom and side slopes of the landfill. A geogrid leak detection system is located between the bottom and side slope liners. The top layer on the landfill liner system is a 2-foot thick aggregate layer with a permeability of 1×10^{-3} cm/sec. The aggregate layer contains perforated leachate collection pipes. Unmarketable by-product from the FGD system, including FGD water treatment sludge, would be disposed of in the landfill. NYSEG's landfill SPDES permit and Solid Waste Management Facility (SWMF) permit have been modified to account for these changes. Water quality standards established within the modified SPDES permit would be maintained through NYSEG's existing landfill operating plan. Further discussion regarding the sedimentation pond associated with the ash landfill and groundwater monitoring are presented in the Waste Management Section of this EA.

3.1.6 Ecological Impacts

The site and its vicinity are not inhabited by significant or unique terrestrial or aquatic communities.

According to the U.S. Department of the Interior, Division of Fish and Wildlife Service (letter dated September 15, 1992 from Mark Clough, U.S. DOI), no Federally listed or proposed endangered or threatened species, other than occasional transient species, are known to exist at the Milliken Station. This letter was in response to a U.S. DOE letter requesting formal agency consultation per the Endangered Species Act as well as the Fish and Wildlife Coordination Act. According to the NYSDEC Wildlife Resources Center Information Service, no known occurrences of rare animals, plants, or natural communities and/or significant wildlife habitats have been recorded in the Significant Habitat and Natural Heritage Program files.

Construction-Related Impacts

Direct impacts to terrestrial animal species inhabiting the construction site would be limited. Although there would be potential for some animal displacement due to excavation and grading activities in the site area, the lack of unique habitat as well as the site's industrial setting would minimize such impacts.

Indirect construction impacts may be experienced by plants and animals near the site. Wildlife currently inhabiting the ravine and open field areas within and near the project site may be impacted by construction activities, causing the more mobile species to flee the area. These effects would be temporary, as over time most species would acclimate and return to wooded and open areas adjacent to the new FGD system site area.

Operational Impacts

A permanent loss of approximately 10 acres of open field and ravine habitat within Milliken Station would occur as a result of site development. Permanent development would remove only a small percentage of the habitat of similar ecological character found in the vicinity. Aquatic ecological resources associated with Cayuga Lake will be unaffected by the project.

3.1.7 Floodplains and Wetlands

Six areas within the boundaries of the entire project area (FGD system site and construction lay-down area) meet the saturation, vegetation, and soil criteria of the U.S. Army Corps of Engineers for designation as wetlands. Each of the six wetlands is under one acre in size. As a result of the proposed project, possibly four of the six wetlands would be impacted. Small isolated wetlands are common within the property boundaries of Milliken Station. None of the affected wetlands, however, is of unusually high ecological value in a regional context. No unique natural resources occur in any of the delineated wetlands.

In accordance with 10 CFR 1022 (DOE's "Compliance With Floodplains/Wetlands Environmental Review Requirements") a wetlands assessment was completed by DOE and is included as an appendix to this EA. This assessment describes the impacts to each of the wetlands. In addition to preparing a wetlands assessment in accordance with Executive Order Number 11990, the DOE also published a "Notice of Wetlands Involvement" on December 9, 1992, in the Federal Register. No comments were received in response to the Federal Register notice.

The location of Milliken Station along a slope of Cayuga Lake precludes it from inclusion in the 100- or the 500-year floodplain.

3.1.8 Waste Management

Solid and liquid wastes would be generated by construction and operation.

Construction-Related Impacts

The two existing 250-foot stacks would be removed and replaced by a single 374 foot stack. The material in the existing stacks has been tested using the toxicity characteristic leaching potential (TCLP) analysis and have been found to be non-hazardous. Upon demolition of the stacks, the material will be disposed of in a licensed off-site landfill.

Nonhazardous construction wastes (cement, brick, and debris) would be reused as much as possible in aggregate for concrete or driveway use or, as a last resort, it would be landfilled off-site. While it is difficult to predict the need for such aggregate, NYSEG is aware of a demand for such material due to a lack of suitable fill in the area. Incidental hazardous wastes resulting from construction (paints, solvents, and lubricants) and routine maintenance (solvents, cleaning solutions, and waste oils) would be accumulated on-site in accordance with Resource Conservation and Recovery Act (RCRA) regulations with subsequent removal and ultimate disposal by a RCRA-licensed carrier to one of several permitted RCRA disposal facilities.

Operational Impacts

Operation activities of the demonstration project would result in solid wastes, including the reusable by-products gypsum, chloride salt, and limestone storage area runoff sediment, and non-reuseable FGD blowdown treatment sludges. Additional data on each of these waste streams are provided below:

- **Gypsum:** Assuming 95% SO_2 removal and 3.2% sulfur coal, gypsum would be produced at a rate of approximately 50,000 pounds per hour. The properties of the gypsum to be produced are shown in Table 9. Although no contracts have been signed, NYSEG is confident that all commercial-quality gypsum would be marketed due to the letters of interest received prior to NYSEG submitting the Round IV proposal for this demonstration project. Gypsum not meeting market specifications would either be returned to the FGD cycle or would be added to the existing ash landfill at Milliken Station.

The unmarketable gypsum is expected to meet all current landfill requirements; however, NYSEG has already worked with the New York State Department of Environmental Conservation (NYSDEC) to address possible disposal alternatives and has secured modified landfill permits.

Table 9

Properties of the Gypsum to be Produced

Property	Value	Commercial-Grade Specs
Moisture	10%	10% maximum
Purity (as $CaSO_4$)	95%	> or equal to 90%
Chloride	100 ppm	< 100 ppm (dry basis)
pH	6.0 to 8.2	
Bulk Density(Cake)	75 lb/ft^3	---
Bulk Density (Pellets)	100 lb/ft^3	---

Approximately 550,000 cubic yards of storage capacity is available at the ash landfill at Milliken Station. NYSEG sells 100% of the bottom ash and 70% of the 80,000 cubic yards of the fly ash produced at Milliken Station per year. NYSEG projects that 90 percent of future fly ash production would be marketed. Consequently, only about 8,000 cubic yards per year of fly ash would be landfilled. Assuming that 10% of the gypsum is unmarketable, about 16,200 cubic yards of landfill would be needed per year for gypsum. Thereby, due to the active ash and future gypsum marketing program by NYSEG, the current landfill space available for any unmarketable gypsum should be more than adequate (approximately 20 years before further expansion would be necessary).

If all of the gypsum produced would need to be landfilled, NYSEG would seek approval to expand the existing Milliken landfill. NYSEG owns the property around the landfill so expansion is possible. Another option would be to transport the gypsum to NYSEG's existing Kintigh Station landfill, which is licensed to accept such wastes.

o **Chloride Salt:** A salt comprised primarily of calcium chloride would be produced at a rate of 450 pounds per hour. The properties of the calcium chloride salt are presented in Table 10. Chloride salt is used as a dust suppressant on roads or as an alternative to rock salt as a road de-icer. Early indications are that a demand for the calcium chloride salt exists and, thereby, NYSEG is confident that all of the product could be sold. Options for disposal of any unmarketable calcium chloride include transportation of the salt to nearby salt mines, returning it to the FGD system to remove impurities, or addition to the Milliken landfill.

The unmarketable salt would meet all current landfill permit requirements. NYSEG has worked with the NYSDEC to address the possible landfill disposal of the salt and has secured modified landfill permits.

Table 10

Properties of Chloride Salt to be Produced

Property	**Value (Wt. %)**
$CaCl_2$	57
$MgCl_2$	28
NaCl	8
Other Alkali Chlorides	2
Inerts	5

- **Limestone Storage Area Runoff Sediment:** Runoff from the limestone storage area would be discharged to a limestone sedimentation basin and then returned to the FGD system. Periodically, sediment will be dredged from the basin and returned to the limestone pile.
- **FGD Blowdown Treatment Sludge:** The only non-reusable solid by-product of the FGD system would be the metal hydroxide suspended solids removed from the FGD blowdown water after chemical treatment. Treatment of the FGD system blowdown is estimated to result in a 54% increase over the quantity of metal hydroxide sludge now generated at Milliken Station. The existing coal pile runoff/maintenance cleaning waste treatment system produces approximately 500 tons of metal hydroxide sludge per year. FGD blowdown treatment would produce an additional 270 tons of dewatered sludge per year.

The FGD system sludge would be handled in the same manner as the water treatment sludge currently produced, which is either sent to a Pennsylvania coal mine that is being reclaimed or added to the Milliken Station landfill. Currently permitted procedures would be followed for handling, transportation, and disposal of the metal hydroxide sludge. Milliken's current landfill permits have been modified to accommodate landfilling of the FGD sludge. With regard to the disposal of the metal hydroxide sludge, NYSEG's permit to operate has been modified to accept the flue gas desulfurization wastewater treatment sludge. As a permit condition, however, it is specified that thirty days prior to disposal of any FGD wastewater treatment sludge, NYSEG shall demonstrate to the satisfaction of NYSDEC the compatibility of the landfill liner with the waste. Prior to disposal of any FGD wastewater treatment sludge, NYSEG shall certify to NYSDEC that the liner system is functioning as designed.

Under the terms of NYSEG's Permit to Operate a Landfill, waste disposal at the landfill must be chemically characterized using standard analytic procedures. The concentration of the elements in the solid wastes must be below those limits presented in Table 11.

Based upon experience gained from landfilling the current metal hydroxide sludge generated at Milliken Station, the FGD blowdown metal hydroxide sludge is expected to meet these requirements. When the FGD is operating, tests will be performed on the FGD system sludge to determine if it is appropriate to dispose of it in the Milliken Station landfill.

Table 11

Milliken Solid Waste Disposal Facility Limits for Metallic Elements

Parameter	Limit (ppm)
Arsenic	5.0
Barium	100.0
Cadmium	1.0
Chromium	5.0
Lead	5.0
Mercury	0.2
Selenium	1.0
Silver	5.0

The permit to operate a landfill requires that NYSEG monitor groundwater at a number of sampling locations around the landfill. The following parameters are monitored: water level, total metals, dissolved metals, alkalinity, total organic carbon, pH, conductivity, temperature, turbidity, hardness (calcium), chloride, sulfate, total dissolved solids, aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, calcium, chromium, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, and zinc. Groundwater has not been affected by current landfill operations. Since the landfill's liner and barrier system are designed to handle metal hydroxide sludge, disposal of the FGD metal hydroxide sludge is not expected to have any impacts on groundwater.

Runoff from the landfill is collected in a sedimentation basin. Effluent from the basin is discharged to Cayuga Lake and must meet the State Pollutant Discharge Elimination System (SPDES) permit limits presented in Table 12. Based on experience from landfilling the current metal hydroxide sludge, the FGD blowdown metal hydroxide sludge is expected to meet the SPDES requirements presented in Table 12.

Table 12

Milliken Solid Waste Disposal Facility

Sedimentation Basin SPDES Discharge Limits

Parameter	Daily Maximum (mg/l)
Aluminum, total	2.0
Arsenic, total	0.15
Cadmium, total Recoverable	0.016
Iron, total	4.0
Manganese, total	1.0
Mercury, total	0.02
Nickel, total recoverable	1.37
Oil and grease	15
Suspended solids	50
Zinc, total recoverable	0.3
pH (range)	6.5 - 9.0

3.1.9 Socioeconomic Impacts

Construction-Related Impacts

Construction is expected to start in April, 1993, with operations beginning by the end of July, 1995. Peak construction activities are expected to occur during 1993 and 1994. The project would have a positive impact on local employment and the local economy during the construction phase. The average construction work force would be approximately 125 workers. The peak project construction work force, expected during the summer of 1994, would consist of approximately 200 workers.

The project construction labor force would be obtained primarily through trade unions. Necessary construction skills appear to exist within the Tompkins County area, although some contractors would be likely to use workers from outside of the area.

With 125 construction workers during the 27-month construction period (and an additional 75 workers during the peak period), local retail establishments could expect increases in revenues during construction.

Operational Impacts

Operation of the facility would require a total of 25 new employees: 15 day workers and 10 shift workers. With no influx of workers from other areas necessary to fill these positions, operation is not anticipated to affect population, labor, or housing trends in the Lansing or Tompkins County areas.

3.1.10 Transportation Impacts

NYSEG conducted extensive studies and conducted public meetings regarding transportation routes in the area of Milliken Station. The potential transportation routes for construction and operation were analyzed by NYSEG and preferred routes were selected. Route selection was based on a combination of factors including roadway characteristics and driving characteristics. Specifically, the criteria for truck route evaluation included

- o roadway characteristics: steepness of hills, frequency of curves, signalization, turning radii;
- o imposed truck restrictions: weight restrictions on bridges or roadway segments;
- o length of travel: total distance between Milliken Station and the entrance to a limited-access highway;
- o existing traffic composition: total volume of traffic and percentage of heavy vehicles using the route; and
- o traffic congestion and safety: length of roadway through hamlets, villages, cities, or other areas of potential traffic congestion or safety concerns.

Based upon this analysis, State Route 34B was selected as the preferred route for the trucks to travel upon to reach limited-access highways (I 90 to the north, I 81 to the east, and Route 17, near Elmira, to the south and west). State Route 34B is a two-lane primary arterial roadway that commences in the Town of Groton, Tompkins County, travels west toward Cayuga Lake, and then north to Route 34 through Fleming, Cayuga County (see Figure 1). While several thickly settled areas are encountered along this route, most of the route traverses agricultural land, characterized by sparse houses, wide travel lanes and shoulders, and speed limits of 55 miles per hour. Route 34B could accommodate the increase in traffic associated with the construction and operation of the proposed demonstration project. Therefore, with respect to both capacity and roadway design, the added traffic would not be expected to degrade traffic conditions in the Milliken Station area.

<u>Construction-Related Impacts</u>

Increased traffic volumes associated with construction would include vehicle trips to and from the site by construction workers and trips by trucks related to construction activities. During the construction phase, the peak number of trucks and construction worker vehicles is expected to be 160 (during the peak morning hour of 7:00 to 8:00

a.m.). During the peak evening hour (4:30 to 5:30 p.m.), 10 vehicles would be expected. The analysis of construction traffic effects was based on worst-case estimates of vehicles arriving and departing during the peak construction period's peak hours. Actual traffic during any given hour of the work day would, in all cases, be less than that used in the analysis.

Until contracts are let, NYSEG would not know which equipment for the construction phase would be delivered by truck and which by rail; however, NYSEG estimates that over 98% of the deliveries would be by truck.

Operational Impacts

Vehicular traffic to and from Milliken Station would increase due to the operation of the FGD system. The current truck and projected truck traffic during operation is shown in Table 13. This table presents the worst-case scenario whereby different trucks are used to deliver product and to transport by-products off the site.

Table 13

Current and Worst Case Truck Traffic During Project Operation

Material Transported	Current/Day	Worst Case/Day
Limestone	0	36
Gypsum	0	35
Calcium Chloride	0	1
Fly/Bottom Ash	15	15
Coal Trucks	25 to 30	25 to 30
Total	40 to 45	112 to 117

NYSEG currently plans to rely on truck transportation for the three-year demonstration project but would not preclude the use of other transportation options (such as rail) when by-product markets have been determined (both during the demonstration period and following the demonstration period). An alternative to minimize the transportation impacts is to use the same vehicles that bring limestone to Milliken Station to transport the by-products to market. This option can only be determined after the operation of the FGD system has commenced and the market for the by-products has been determined.

As the project demonstrates the application of this technology and the production of by-products is established, alternative transportation methods would be actively pursued.

3.1.11 Cultural and Historic Resources

The New York State Office of Parks, Recreation and Historic Preservation has concluded (letter dated Sept. 11, 1992 from Julia S. Stokes) that the proposed project would have "No Impact upon cultural resources in or eligible for inclusion in the State and National Registers of Historic Places." In addition, the proposed site is not within or near an area listed by the National Park Service as a National Natural Landmark. The project would not impact Native American tribal or other religious practices or sites.

3.1.12 Noise Impacts

Construction-Related Impacts

Construction noise levels would vary depending on the particular construction phase. During light construction phases, a lower level of noise is expected to be generated than during maximum construction periods. In addition, within each phase of construction, noise levels would vary on an hour-to-hour basis. The project construction schedule will consist of four phases: excavation, concrete pouring, steel erection and mechanical work. The noisiest of these phases would occur during excavation and steel erection. Because of the location of the project on the power plant property, off-site perception of ambient changes in noise levels is unlikely. During the construction phase, all equipment would employ mufflers and operate only during normal daylight hours with the exception of approximately one month of 24-hour concrete pours. The excavation activities were modeled and, while the closest receptor is located 1,500 feet from the proposed facility location, sound will be attenuated by existing buildings, resulting in a projected total increase of 4 A-weighted decibels (dBA) over existing sound levels. (The closest receptor is a residence situated between the Conrail railroad tracks and the eastern shore of Cayuga Lake).

Operational Impacts

The operation phase of this project would involve several new items of equipment that are not currently in use at the power plant. Project operation will be 24 hours per day, seven days per week. The major demonstration and post-demonstration project components will be located inside buildings or structures; this will provide a significant degree of noise control. No major noise sources will be located outdoors. Silencers or baffles will be employed, as appropriate, to ensure that air intake and ventilation fans will not have a noticeable effect on perceived noise levels. The current background noise level at Milliken Station was measured and the highest readings found were 55.6 dBA for daytime readings. The increase in residual (L_{90}) noise levels would not be greater than 3 dBA. Noise requirements are often related to limiting the increase in the background (L_{90}) noise level. An increase of 3 dBA is considered just noticeable, while an increase of five dBA is perceived as clearly noticeable. A 10 dBA increase corresponds to a perceived doubling in loudness.

3.1.13 Occupational Health and Safety

Any potential exposure of workers to hazards would be minimized by a combination of adherence to OSHA standards, engineering controls, sound work practices and procedures, and personal protective equipment. Training programs would be conducted to ensure that workers are aware of potential hazards and are able to react properly to emergency situations.

NYSEG would minimize the inherent risks associated with construction and operation activities by enforcing all OSHA and NYSEG health and safety standards. During construction, NYSEG would comply with OSHA Construction Industry standards (29 CFR 1926). A NYSEG representative responsible for monitoring health and safety compliance would be available at all times during construction.

Any chemicals used during construction and operation would be required to pass a health and safety review and be approved by NYSEG's Certified Industrial Hygienist prior to use. Through NYSEG's Hazard Communication Training Program, all employees (who might be exposed to the chemicals) would receive training on how to handle the chemicals safely. Construction and operating equipment would meet regulatory and consensus standards for adequacy. Special attention would be given to the design of handling and storage equipment for formic acid and urea. Safety and handling rules and procedures would be established for aspects of the formic acid and urea use.

3.1.14 Cumulative Impacts

Milliken Station is the only industrial facility located on Cayuga Lake. The surrounding area consists primarily of residential and farming communities. No current or planned activities/facilities exist in the region that, combined with the expected impacts of the proposed project, would be expected to result in significant cumulative impacts.

3.1.15 Findings

The purpose of an EA is to determine whether the proposed action could have a significant impact on the human environment. If an EA shows that the proposed action is likely to result in a significant impact, an environmental impact statement must be prepared. If not, a "Finding of No Significant Impact" is issued.

The impacts of the proposed action have been evaluated relative to the nine indicators of significance specified by the CEQ (40 CFR 1508.27). The results of this evaluation follow.

- **The degree to which the public health or safety would be affected:** Public health and safety would not be affected by the project.
- **The unique geographic characteristics of the site:** The unique characteristics of the area center on the location of the site relative to Cayuga Lake, which is a part of the Fingerlakes Region of New York State. No adverse impacts to Lake Cayuga are anticipated as a result of this project. The proposed FGD system along with the combustion modifications and the NO_xOUT^{TM} SNCR would result in significant reductions of SO_2 and NO_x concentrations and emissions in the region of Lake Cayuga.
- **The degree to which effects on the environment are likely to be highly controversial:** NYSEG conducted a series of five public meetings with the local communities in the vicinity of the Milliken Station site. These meetings were held in the following communities: Lansing (Sept. 26, 1991), Ithaca, Trumansburg (Oct. 1, 1991), King Ferry (Oct. 30, 1991) and Auburn (Oct. 10, 1991). The meetings were designed to inform the community about the project and to solicit the comments, concerns and suggestions of the public regarding the proposed project. While DOE did not participate in the presentations at the meetings, DOE did attend the meeting in King Ferry to observe the community's reaction and comments toward the proposed project.

  As a follow-up to these public meetings, NYSEG made available to the public documentation supplied to the New York State Department of Environmental Conservation as part of the permitting process and also made available to the public the EIV submitted to DOE as part of the NEPA process. NYSEG solicited comments from the public regarding the information presented to the State and to DOE. The information gathered from the public supported the initiation of the project and no formal opposition was expressed to the project itself. The EIV and information gathered from the public are available for viewing at NYSEG's area offices in Ithaca and Auburn, the Town Hall of Lansing, public libraries in the Ithaca area, the Tompkins County library, and the law library at Cornell University.

- **The degree to which the environmental effects are highly uncertain or involve unique or unknown risks:**
  The technology and effects of the proposed action are not expected to present significant or unique unknown risks.
- **The degree to which the proposed action establishes a precedent regarding future actions with significant effects:**
  No precedent for future actions that would have significant effects is expected to be established as a result of the proposed project.
- **Whether the action is related to other actions with individually insignificant but cumulatively significant impacts:**
  There are no current activities in the region that, combined with the expected impacts of the proposed project, would be expected to result in significant cumulative impacts.
- **The degree to which the action may cause loss or destruction of significant scientific, cultural, or historic resources:**
  There are no known archaeological, historic, cultural, or scientific resources that would be affected by the construction and operation of the proposed project. In compliance with the National Historic Preservation Act, consultation with the New York State Office of Parks, Recreation, and Historic Preservation has been undertaken and completed.

- **The degree to which the action may adversely affect threatened or endangered species or their critical habitats:**

  No Federally listed or proposed threatened or endangered species reside within the Milliken Station site or surrounding region. Consultation with the U.S. Fish and Wildlife Service has indicated that construction and operation of the proposed project would not affect any Federally listed or proposed threatened or endangered species.

- **Whether the action would threaten violation of Federal, State, or local law or environmental regulations:**

  Analysis of atmospheric emissions, wastewater discharges, and potential solid wastes indicates that neither the construction nor the operation of the proposed project would threaten to violate any Federal, State, or local law or regulation for protection of the environment.

3.2 THE NO-ACTION ALTERNATIVE

In the event that the FGD project is continued without DOE funding, the environmental impacts would be identical to the proposed action. Under the no-action alternative, if the S-H-U FGD were to be canceled, NYSEG would install and operate a more conventional scrubber. The generic impacts of installing a conventional scrubber were analyzed in the DEIS (DOE/EIS-0146).

4.0 PERMITS AND REGULATORY REQUIREMENTS

4.1 Air Permits

Milliken Station operates under two permits to operate an air contamination source issued by NYSDEC. These permits expire December 1, 1993, and were last issued on December 1, 1988. Under Part 201 of the New York State Air Pollution Control Regulations, NYSEG submitted applications in December, 1991, to the NYSDEC to construct an air contamination source for the FGD project as well as for modification of NYSEG's existing certificate to operate. NYSDEC has issued the permit to construct a stationary combustion unit and permit modifications for Milliken Station's certificate to operate.

The United States Environmental Protection Agency (EPA) of Region II determined that the NYSEG Milliken Station Clean Coal Technology Demonstration Project would not be subject to Federal New Source Review.

4.2 Water Permits

Milliken Station's wastewater discharges are regulated by the NYSDEC under State Pollutant Discharge Elimination System (SPDES) permit numbers 0001333 and 0108553. Permit number 0108553 is the existing SPDES permit for the Milliken landfill. Operation of the FGD system would possibly result in changes in wastewater (leachate) discharge from the Milliken landfill. NYSEG submitted an application for modification of the SPDES permit for the Milliken landfill in December, 1991. A modified SPDES permit has been issued for the Milliken landfill.

4.3 Wetlands

As discussed in Section 3.1, the proposed project involves modification to wetlands in the project site area and the construction laydown area. The total area of affected wetlands is less than one acre. NYSEG submitted a wetlands assessment to the U.S. Corps of Engineers to obtain a permit to allow for modification of the wetlands. A Nationwide Permit #26 (isolated wetlands) has been issued by the Corps of Engineers and no replacement of wetlands was required by the Corps of Engineers.

4.4 Solid Waste

Any unmarketable by-products from the FGD system as well as the wastewater treatment sludge would be disposed of in the on-site Milliken landfill. The addition of such products required modification to the existing Solid Waste Management Facility (SWMF) permit to operate (#7-5032-00019/00001-0). NYSEG submitted an application for modification of the SWMF permit to operate in December 1991. This permit has been modified and issued by NYSDEC in August 1992.

4.5 New York State Regulatory Requirements

As part of the State Environmental Quality Review Act (SEQR), the New York State Department of Environmental Conservation issued a final Environmental Impact Statement (EIS) for the proposed Clean Coal Technology project to be conducted at Milliken Station. SEQR is a process that introduces the consideration of environmental factors into the early planning stages of projects requiring approval from local, regional and state agencies. NYSEG submitted the documentation to the appropriate NYSDEC regulatory affairs office for review by that agency and was subsequently distributed to other involved state and local regulatory agencies and governmental units. Since no objections were raised in public meetings, NYSDEC approved and issued a general permit to construct.

5.0 LIST OF AGENCIES AND PERSONS CONSULTED

Mr. Rick Benas
New York State Department of Environmental Conservation
50 Wolf Road
Albany, New York 12233-0001

Mr. Leonard P. Corin
United States Department of the Interior
Fish and Wildlife Service
3817 Luker Road
Cortland, New York 13045

Ms. Julia S. Stokes
NYS Office of Parks, Recreation and Historic Preservation
The Governor Nelson A. Rockefeller Empire State Plaza
Agency Building 1
Albany, New York 12238

Ms. Diana Falb
Mr. Joe Kassler
U.S. Army Corps of Engineers
Buffalo District Office
1776 Niagara Street
Buffalo, New York 14207

Ms. JoAnn Arenwald
U.S. Environmental Protection Agency
Region II
Environmental Impacts Branch
Room 500
26 Federal Plaza
New York, New York 10278

Mr. Paul Webb
Soil Conservation Service
4876 Onondaga Road
Syracuse, New York 13215

APPENDIX

Wetlands Assessment

The New York State Electric & Gas Corporation Milliken Station Clean Coal Technology Demonstration Project

Town of Lansing, Tompkins County, New York

December, 1992

1.0 PROJECT DESCRIPTION

Under the Clean Coal Technology (CCT) program, the Department of Energy (DOE) plans to cost-share in the design, construction, and operation of a high-efficiency flue gas desulfurization system to demonstrate innovative emissions-control technology. The demonstration project is proposed for New York State Electric and Gas (NYSEG) Corporation's Milliken Station, located in the Lansing, Tompkins County, New York. The proposed demonstration project at Milliken Station would be a combination of several different technologies designed to reduce sulfur dioxide (SO_2) and nitrogen oxides (NO_x) emissions. A formic-acid enhanced Saarberg-Holter Umwelttechnik GmbH (S-H-U) flue gas desulfurization (FGD) system would be installed in the base of a new 374-foot stack and would incorporate a Stebbins tile-lined split module absorber. This S-H-U FGD system, designed to reduce SO_2 emissions from both Units 1 and 2, would be the first application of the S-H-U technology in North America. The S-H-U FGD system is a wet limestone scrubbing process which uses in-situ forced oxidation to produce a marketable, wallboard grade gypsum by-product.

The NO_xOUT^{TM} selective non-catalytic reduction (SNCR) system would be installed on Unit 2. The SNCR system, which would consist of urea injection into the post combustion zones of the Unit 2 boiler, would be designed to reduce NO_x emissions. The Milliken demonstration project would be the first application of the NO_xOUT^{TM} enhanced urea injection SNCR on a high-sulfur, coal-fired boiler. Low NO_x burners and windboxes, also designed to reduce NO_x emissions, would be installed on both Units 1 and 2. Figure 1 presents a process flowchart for the proposed project.

2.0 BACKGROUND

The U.S. Corps of Engineers (COE) regulates the placement of fill into waters of the United States, including wetlands, under the regulatory program of Section 404 of the Clean Water Act (33 CFR 320 et seq). Wetland areas under the jurisdiction of the COE are identified by the method presented in the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory, 1987). This method establishes three mandatory criteria in the determination of federal wetlands jurisdiction:

- Hydric soils - soils that are saturated, flooded or ponded long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophytic vegetation;

- Hydrophytic Vegetation - a macrophytic plant community in which more than half of the dominant species are adapted to thrive in saturated soils; and

- Wetland Hydrology - inundation or saturation of the soil surface for a significant portion of the growing season.

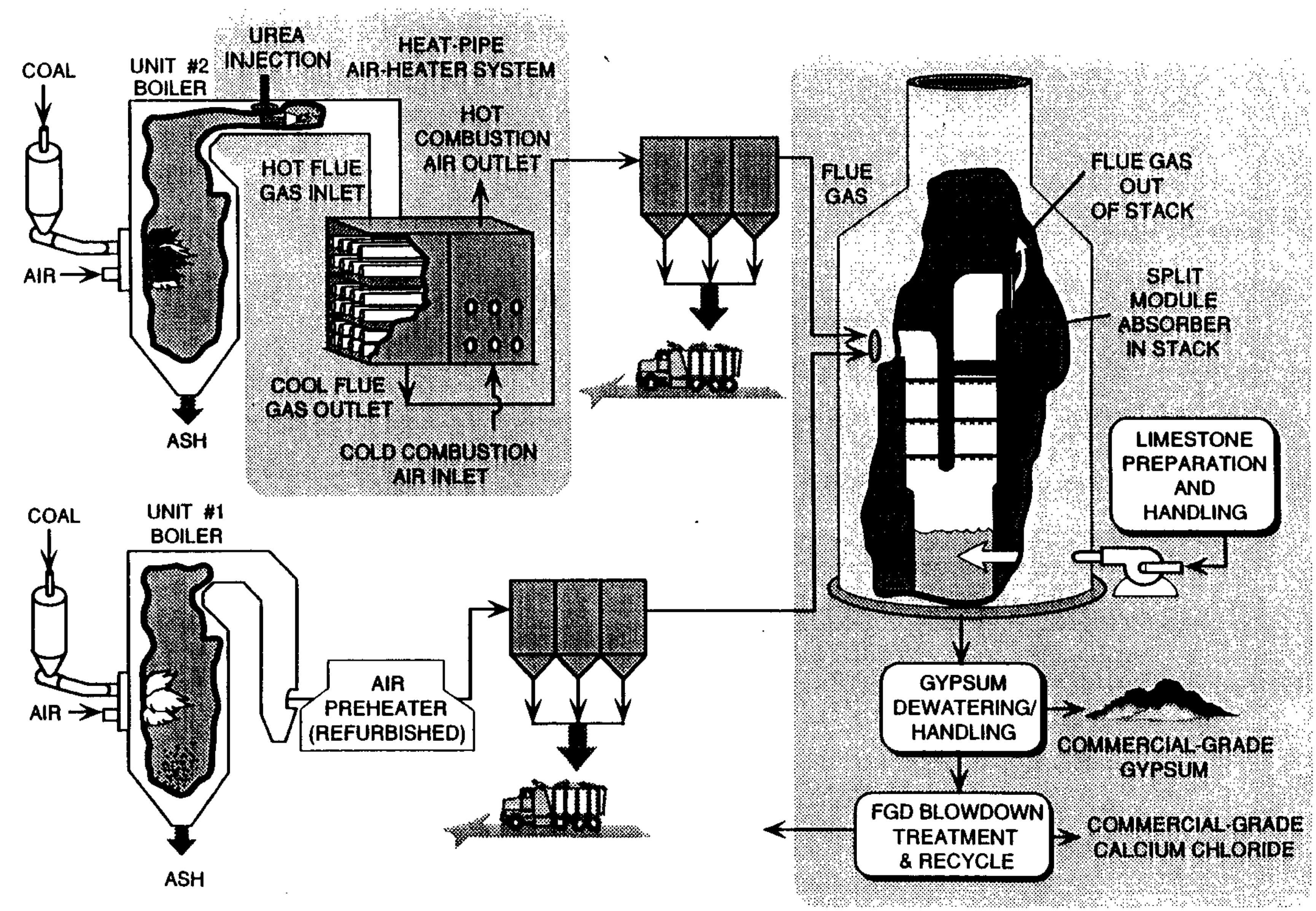

Figure 1. Flow Chart of Proposed Project

In December 1991, NYSEG submitted an Environmental Information Volume (EIV) to DOE to partially fulfill the requirements of the National Environmental Policy Act (NEPA) of 1969. During the review of the EIV, it became apparent that wetlands may be located in the area of the proposed project. In March, 1992 the DOE requested that NYSEG investigate the applicability of the COE Section 404 Regulations to the proposed project and enlist a qualified soil scientist to complete field sampling of the potential wetland areas. On April 8-9, 1992, ENSR, the environmental contractor to NYSEG, evaluated and delineated four wetlands in the project site area (all four wetlands met the COE mandatory criteria of hydric soils, hydrophytic vegetation, and wetland hydrology). On June 17th, ENSR delineated two additional wetlands located in the construction laydown area for the proposed project which also met the criteria for COE jurisdiction. During both delineations, representatives from both DOE and Science Applications International Corporation (SAIC), the environmental contractor to DOE, were present. Pursuant to 10 CFR 1022 (DOE's "Compliance With Floodplains/Wetlands Environmental Review Requirements"), as a result of the field sampling, DOE determined that this proposed project would involve activities within wetlands during construction and operation. Figure 2 is a map indicating the location of the wetlands in the project site area and the construction laydown area.

The four wetlands delineated in the proposed project site area and the two wetlands delineated in the construction laydown area are each under one acre in size. Guidance received from the COE indicated that the disturbance to wetlands resulting from direct construction impacts of the proposed project would be permitted under the Nationwide Permit program. Nationwide Permit #26 (isolated wetlands) would apply to the construction of the FGD system because the total area of wetlands disturbed by the construction would be less than one acre. This wetlands assessment discusses each of the wetlands impacted due to the construction and operation of the proposed project.

3.0 WETLANDS IMPACTS

3.1 Area Description

The general environmental and hydrologic setting of wetlands in the proposed project site area and construction laydown area are described below, followed by a description of each wetland and the effect of the construction of the proposed project on each wetland. This assessment does not include a detailed description of the site, including geology and biotic resources at Milliken Station, since such a description is contained in the publicly available *Environmental Information Volume -- Milliken Station Clean Coal Demonstration Project* (NYSEG, 1992) to which the reader is referred for more information.

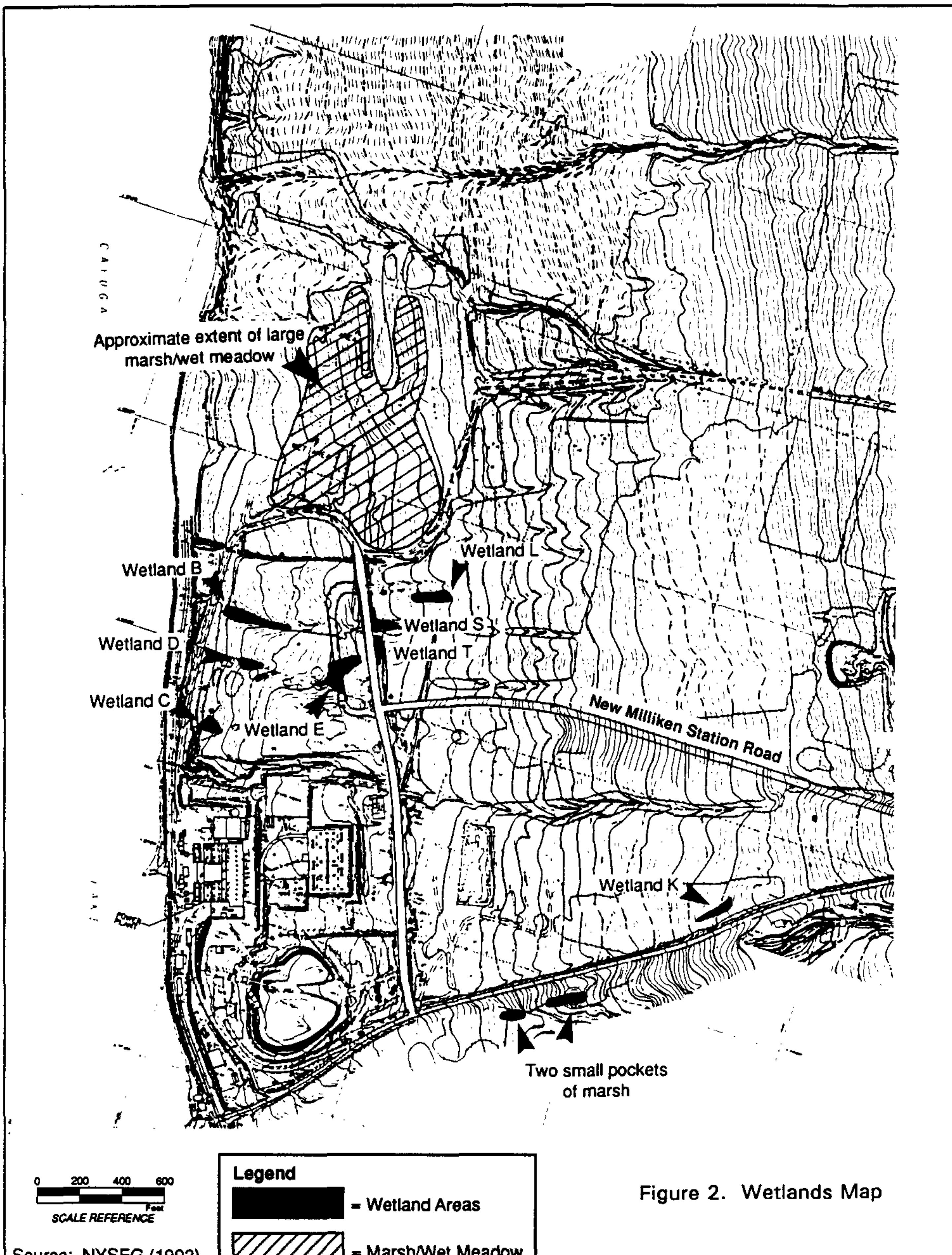

Figure 2. Wetlands Map

Source: NYSEG (1992)

Topography in the area surrounding Milliken Station is characterized by moderate to steep slopes with a western aspect. The soil substrate is dominated by fine-textured soils composed of a mixture of lacustrine deposits and glacial till, such as Hudson and Cayuga soils. These soils have high clay content and contain subsurface layers that are moderately to highly impermeable. The combination of sloping topography and assessment impermeable soil layers limits the infiltration of water, resulting in saturated surface soils, high surface runoff, and the presence of intermittent streams throughout the Milliken Station site. Additionally, water accumulates in several swales and topographic depressions accumulate water during storm events and the spring snow melt. In this setting, many small wetlands exist throughout the 1,100 acre site that are either isolated or associated with the small intermittent streams.

Wetlands in the proposed project site area and construction laydown area occur in two environmental settings: (1) land immediately north of the existing generating facility that was cleared and regraded for an earlier (abandoned) development project, and (2) second-growth hardwood forests. Diversity of plant species tends to be low but the density is high in the cleared and regraded area. Diversity is highly variable and density is typically moderate to low in the forested areas. Each delineated wetland is described below.

3.2 Delineated Jurisdictional Wetlands Impacted by the Proposed FGD Project

Construction-Related Impacts

Table 1 presents the total acreage of the delineated wetlands along with the associated losses of each due to the construction of the FGD system. These wetlands are identified by the letter designation used in the field flagging. Construction of the proposed FGD system would directly impact four of the six delineated wetlands (wetlands B, D, S and T). None of the wetlands that would be affected by the proposed FGD project are of unusually high ecological value in a regional context. No unique natural resources occur in any of the delineated wetlands.

Wetland B is located in a small hardwood forest north of the limit of the previously cleared and regraded area. This narrow wooded swamp is associated with an intermittent stream in a distinct channel and terminates in a small pool at its down-gradient end. Below the pool there is an area of diffused flow into a roadside ditch. The soil in wetland B exhibits the color and hydrogen sulfide odor indicative of long periods of saturation during the growing season.

Table 1. Total Acreage of Wetlands and Losses of Wetlands

Wetland	Total Wetland Area (Acres)	Wetlands - Project Impacts (Acres)[1]	Remaining Undisturbed Wetland Area (Acres)
B	0.10	0.03[2]	0.07
C	0.03	0.00	0.03
D	0.05	0.05	0.00
E	0.35	0.00	0.35
K	0.07	0.00	0.07
L	0.17	0.00	0.17
S-T	0.06	0.06	0.00
TOTAL	0.83	0.14	0.69

[1] Project impacts include wetlands altered as a result of DOE-funded construction of the flue gas desulfurization unit.

[2] Construction of the sedimentation basin will actually offset the loss of area from wetland B.

Wetland B supports saplings of green ash (*Fraxinus pennsylvanica* var. *subintegerrima*), red maple (*Acer rubrum*), eastern cottonwood (*Populus deltoides*), northern arrowwood (*Viburnum recognitum*), some aquatic herbs such as common cattail (*Typha latifolia*), wool grass (*Scirpus cyperinus*), and various sedges (*Carex* spp.) that were not identified due to early spring field conditions.

The upland surrounding wetland B quickly grades to a mature second-growth forest on either side of the wetland. Dominant overstory species in the forest include shagbark hickory (*Carya ovata*), northern red oak (*Quercus rubra*), sugar maple (*Acer saccharum*), and hophornbeam (*Ostrya virginiana*). The understory is moderately dense and supports black haw (*Vibernum prunifolium*), saplings of dominant trees, sapling black cherry (*Prunus serotina*), and grape vines (*Vitis* spp.).

The total area of wetland B is approximately 0.10 acres. This wetland would be impacted due to the construction of a sedimentation basin. The sedimentation basin would be sited to cut through 0.01 acres of the western end of the wetland and would restrict waterflow to the western-most 0.03 acres of the wetland. The sedimentation basin would have dimensions of approximately 280 ft long and 30 ft wide (0.19 acres) and would be surrounded on three sides by an earthen berm. If constructed properly, the new sedimentation basin would, in effect, expand the overall size of wetland B. The overall size of the resulting wetland/sedimentation basin could be as large as 0.25 acres.

Wetland D is an isolated hillside seep located in the previously cleared and graded area. Wetland D occupies a linear depression parallel to the slope and has a dense clay layer near the surface of the soil substrate. This combination of impermeable soil and topography results in an area where runoff collects and water flowing within the soil profile is forced to the surface by a shallow impervious layer.

Wetland D is dominated by wetland herbs including common cattail, sphagnum moss (*Sphagnum* spp.), and purple willowweed (*Epilobium coloratum*). At both its up- and down-gradient ends, wetland D grades quickly to nonwetland areas. The nonwetland area surrounding wetland D is of noticeably higher relief than the wetland. Dominant vegetation in the surrounding area includes elm-leaved goldenrod (*Solidago ulmifolia*), dropseed grass (*Sporobolus asper*), and saplings of eastern red cedar (*Juniperus virginiana*).

The total area of wetland D is approximately 0.05 acres. All of wetland D may be impacted by the excavation of a ditch through the eastern end of the wetland thereby cutting off the east-to-west water flow required to replenish the wetland. NYSEG is working with the New York State Department of Environmental Conservation to avoid impacting this particular wetland.

Two wetlands (wetlands S and T) are located in the construction laydown area for the project. Wetland S is situated in a small intermittent channel immediately upslope from wetland B but separated from wetland B by the existing haul road. Wetland S was formed by stream flow backing up before being diverted into a drainage ditch along the haul road. The overstory in the wetland consists of black willow (*Salix nigra*) and cottonwood;

the understory contains a mixture of cottonwood and green ash saplings, red-osier dogwood (*Cornus stolonifera*), pussy willow (*Salix discolor*), and field horsetail (*Equisetum arvense*).

Wetland T is located in a roadside ditch immediately south of wetland S. Wetland T is separated from wetland S by a small roadway that apparently acts as a small dam causing flow in the ditch to pond before flowing into wetland S. Vegetation in wetland T consists of black willow in the overstory, and pussy willow, common cattail, field horsetail, and sphagnum moss in the understory.

Dominant vegetation on the upland area surrounding wetlands S and T includes teasel (*Dipsacus sylvestris*), wild carrot (*Daucus carota*), multiflora rose (*Rosa multiflora*), pasture rose (*Rose carolina*), common buckthorn (*Rhamnus cathartica*), tall goldenrod (*Solidago altissima*), black haw, and eastern red cedar.

The total area of wetlands S and T is approximately 0.06 acres all of which has been destroyed by construction of a laydown area which was needed immediately by NYSEG for a construction project being performed independently of the Federal Action.

Operation-Related Impacts

The operation of the proposed FGD project would have no effect on wetlands D, E, S, and T other than those described under "construction-related impacts."

3.3 Delineated Jurisdictional Wetlands Not Impacted by the Proposed FGD Project

Two wetlands (wetlands C and E) are located in the project site area that would not be impacted by the proposed project. Wetland C is a small closed depression containing a pond. During site reconnaissance this pond had a maximum depth of at least three feet and appeared to be perennially wet. There is little vegetation within the pond and the edge of the vegetated wetland follows the waterline closely, except at an area which serves as an overflow outlet during high water on the western end of the pond. Wetland C, although close to the proposed FGD system, would not be impacted by the construction or operation of the proposed project. The total area of wetland C is approximately 0.03 acres.

Wetland E is located up-gradient of wetland D and is indirectly connected to wetland D by diffused overland flow and interflow. Wetland E is located within the previously cleared and regraded area. The wetland occupies a relatively flat area surrounded by steeper slopes. In this setting, wetland E receives and detains runoff from higher areas.

The dominant species within wetland E include common reed (*Phragmites australis*), common cattail, wild rye (*Elymus virginica*), various sedges, red-osier dogwood, and saplings of green ash. The area surrounding wetland E supports wild carrot, elm-leaved goldenrod, drop seed grass, hawthorn (*Crataegus* spp.), multiflora rose, pasture rose, pin cherry (*Prunus pensylvanica*), and seedlings of eastern red cedar.

Wetland E is located adjacent to the proposed limestone storage pile. The proximity of the limestone pile to the wetland should not have any adverse impact on the wetland during either the construction or operation of the proposed FGD project. The total area of wetland E is approximately 0.35 acres.

Wetlands K and L (shown in Figure 2) are located outside of the proposed FGD project site area and construction laydown area. These wetlands, thereby, would be unaffected by the construction and operation of the proposed FGD project.

4.0 DISCUSSION OF ALTERNATIVES

The alternative sites, alternative technologies and the no-action alternative have all been considered for the Milliken Station Clean Coal Technology Demonstration Project. These alternatives are all discussed in the Environmental Assessment (EA) prepared for this project as well as here.

4.1 Alternatives Eliminated from Consideration

Other technologies that could be demonstrated as part of the CCT Program were considered through all three elements of the NEPA strategy as presented in the "Introduction" of the EA prepared for this proposed project. Alterative sites and technologies that were available to the CCT program were considered during the project selection process. These technologies and sites were not considered further in the EA prepared for this proposed project and accordingly will not be considered further in this wetlands assessment.

As part of NYSEG's technology selection process, NYSEG arranged for a task force to review 32 separate options to demonstrate reductions in SO_2 emissions. The task force considered the benefits of each option and determined the optimal technique, considering emissions, land use, disposal requirements, costs, and overall impacts to the NYSEG network of power plants, to demonstrate the S-H-U FGD system at Milliken Station under the CCT program. Additional discussions on the alternatives considered by NYSEG are publicly available in the EIV and therefore will not be reiterated here.

4.2 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, whereby DOE does not provide cost-shared funding support, the NYSEG S-H-U FGD project would not be demonstrated at Milliken Station. If canceled, the S-H-U FGD technology may not become commercially available as an alternative to existing technologies, unless demonstrated totally with private funding. In addition, the CCT program would not be able to demonstrate this technology that promises to allow the environmentally safe utilization of high-sulfur coal, which is an abundant resource in the U.S.

Without the provision of cost-shared funding support from the DOE for this demonstration project, NYSEG would not demonstrate the innovative, advanced FGD system proposed for this project but would instead install a more conventional FGD system at the Milliken Station in order to comply with the emissions reductions mandated by the Clean Air Act Amendments of 1990. A more conventional scrubber, while reducing SO_2 emissions, would contribute more solid waste to landfills since no useful by-products would be manufactured.

The "No-Action Alternative" would result in the proposed demonstration project not contributing to the objective of the CCT program which is to make a number of advanced, more efficient, economically feasible, and environmentally acceptable coal technologies available to the United States energy market place.