Environmental Monitoring Plan

Advanced Flue Gas Desulfurization Project

Bailly Generating Station

January 1991

FINAL

Pure Air on the Lake, Limited Partnership

FINAL
ENVIRONMENTAL MONITORING PLAN
(EMP)
FOR
BAILLY GENERATING STATION ADVANCED FLUE GAS DESULFURIZATION PROJECT

SUBMITTED TO
U.S. DEPARTMENT OF ENERGY
PITTSBURGH ENERGY TECHNOLOGY CENTER
P.O. BOX 10940
PITTSBURGH, PA 15236-0940

BY

PURE AIR ON THE LAKE, LIMITED PARTNERSHIP
C/O AIR PRODUCTS AND CHEMICALS, INC.
7201 HAMILTON BOULEVARD
ALLENTOWN, PA 18195-1501

NORTHERN INDIANA PUBLIC SERVICE COMPANY
5265 HOHMAN AVE.
HAMMOND, IN 46320

JANUARY, 1991

PURE AIR, NORTHERN INDIANA

BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

ENVIRONMENTAL MONITORING PLAN
(EMP)

TABLE OF CONTENTS

TABLE OF CONTENTS (CONTD)

TABLE OF CONTENTS (CONTD)

TABLE OF CONTENTS (CONTD)

TABLE OF CONTENTS (CONTD)

TABLE OF CONTENTS (CONTD)

TABLE OF CONTENTS (CONTD)

SECTION

LIST OF TABLES

LIST OF TABLES (CONTD)

LIST OF TABLES (CONTD)

LIST OF FIGURES

SECTION 1.0

INTRODUCTION

1.1 PURPOSE OF EMP

Pure Air and the Northern Indiana Public Service Company (Northern Indiana) will construct and operate an Advanced Flue Gas Desulfurization (AFGD) system and associated facilities at Northern Indiana's Bailly Generating Station. The purpose of the EMP is to, (1) provide a description of the environmental monitoring tasks to be performed prior to and during the demonstration period of the AFGD system and (2) provide the rationale for the scope and types of monitoring that will be conducted. General information was provided in the Environmental Monitoring Plan Outline (EMPO) submitted to the U. S. Department of Energy (DOE) on February 16, 1990 and subsequently approved by DOE on March 29, 1990. Both the EMPO and EMP are required under the cooperative agreement between DOE and Pure Air.

The environmental monitoring activities presented in the EMPO and EMP are based on expected project needs and current regulatory agency requirements. As such, the scope of the monitoring activities may be revised if the project's needs change because of information obtained from monitoring activities. In addition, monitoring activities may change if regulatory agency requirements change. Therefore, the environmental media sampled, parameters analyzed, sampling and analytical methods used, and frequency of sampling may change during the AFGD system's demonstration period. This will be reflected in revisions or amendments to the EMP.

1.2 SCOPE

1.2.1 CATEGORIES OF ENVIRONMENTAL MONITORING

Environmental monitoring for the Bailly Station AFGD project will focus on collecting on-site technical, environmental, and

operating data. The usefulness of collecting extensive off-site data is questionable because of the industrial nature of the setting and numerous variables the project cannot control. However, the project will consider reporting any available off-site ambient air quality monitoring data during the 3-year demonstration period. Monitoring will be primarily for environmental characterization (Class I Monitoring) and compliance (Class II Monitoring) with regulatory agency conditions. This will then be related to the impact of the AFGD project. Because the AFGD system will be operated in accordance with all applicable governmental rules and regulations, there will be minimal supplemental monitoring (Class III Monitoring). The environmental characterization and compliance monitoring will minimize or negate the need for supplemental monitoring. These monitoring activities are described in more detail in Section 6.0 Environmental Monitoring.

1.2.2 DURATION OF ENVIRONMENTAL MONITORING

Environmental characterization monitoring will be performed prior to and during the 3-year demonstration phase of the project. Compliance monitoring will be performed during the 3-year demonstration phase and will continue through the remaining 17-year operating phase of the project. The only supplemental monitoring will be sound level measurements taken just before and after AFGD system start-up.

1.2.3 ENVIRONMENTAL MEDIA AND PARAMETERS

Table 1.2-1 shows the general environmental media and parameters to be monitored as part of the AFGD project. Both the media and parameters are dependent, in part, on the sample location. Additional details on the monitoring of environmental media and parameters are provided in Section 6.0 Environmental Monitoring.

TABLE 1.2-1

PURE AIR, NORTHERN INDIANA

BAILLY GENERATING STATION ADVANCED FLUE GAS

DESULFURIZATION PROJECT

ENVIRONMENTAL MEDIA AND PARAMETERS TO BE MONITORED

Environmental Media	General Parameters[a]
Coal Solid	Major Anions[b], Ultimate/Proximate Analysis[c], General/Metals[d], Radioactivity[e]
Raw Limestone	Major Anions, Particle Size Distribution, General/Metals, Radioactivity
Hydrated Lime	Major Anions, General/Metals, Radioactivity
Makeup Water	pH, Temperature, Weight Percent Solids, Major Anions, Flow, General/Metals
Gypsum	General/Metals, $CaSO_4 \cdot 2H_2O$, $CaSO_3 \cdot 1/2\ H_2O$, SiO_2, Fe_2O_3, R_2O_3 (other metal oxides), pH, Free H_2O, Radioactivity, Corrosivity, Ignitability, Reactivity, Toxicity Characteristic Leaching Procedure (TCLP) Test[f], Indiana Neutral Leaching Method Test[g], Total Water Soluble Salts, Mean Particle Size
Ash	General/Metals, Corrosivity, Ignitability, Reactivity, TCLP Test, Indiana Neutral Leaching Method Test, Radioactivity, $CaCl_2$, $Ca(OH)_2$, $MgCl_2$, $CaSO_4 \cdot 2H_2O$, CaF_2
Wastewater Treatment System Solids	Corrosivity, Ignitability, Reactivity, TCLP Test, Indiana Neutral Leaching Method Test, General/Metals, Major Anions
Wastewater Discharges	Flow, Temperature, Total Residual Chlorine, TSS, Oil and Grease, Chloride, TDS, Sulfate, Fluoride, BOD_5, pH, Calcium, Magnesium, Fecal Coliform, General/Metals
Air Emissions	SO_2, Percent Oxygen or Carbon Dioxide, Opacity, Particulate Matter, Air Metals[h], Unburned Hydrocarbons, Particle Size Distribution, SO_3/H_2SO_4, NO_x
Sound	dBA, Leq, Octave Band Spectrum

TABLE 1.2-1 (CONTD)

PURE AIR, NORTHERN INDIANA

BAILLY GENERATING STATION ADVANCED FLUE GAS

DESULFURIZATION PROJECT

ENVIRONMENTAL MEDIA AND PARAMETERS TO BE MONITORED

Footnotes:

[a] - The parameters analyzed will vary depending on the specific sample location in the process.

[b] - Major anions = NO_3, SO_3, CO_3.

[c] - Ultimate analysis includes ash, carbon, Btu/lb as received, Btu/lb dry, H, N, O and S; proximate analysis includes ash, fixed carbon, moisture, and volatiles.

[d] - General/Metals include the following: Al, Sb, As, Ba, B, Be, Cd, Ca, Cl, Cr, Co, Cu, Cn, F, Fe, Pb, Li, Mg, Mn, Hg, Mo, Ni, K, Se, Ag, Na, SO_4, Sulfide as S, Sn, Ti, U, V, and Zn.

[e] - Radioactivity parameters include gross alpha and beta, lead-210, polonium-210, radium-226, radon-222, and thorium-230.

[f] - TCLP Test parameters include As, Ba, Cd, Cr, Pb, Hg, Se, and Ag.

[g] - The Indiana Neutral Leaching Method Test is the TCLP Test without the addition of acetic acid and includes the analyses for the following: Ba, B, Cl, Cu, Cn, F, Fe, Mn, Ni, Phenols, Na, SO_4, Sulfide as S, TDS, Zn, and pH.

[h] - Air metals include the following: Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, and Zn.

The technical feasibility of performing some of the sampling and analyses, while still generating reliable data, is in doubt for some media (e.g., particle size distribution of air emissions). This may be reflected in revisions to the environmental media sampled and parameters analyzed since certain tests may not be performed or may be replaced by other tests/methods that are more reliable.

1.2.4 DATA COLLECTION

Environmental monitoring data will be collected using continuous monitoring equipment, a distributed control system, and intermittent or periodic sampling. Continuous monitoring equipment is anticipated to include monitors primarily for stack emissions (e.g., SO_2 and opacity). Other process data will be collected on a distributed control system with a high sampling frequency such that this data can be considered essentially continuous. The distributed control system will consist of interface cabinets throughout the AFGD facility that collect information from equipment for transmittal to a computer in the facility's control room. Finally, some data will be collected on a set sampling schedule primarily as part of compliance monitoring to meet permit conditions. Where possible Northern Indiana's existing monitoring network for various parameters will be integrated with the collection of data for the AFGD system. The existing monitoring system consists primarily of coal analyses, and the monitoring of stack emissions and wastewater discharges.

1.3 ORGANIZATION OF EMP

The EMP has been organized following the format used in the EMPO. This format was based primarily on DOE's October, 1988 document, "Environmental Guidance Manual for Innovative Clean Coal Technology

Program Selectees". The information provided in the EMP is based on current design and design information presented to regulatory agencies in appropriate permit applications.

This Section 1.0 Introduction, provides information on the purpose and scope of the EMP. A summary has been included of the environmental media and parameters to be monitored and reported to DOE during the 3-year project demonstration period.

Section 2.0 Project Description, contains information on the project's proponents, location, phases, schedule, process, and the various emissions or discharges and their control.

The next three sections, Section 3.0 Existing Environment, Section 4.0 Consequences (Impacts) of the Project, and Section 5.0 Project Mitigation Measures, contain information from the Environmental Information Volume (EIV) and the Environmental Assessment (EA). In these sections the environmental disciplines addressed are: atmospheric, land, water, ecological, socioeconomic, and energy and materials resources. The discussion in these sections helps provide a basis for developing various aspects of the EMP.

The planned environmental monitoring activities for the AFGD project are presented in Section 6.0 Environmental Monitoring. The categories of monitoring are as follows:

- Baseline Studies or Environmental Characterization (Class I Monitoring);
- Compliance Monitoring (Class II Monitoring), and
- Supplemental Environmental Impact Monitoring (Class III Monitoring).

These three classes of monitoring were specified in the previously mentioned DOE "Environmental Guidance Manual for Innovative Clean Coal

Technology Program Selectees". Subsequent to the issuance of this document and the approval of the EMPO, the DOE verbally indicated that a two class scheme of monitoring activities was preferred: Class I (compliance monitoring) and Class II (supplemental monitoring). Monitoring Classes I and III used in the EMP are equivalent to the two scheme Class II (supplemental monitoring); whereas, Class II in the EMP is equivalent to the two scheme Class I (compliance monitoring).

Both Pure Air and Northern Indiana, the project's proponents, will be responsible for various aspects of environmental monitoring. Section 7.0 Integration of Monitoring Activities, contains information on the coordination of the monitoring activities between the proponents and monitoring responsibilities.

The results of the environmental monitoring will be provided to DOE in quarterly reports with annual summaries and detailed reports. Section 8.0 Data Management and Reports, discusses the data management and collection system, and format and contents of the reports including confidential information.

The EMP has been prepared by several project team members. Their names and qualifications are presented in Section 9.0 List of Preparers and Professional Qualifications.

The Appendix to the EMP contains copies of AFGD project related permits for air emissions and wastewater discharges. The project is currently not aware of any environmental permits for solid waste disposal. If solid waste disposal permits are required as the project progresses, these permits and their monitoring requirements, if any, will be incorporated in the EMP.

SECTION 2.0

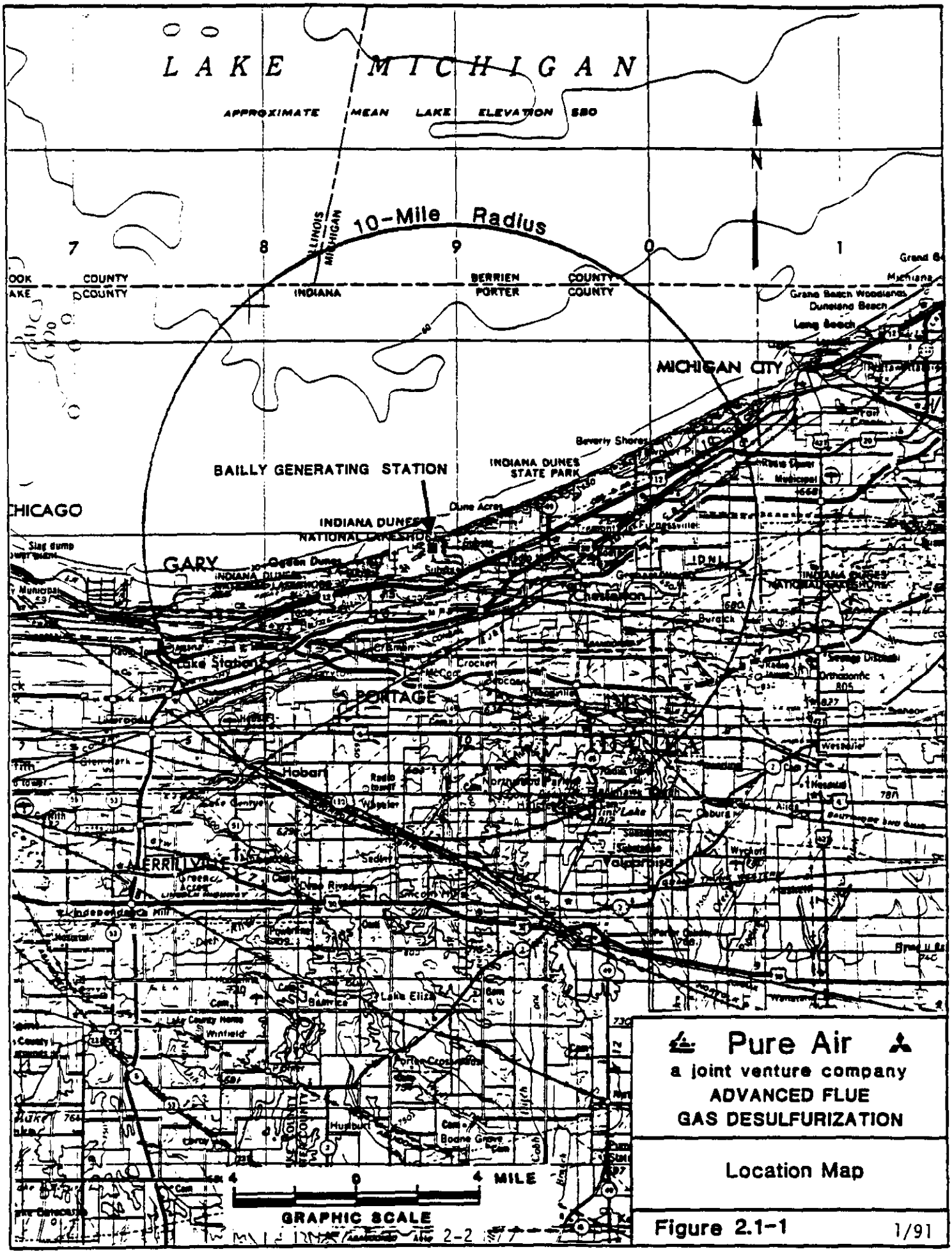
PROJECT DESCRIPTION

2.1 PROJECT PROPONENTS, PURPOSE AND LOCATION

The AFGD project will be a cooperative effort between Pure Air and Northern Indiana. Pure Air is a joint venture company between Air Products and Chemicals, Inc., and Mitsubishi Heavy Industries America, Inc. (MHIA). Pure Air on the Lake, Limited Partnership (a limited partner among corporate subsidiaries of Air Products and Chemicals, Inc.) will act as the project company for the Bailly Generating Station AFGD facility.

The purpose of the project is to demonstrate that the AFGD system can significantly reduce SO_2 emissions in an environmentally sound manner at a cost of approximately 50 percent of the cost of currently available Flue Gas Desulfurization (FGD) systems. This emission reduction will be shown to have the potential to be achieved without generating continuous solid or liquid waste disposal problems. The production of a by-product saleable gypsum solid instead of a scrubber sludge will show the potential for reducing solid waste production. The minimization of liquid waste disposal problems will be demonstrated by a Wastewater Evaporation System (WES). The WES will evaporate wastewater upstream of the Bailly Station's Unit No. 8 electrostatic precipitator (ESP) and thus has the potential to minimize wastewater production.

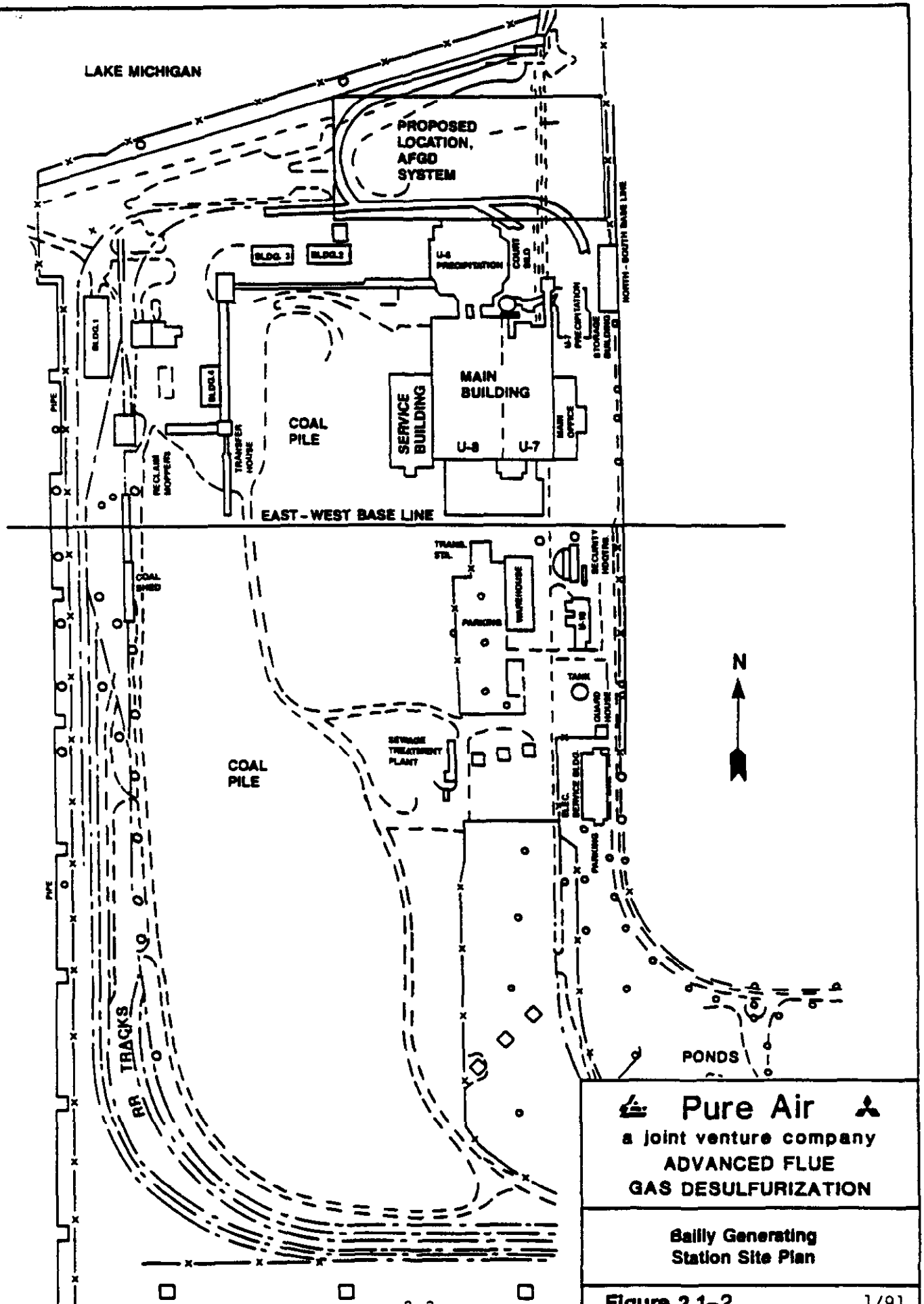
The project will be located at Northern Indiana's Bailly Generating Station. The Station is situated along the shore of Lake Michigan, approximately 12 miles northeast of Gary, Indiana. Figure 2.1-1 shows the location of the Bailly Generating Station; Figure 2.1-2 shows the location of the AFGD system in relation to the Bailly Station, and Figure 2.1-3 shows the equipment arrangement of the AFGD system immediately to the north of the Station.



Pure Air
a joint venture company
ADVANCED FLUE GAS DESULFURIZATION

Location Map

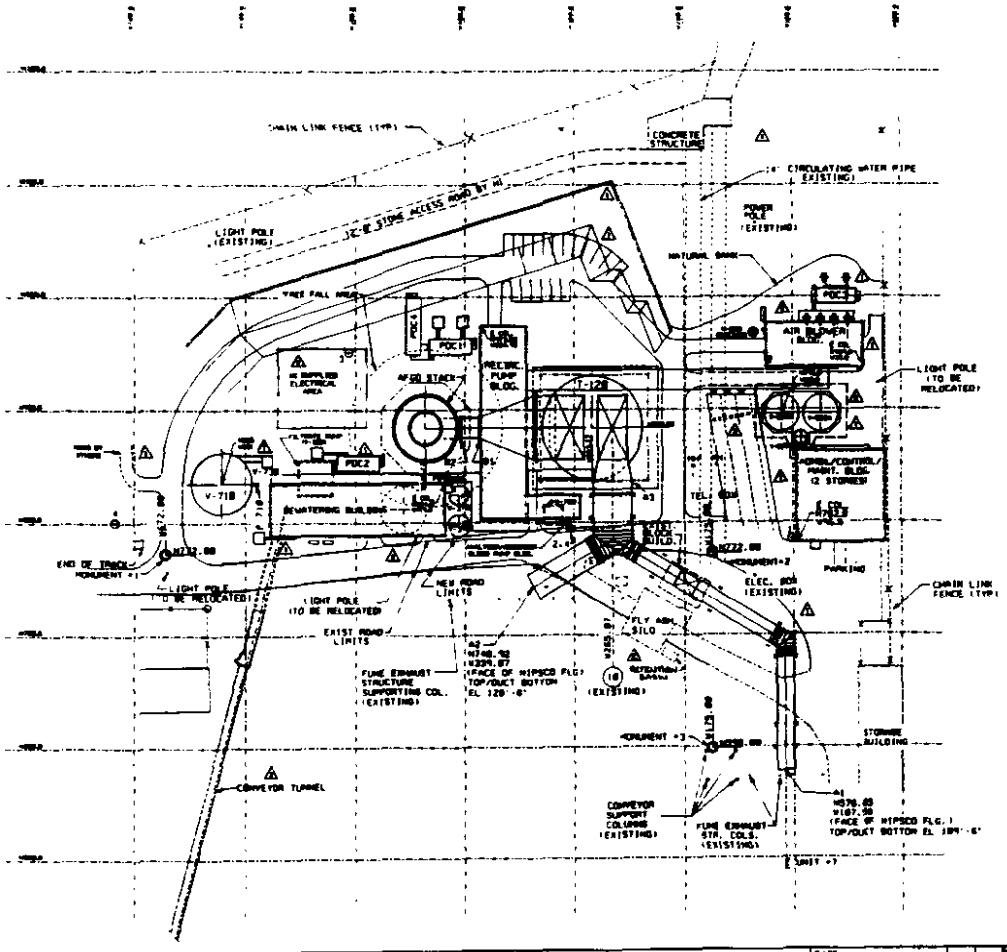
Figure 2.1-1 1/91



Pure Air
a joint venture company
ADVANCED FLUE GAS DESULFURIZATION

Bailly Generating Station Site Plan

Figure 2.1-2 1/91



"EN LIST"

	ABSORBER
	FILTRATE SUMP
	CENTRIFUGE FEED TANK
	LIMESTONE SILOS
	INSTRUMENT AIR RECEIVER
	ABSORBER SUMP
	ABSORBER HOLD TANK
	ABSORBER HOLD TANK PUMP
	ABSORBER HOLD TANK SUMP
	HYDRATED LIME SILO

TIE INS

- POTABLE WATER, SANITARY WASTE, PLANT I & C ELECTRICAL SIGNALS
2 MAKE-UP WATER, FIRE WATER, EMERGENCY QUENCH WATER, AND RETURN WATER
3 ELECTRICAL POWER AND GROUND GRID
4 CONSTRUCTION POWER

SUPPLY/INTERFACE POINTS

#1 - UNIT 7 TIE-IN
#2 - UNIT 8 TIE-IN
#3 - DUCT TIE-IN TO ABSORBER
#1 - DUCT TIE-IN TO FUTURE REHEAT SECTION
#2 - CHIMNEY TIE-IN
- GYPSUM RETURN POINT

ABBREVIATIONS

NIPSCO - NORTHERN INDIANA PUBLIC SERVICE CO.
MH - MANHOLE
STR. - STRUCTURAL
COL. - COLUMN

Figure 2.1-3

Proposed AFGD System Plot Plan

BUILDING LIST

BUILDING	APPROX. OUTSIDE DIMENSIONS
ADMIN./CONTROL/MAINT. BLDG.	93'-0" X 82'-0" X 38'-0"H
RECIRCULATION PUMP BLDG.	43'-0" X 173'-0" X 41'-0"H
DEWATERING BLDG.	48'-0" X 161'-0" X 43'-0"H
AIR BLOWER BLDG.	28'-0" X 48'-0" X 24'-0"H
ABSORBER BLEED PUMP BLDG.	22'-0" X 53'-0" X 14'-0"H
SCRUBBER EMERG. QUENCH WTR PUMP HOUSE	18'-0" X 27'-0" X 12'-0"H

NOTES:
1. BASED ON PSI DWG. 9-6992-6288 SHEET 2 OF 2, REV 5 DATED 9-5-89 AND HARDWICK & BRADY SURVEY DWG. A-12868 DATED 9-21-89
2.

5	ISSUE REVISED FOR CONSTRUCTION		
4	ISSUE REVISED FOR CONSTRUCTION		
3	APPROVED FOR CONSTRUCTION		
2	FOR APPROVAL		
1	FINAL REVIEW		
0	PRELIMINARY - FOR REVIEW		

REVISIONS

2 - 4
REFERENCE DRAWINGS

PRINT RECORD

ENG. RECORD

DRAWING STATUS

Pure Air

GENERAL ARRANGEMENTS — PLOT PLAN

EQUIPMENT ARRANGEMENT PLAN-INDEX DRAWING

BAILLY STATION 600MW AFGD
NORTHERN INDIANA

DRAWING NO. 6992-601 | SCALE: NTS | DWG NO. 89-9-6992-6280 | SHT 2 OF 7 | REV 4

2.2 PROJECT PHASES

The design life of the project will be for 20 years. The first 3 years will comprise the demonstration period of the project; whereas, the remaining 17 years will be for full commercial operation. During the 3-year demonstration phase of the project, environmental monitoring will focus primarily on environmental baseline or characterization monitoring and on compliance monitoring. Commercial operation of the facility for the remaining 17 years will focus on compliance monitoring. The monitoring data that will be provided to DOE will be collected during the 3-year demonstration phase of the project.

2.3 PROJECT SCHEDULE

A preliminary overall project schedule is as follows:

1. Last quarter 1988 through third quarter 1992 - Phase 1 Design and Permitting: Includes development of Environmental Information Volume (EIV) and Environmental Assessment (EA), developing design data, process engineering, detail engineering, equipment procurement, obtaining all engineering and environmental permits, and development of the EMPO and EMP.

2. Second quarter 1990 through second quarter 1992 - Phase 2 Construction and Start-up: Includes providing construction utilities, modifying existing Bailly Station facilities, calibration, and pre-commissioning start-up.

3. Third quarter 1992 through third quarter 1995 - Phase 3 Demonstration Operation: Includes providing utilities for operation, monitoring engineering and environmental parameters, and reporting results of operation to the DOE.

4. Third quarter 1995 through 2012 - Phase 4 Commercial Operation: Includes compliance monitoring and commercial operation arrangement between Pure Air and Northern Indiana.

2.4 PROCESS DESCRIPTION

Figure 2.4-1 shows a schematic of the AFGD system process. The process involves using Mitsubishi Heavy Industry's (MHI) basic wet limestone FGD technology on high sulfur United States coals to achieve high SO_2 removal efficiency (90 percent or higher capability). The process includes the following key components:

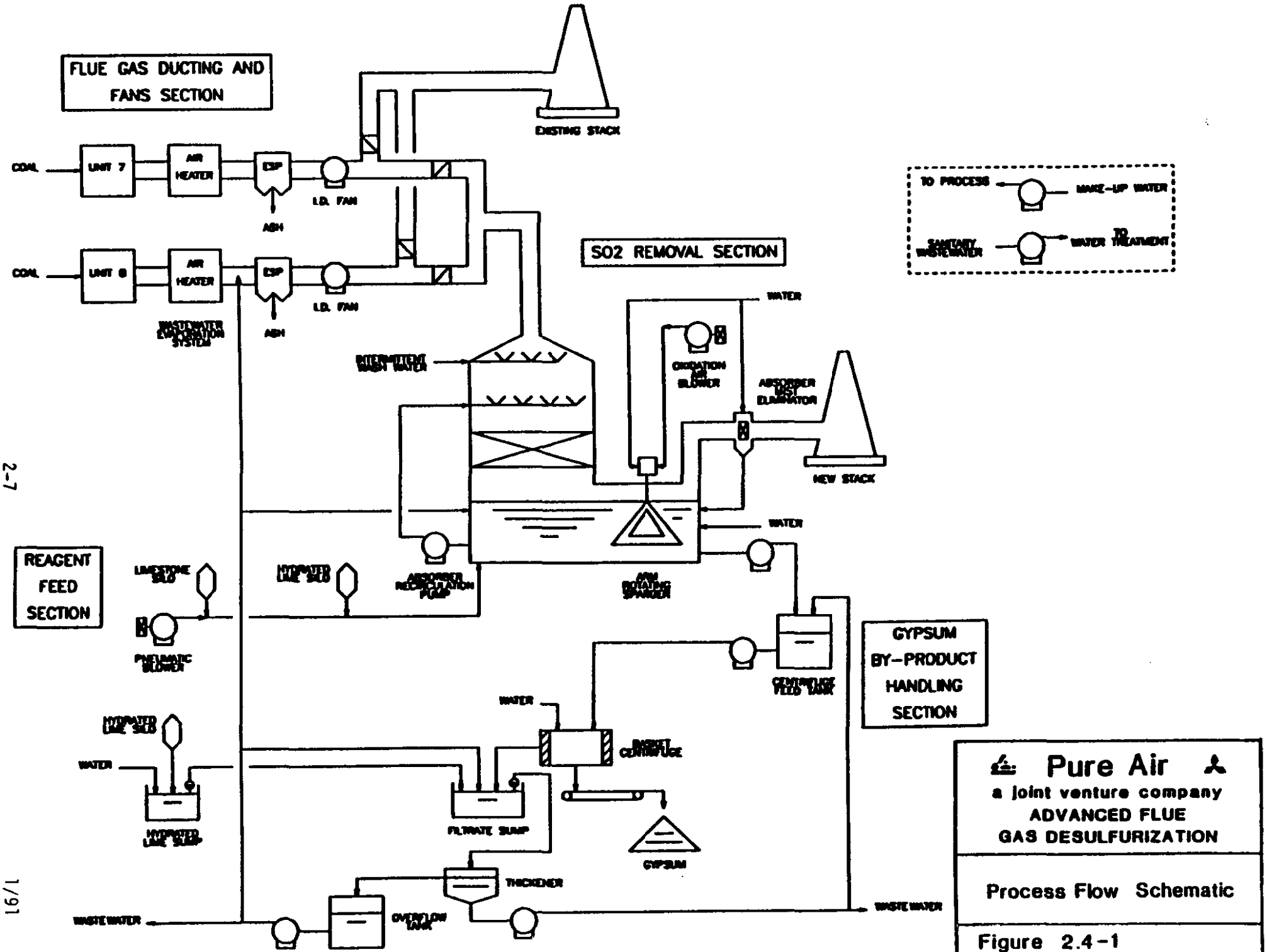
- Limestone Feed System to provide limestone reagent to the Absorber System;

- Absorber System involves the contact of flue gas with a recirculating slurry containing gypsum and limestone. The product gypsum slurry will be routed to the Gypsum By-Product Handling System. After passing through mist eliminators, scrubbed flue gas exits through the stack;

- Gypsum By-Product Handling System where the gypsum slurry is reduced to dewatered cake containing 8 to 10 percent moisture by weight. Filtrate water is returned to the Absorber System, and a wastewater bleed stream is sent to the Wastewater Evaporation System (WES) and to the Northern Indiana wastewater treatment system, and

- WES where wastewater is neutralized with hydrated lime and directed to wastewater evaporators upstream of the Bailly Station's Unit No. 8 electrostatic precipitator (ESP). Wastewater is then atomized and evaporated in the flue gas between the Unit No. 8 air heater and ESP. After evaporation, the flue gas with dry solids is ducted to join the main flue gas stream. Dry solids are removed by the ESP.

  Operation of the WES is expected to have little negative impact on ESP performance and there may be a positive impact from flue gas humidification. The flue gas temperature from Unit No. 8 is expected to drop approximately 40°F when the WES is in operation.


FLUE GAS DUCTING AND FANS SECTION
EXISTING STACK
COAL
UNIT 7
AIR HEATER
ESP
I.D. FAN
ASH
COAL
UNIT 8
AIR HEATER
ESP
I.D. FAN
ASH
WASTEWATER EVAPORATION SYSTEM
SO2 REMOVAL SECTION
WATER
INTERMITTENT WASH WATER
OXIDATION AIR BLOWER
ABSORBER MIST ELIMINATOR
NEW STACK
WATER
ABSORBER RECIRCULATION PUMP
ADIPIC ENHANCED LIMESTONE (DBA) ROTATING SPARGER
REAGENT FEED SECTION
LIMESTONE SILO
HYDRATED LIME SILO
PNEUMATIC BLOWER
HYDRATED LIME SILO
WATER
HYDRATED LIME SLAKER
FILTRATE SUMP
BASKET CENTRIFUGE
CENTRIFUGE FEED TANK
GYPSUM BY-PRODUCT HANDLING SECTION
GYPSUM
THICKENER
OVERFLOW TANK
WASTEWATER
WASTEWATER
TO PROCESS
MAKE-UP WATER
SANITARY WASTEWATER
TO WATER TREATMENT
Pure Air
a joint venture company
ADVANCED FLUE GAS DESULFURIZATION
Process Flow Schematic
Figure 2.4-1

2.5 EMISSIONS AND DISCHARGES

The AFGD system will have air emissions, wastewater discharges, and solid wastes generated during both construction and operation. These emissions and discharges are briefly described below. The AFGD system permit conditions for atmospheric emissions and wastewater discharges are discussed in Section 6.2 Compliance Monitoring (Class II Monitoring) in relation to existing Bailly Station permit limits.

2.5.1 ATMOSPHERIC EMISSIONS

During construction, air emissions will consist primarily of fugitive dust. Operational emissions of SO_2 will be reduced based on the AFGD system's expected performance. NO_x and particulate emissions will be essentially unaffected.

2.5.2 WASTEWATER DISCHARGES

Wastewater generated during construction will consist primarily of stormwater runoff. During operation a portion of the process liquid wastes from the AFGD system may be reinjected into the process and then eliminated. Any remaining process liquid wastes from the AFGD system and domestic wastes will be discharged to wastewater treatment systems.

2.5.3 SOLID WASTES

Solid wastes from the project will consist of, (1) ash, (2) gypsum not sold or off-specification, (3) normal construction waste materials, (4) solids from the wastewater treatment system, and (5) office wastes. All of these wastes will be disposed in appropriately approved facilities.

As indicated, gypsum not sold or off-specification gypsum will be a solid waste. However, it is expected that most of the gypsum will be sold for wallboard manufacturing. The gypsum's expected chemical composition listed below meets or exceeds wallboard manufacturer requirements.

Gypsum Composition

Parameter	Weight Percent (Dry Basis)
$CaSO_4 \cdot 2H_2O$	93.0 min (95.0 expected)
$CaSO_3 \cdot 1/2\ H_2O$	2.0 max
SiO_2	2.5 max
Fe_2O_3	1.5 max
R_2O_3 (other metal oxides)	3.5 max
pH (units)	5 to 8
Free H_2O (percent)	10 max

The other metal oxides in the gypsum are expected to consist primarily of oxides of magnesium, sodium, and potassium.

2.6 EMISSIONS AND DISCHARGES CONTROL

The AFGD system will be constructed and operated in compliance with all applicable federal, state and local rules and regulations as enforced through appropriate permits described in Section 6 Environmental Monitoring. Compliance will be ensured by efficient operation of the AFGD system and the monitoring also described in Section 6.0. Compliance will involve the control of atmospheric emissions, wastewater discharges and solid waste disposal as described below.

2.6.1 ATMOSPHERIC EMISSIONS CONTROL

During construction fugitive dust will be controlled by good construction and engineering practices which utilize various dust control techniques. The AFGD system will be designed to control fugitive emissions as described in Section 5.0 Project Mitigation Measures. This will include the use of silos with bin vent filters for storage of raw materials, pneumatic or enclosed conveyors, or totally enclosed buildings. Fugitive emissions from truck traffic will be controlled by utilizing covered trucks and a weekly paved roadway water flushing program.

Operation of the AFGD system will control SO_2 emissions. NO_x and particulate emissions will be essentially the same as those currently emitted by the Bailly Station.

The atmospheric emissions control will be done in compliance with Construction and Operating Permits issued by the Indiana Department of Environmental Management (IDEM), Office of Air Management (OAM). Information on the Construction Permit is included in Section 6 Environmental Monitoring. The Operating Permit will reiterate the conditions of the Construction Permit and will be applied for approximately 60 days before AFGD system start-up.

2.6.2 WASTEWATER DISCHARGES CONTROL

Surface water runoff from precipitation events will be controlled using runoff channels, straw bales or other suitable methods. The wastewater generated from operation of the AFGD system will consist of domestic sewage wastes and process related wastewater. The domestic sewage or sanitary wastes will consist of routine wastes from showers, sinks, and toilets. These wastes will be routed through the Bailly Station's existing on-site sewage treatment facility.

Process related wastewater will consist of a filtrate wastewater bleed stream from the centrifuge operation. When the WES is not in operation this wastewater will be directed to a wastewater treatment system prior to combining with the Bailly Station's recirculating water. When the WES is in operation, a portion of the bleed stream will be routed to the WES with the remainder sent to the wastewater treatment system.

The discharge of wastewater from the AFGD system will be in compliance with a modification to the Bailly Station's National Pollutant Discharge Elimination System (NPDES) permit issued by the IDEM, Office of Water Management (OWM) as discussed in Section 6 Environmental Monitoring.

2.6.3 SOLID WASTES CONTROL

Solid wastes generated during both construction and operation of the AFGD system will be removed from the Bailly Station area by a contract hauler for disposal in an appropriately approved landfill or resale for another use. The gypsum generated by the process will be sold as a raw material in a manufacturing process (e.g., wallboard) as previously indicated. Gypsum not sold, including off-specification gypsum, will be landfilled.

The disposal of solid wastes will be done in compliance with conditions, if any, specified by the IDEM, Office of Solid and Hazardous Waste Management (OSHWM) as discussed in Section 6 Environmental Monitoring.

SECTION 3.0

EXISTING ENVIRONMENT

As part of development of the EIV and EA for the AFGD project, the existing environment was described in the vicinity of the Bailly Generating Station. This information is presented below based on data contained in the EIV and EA. The environmental disciplines discussed include, Atmospheric Resources, Land Resources, Water Resources, Ecological Resources, Socioeconomic Resources, and Energy and Material Resources.

3.1 ATMOSPHERIC RESOURCES

3.1.1 SITE METEOROLOGY

The climate of the site area is continental with frequent high winds and weather changes. In addition, the area is subject to cold, dry winters and warm, moist summers. These climatic characteristics are the result of storms moving eastward along the northern tier of the United States and storms in the southwest moving toward the Great Lakes. The average temperature for the area is approximately 50°F, with the highest temperatures occurring between May and August, while the lowest temperatures occur in the fall and winter. Record low and high temperatures for Ogden Dunes, Indiana (4 miles southwest of the Station) are -21°F and 104°F (Gale Research Company, 1985).

As indicated above, the area is known for frequent high winds, however, damaging winds are rare. During a 10-year period, 20 tornadoes were identified and reported in the 1° latitude and 1° longitude sector containing the plant site. Using the Thom (1963) technique, the cycle for a tornado striking a point in this sector is once every 635 years. Wind velocity data collected by Northern Indiana at the Dune Acres substation (1 mile southeast of

the Bailly Station) are shown in Figure 3.1-1 and indicate that the prevailing winds are from the southwest.

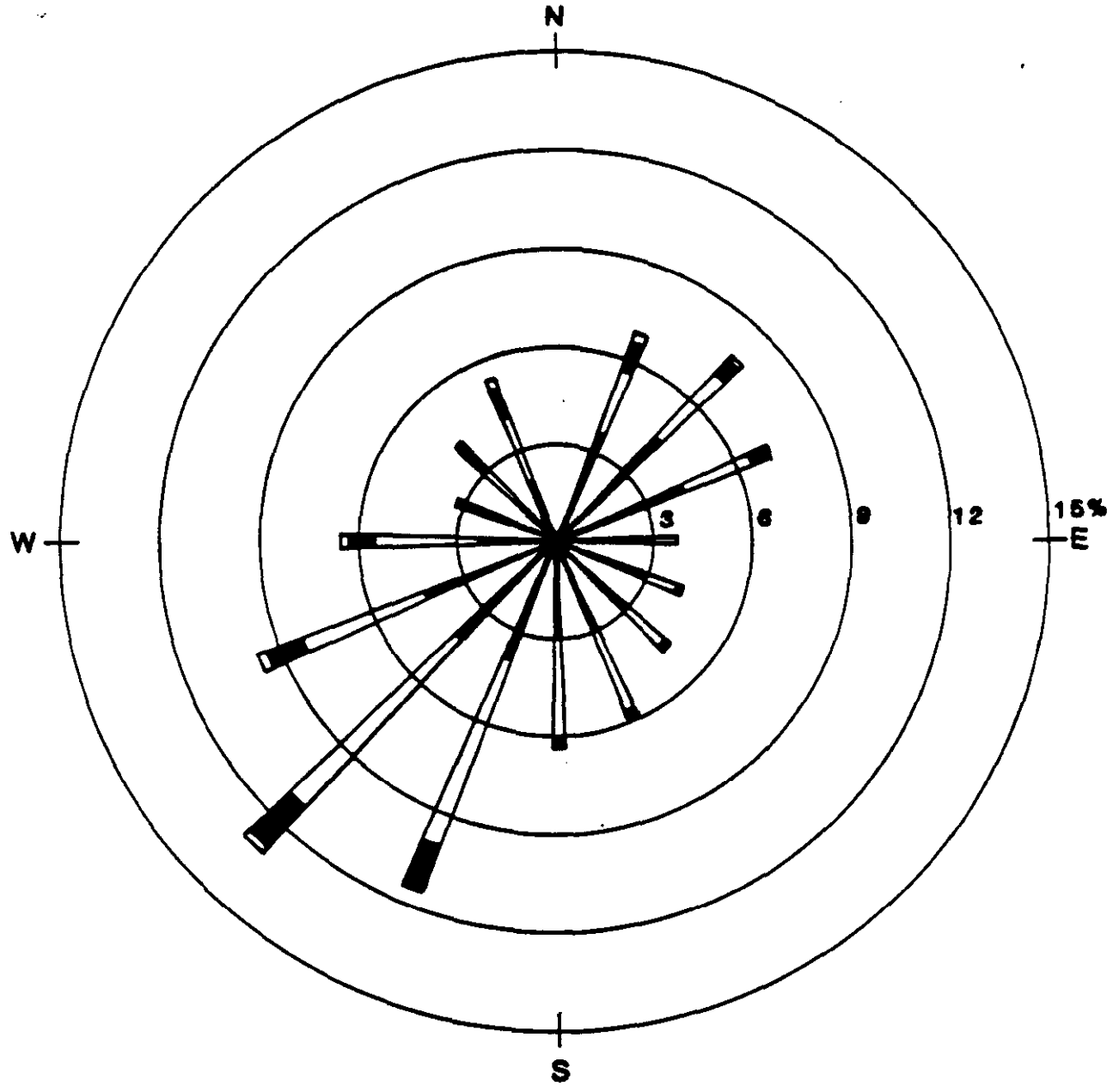
There are important climatological differences between dune areas, which include the plant site, and more urban inland areas. The modifying effect of Lake Michigan is such that the dune areas receive less precipitation than areas further inland. Ogden Dunes receives only 26.6 inches of precipitation per year, while LaPorte (about 23 miles to the southeast) averages 47.7 inches of precipitation per year.

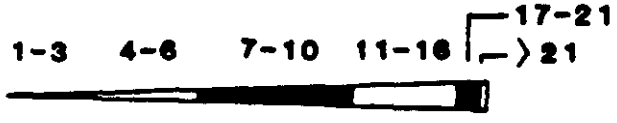
3.1.2 AIR QUALITY

In the vicinity of the Bailly Station, existing ambient air quality is generally indicative of the highly industrialized nature of the area. The area (Porter County) is presently classified as nonattainment for ozone (O_3) and is an "uncertain" status for particulate matter less than 10 um (PM10). All other criteria pollutants (SO_2, NO_2, CO and Pb) are in attainment. It is of interest to note that portions of LaPorte County to the east of Porter County, are nonattainment for SO_2 (Ritter, September 6, 1989).

Recently, IDEM conducted a study to develop a control strategy to attain the National Ambient Air Quality Standards (NAAQS) for SO_2. The result of this study indicated that the NAAQS for SO_2 are being met, however, the concentrations predicted were very close to the standards.

As indicated above, the area is currently designated as "attainment" or unclassifiable for all criteria pollutants except ozone (O_3). However, ozone will not be impacted by either construction or operation of the AFGD system.





WIND SPEED CLASSES
(KNOTS)

Note:
Wind direction is the direction from which the wind is blowing.

Pure Air
a joint venture company
ADVANCED FLUE GAS DESULFURIZATION

Windrose '84 - '86
Dune Acres Data

Figure 3.1-1 1/91

Northern Indiana has collected air-quality data at the Bailly Station for over 10 years. The Bailly Ambient Air Monitoring Network has been incorporated into the Porter Country SO_2 Monitoring Network. Northern Indiana now operates three SO_2 monitoring sites within the Porter County SO_2 monitoring network. Meteorological data are collected at two of the three SO_2 monitoring sites. Northern Indiana does not currently monitor any other criteria pollutants (NO_2, CO, O_3, PM10, Pb) from these sites. Other monitoring stations are operated by the State of Indiana (IDEM), National Park Service and Porter County. Table 3.1-1 presents data for PM10, SO_2, and NO_x from three stations in the Bailly Station area.

Northern Indiana continuously monitors the plume opacity from the Bailly Station stack. Periodic stack tests are also conducted to determine emission rates for SO_2 and particulates. The existing air permit allows for an emission level of 6.0 lbs/MMBtu for SO_2, 0.22 lbs/ MMBtu for particulate matter and an opacity limit not to exceed 40 percent.

In 1988 the Bailly Station had annual particulate and NO_x emissions estimated at 527 tons and 23,310 tons, respectively. For the period August, 1988 through August, 1989, the Station's average opacity levels varied from 6 to 17 percent per month.

3.2 LAND RESOURCES

3.2.1 GEOLOGY

The Bailly Station is located in a stable geological region in which no faults have been identified in either the basement or in the overlying sedimentary rock. It is adjacent to Lake Michigan in an area where the sand dunes have been leveled and stripped of vegetation. Natural dune sands extend from the existing ground surface to depths ranging between 10 and 30 feet.

TABLE 3.1-1

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

1988 MONITORING DATA FOR PM10, SO_2,
AND NO_x *NEAR BAILLY GENERATING STATION*

Parameter	Monitoring Location	Location From Station	Concentration ug/m3	NAAQS ug/m3
PM 10	East Office	1.2 mi SE		
24-Hr	Bethlehem		73[a]	150
Annual[b]	Steel		32	50
SO_2				
3-Hr	Dune Acres	1.4 mi SE	430[a]	1,300
24-Hr	Substation		182[a]	365
Annual[c]			26	80
NO_x				
Annual[c]	Calumet City, Ill.	22 mi W	46	100

Footnotes:
[a] - Second highest concentration.
[b] - Geometric mean.
[c] - Arithmetic mean.

Source: Ritter, K. September 13, 1989. Indiana Department of Environmental Management, Indianapolis, Indiana, Monitoring data report sent to M. Mitckes, EBASCO, Oak Ridge, Tennessee.

The geology at the southern shore of Lake Michigan represents a complex history of glacial, shallow-water coastal, lake, wetland, and beach/dune sedimentation that began during and after the final stages of glacial retreat from the great lakes area, approximately 12,000 years ago. In the subsurface of the Indiana Dunes region, three distinct sedimentary units (the basal, middle, and surface units) have been described by Thompson (1987). The basal unit consists of randomly interbedded clay, sand and gravel, and till, which rest on an irregular Paleozoic bedrock surface that is approimxately 4,000 ft thick. The thickness of this lowermost lithologic unit is highly variable due to relief on the underlying bedrock and latest erosion of the sediments.

The middle unit consists of an assemblage of interbedded till, glacial/lake clay, sand, and gravel. This unit crops out in the region as the Lake Border Moraine (Figure 3.2-1). The glacial/lake deposits are well developed northward within this unit where it extends under Lake Michigan and the till deposits of the middle unit are more common to the south of the Lake. Glacial till is exposed on the surface of the Lake Border Moraine, whereas the core consists of till interbedded sand and gravel.

The surface unit, an outcropping along the southern shore of Lake Michigan, consists of coastal sand with minor gravel, clay, calcareous mud, and peat. From south to north, these sediments form the Glenwood, Calumet and Tolleston Beaches, and interridge marshes. This series of the beach/dune complexes began forming between 14,500 and 12,400 years ago in response to rises and falls in lake level and changes in the amount of sediment supplied to the coastline (Thompson 1987).

The most pronounced topographic feature in Porter County is the Valparaiso Moraine. It is a terminal mass of rocks, sand and gravel formed by glaciation of the Wisconsin Age. The Moraine serves as the dividing line for drainage into Lake Michigan.

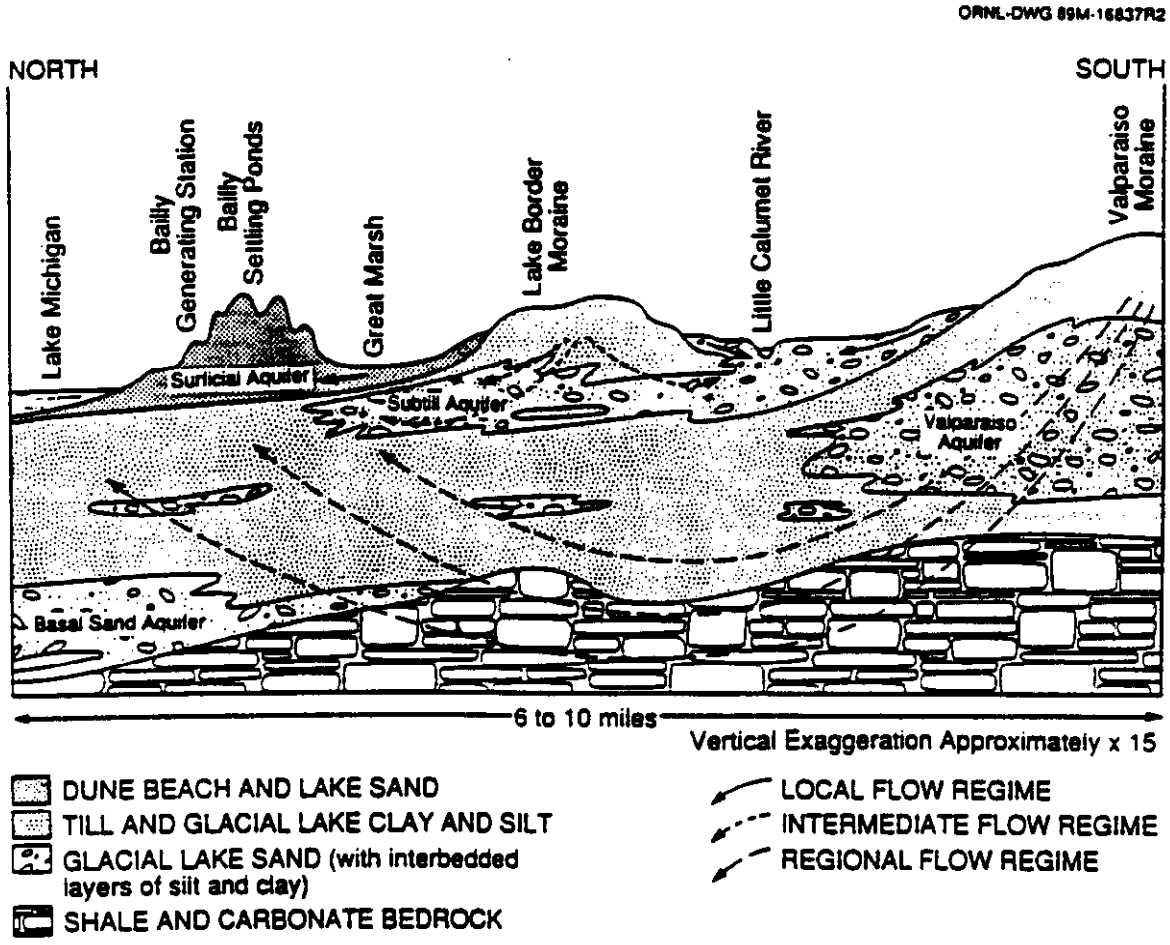


Figure 3.2-1. **Cross-section perpendicular to the Lake Michigan shoreline showing geology and groundwater movement near the Bailly Generating Station.**
Sources: D. A. Cohen, 1989; Thompson, 1987.

3.2.2 SEISMOLOGY

The Bailly Station is located in an area of minor seismic activity where, since the beginning of the 19th century, only seven shocks have been reported for epicenters within 100 miles of the Station. Of these seven, only three have occurred within 50 miles of the site. The largest occurred in 1938 near the south shore of Lake Michigan and had a Modified Mercalli Scale (Table 3.2-1) of IV.

3.2.3 SOILS

Soils located in the vicinity of the station are composed primarily of five types: Oakville fine sand, Houghton muck, Adrian muck, Maumee loamy fine sand, and Dune land. The large portion of ground used for industrial purposes in the area is classified as cut and fill. This is illustrated in Figure 3.2-2, "Soil Composition - Bailly Generating Station Area."

Oakville fine sands are located on the older dunes in the area and are vegetated by immature and mature black oak forests. Productivity is limited primarily because of low available water capacity and frequent drought.

Soils in the northern portion of the subdunal area are comprised of Houghton muck. These soils are very poorly drained with a thick muck surface layer. The very poorly drained organic material of the soils severely limits the productivity of plants other than wetland species.

The soils of the subdunal area and interdunal ponds are composed primarily of Adrian muck. These soils are very poorly drained and have characteristics similar to Houghton muck.

TABLE 3.2-1

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

MODIFIED MERCALLI SCALE

I. Not felt except by a few under especially favorable circumstances.

II. Felt only by a few persons at rest, especially on upper floors of buildings. Delicately suspended objects may swing.

III. Felt quite noticeably indoors, especially on upper floors of buildings, but many people do not recognize it as an earthquake. Standing automobiles may rock slightly. Vibration like passing of truck. Duration estimated.

IV. During the day felt indoors by many, outdoors by few. At night some awakened. Dishes, windows, doors disturbed, walls make creaking sound. Sensation like heavy truck striking building. Automobiles rocked noticeably.

V. Felt by nearly everyone, many awakened. Some dishes, windows, etc., broken; a few instances of cracked plaster; unstable objects overturned. Disturbance of trees, poles, and other tall objects sometimes noticed. Pendulum clocks may stop.

VI. Felt by all, many frightened and run outdoors. Some heavy furniture moved; a few instances of fallen plaster or damaged chimneys. Damage slight.

VII. Everybody runs outdoors. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving automobiles.

TABLE 3.2-1 (CONTD)

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

MODIFIED MERCALLI SCALE

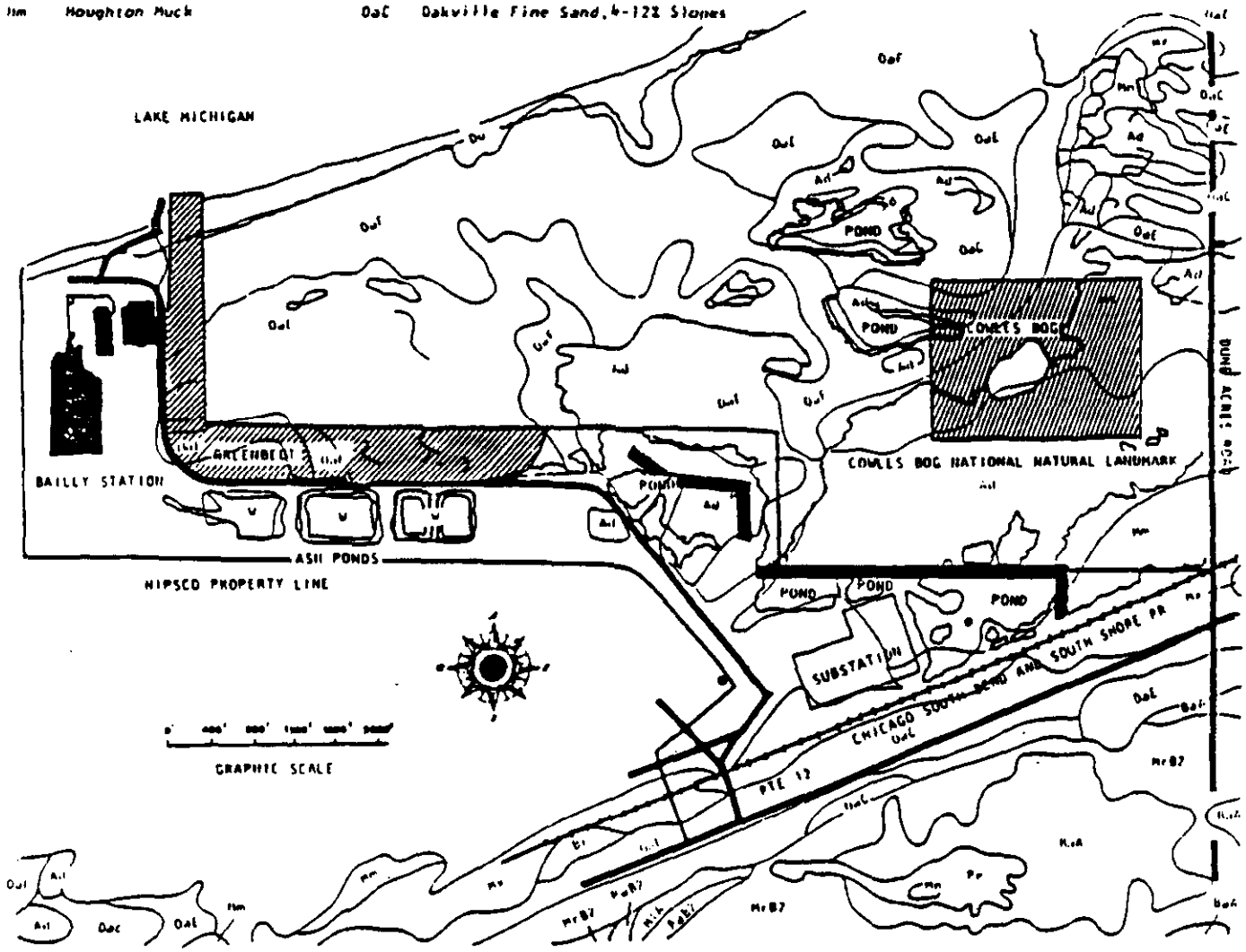
VIII. Damage slight in specially designed structures; considerable in ordinary substantial buildings, with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. Sand and mud ejected in small amounts. Changes in well water. Disturbs persons driving autos.

IX. Damage considerable in specially designed structures; well-designed frame structures thrown out of plum; great in substantial buildings, with partial collapse. Buildings shifted off foundations. Ground cracked conspicuously. Underground pipes broken.

X. Some well-built wooden structures destroyed; many masonry and frame structures destroyed with foundations; ground badly cracked. Rails bent. Landslides considerable from river banks and steep slopes. Shifted sand and mud. Water splashed (slopped) over banks.

XI. Few, if any, (masonry) structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipe lines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly.

XII. Damage total. Waves seen on ground surfaces. Lines of sight and level distorted. Objects thrown upward into the air.



Source: Texas Instruments, Inc., "1974-1975 Annual Report - Bailly Nuclear I Site"

Pure Air
a joint venture company
ADVANCED FLUE GAS DESULFURIZATION

Soil Composition - Bailly Generating Station Area

Figure 3.2-2 1/91

Soils at the southern end of the subdunal area are composed of Maumee loamy fine sand. Maumee soils are very poorly drained, coarse-textured soils that occupy nearby level flats and depressions. These soils are less wet and have shorter periods of standing water than the subdunal area.

Dune land occupies the area extending inland from the shore of Lake Michigan to established sand dunes. The blowing and deposition of sand create conditions that are tolerated by only a few plant species.

3.2.4 LAND USE

The station is bordered on the south and west by the Bethlehem Steel Corporation's Burns Harbor complex. The Indiana Dunes National Lakeshore borders the site to the east and the south.

The area to the west of the site is heavily industralized. Lake County, 5 miles west of the site, includes Gary, Hammond and East Chicago, all of which are centers of heavy industry. Steel manufacturing is the major industry.

Very little of the land north of U.S. Route 12 is either suitable or used for agriculture. However, the area south of the Indiana Toll Road is largely devoted to growing corn and soybeans. Approximately 60 percent of the land in Porter County is used for agricultural purposes. The closest houses to the Bailly Station are those within the town of Dune Acres, 2 miles northeast of the station.

3.3 WATER RESOURCES

3.3.1 GROUNDWATER

There are three major aquifers (basal, subtill and surficial) within the unconsolidated sediments surrounding the Bailly

Generating Station (Figure 3.2-1). The lowermost basal sand aquifier appears to be thicker eastward of the Station, although the extent of the aquifer is not well defined.

The most extensive confined aquifer in the area is the subtill aquifer which consists primarily of sand with interbedded lenses of clay. The subtill aquifer is part of Thompson's (1987) middle unit and underlies virtually the entire area of the Lake Border Moraine. It extends north of this moraine into the Great Marsh (the interdunal wetland between the Calumet and Tolleston Beaches).

The most extensive aquifer in the area adjacent to the Bailly Generating Station is the surficial aquifer which consists of lake, beach and dune sand deposits. The surficial aquifer is developed in all areas adjacent to the Station, except where glacial moraines are exposed at the surface. In the vicinity of the Bailly Generating Station, the surficial aquifer is over 50 ft thick.

Groundwater flow in the region may be divided into regional, intermediate, and local flow systems, as shown in Figure 3.2-1. The regional groundwater flow system originates at the water table high in the Valparaiso Moraine and flows down through the glacial deposits under the Moraine into the upper bedrock, and then laterally through the bedrock toward Lake Michigan.

The intermediate flow system originates at the watertable high in the Lake Border Moraine and extends down through the underlying subtill aquifer and flows northward, where it discharges by upward leakage into drainage systems in the Great Marsh.

Local flow systems within the surficial aquifer are recharged in the dunebeach complexes and discharge into streams, ditches, and ponds in the interdunal wetlands. The shallow groundwater flow system is typified by broad, flat, watertable mounds that function as groundwater flow divides underlying the topographical high dune

beach complexes. Shallow groundwater flows northward and southward from these divides and discharges into adjacent low-lying areas and wetlands. The Bailly Generating Station is located north of the water table divide underlying the shoreline dune-beach complex (Figure 3.2-1). The shallow groundwater flows directly into Lake Michigan at an estimated rate of approximately 0.5 ft/day.

From 1967 to 1980, fly-ash produced during operation of the Bailly Generating Station was collected by ESPs and transported as a slurry to a series of unlined settling ponds located on the southeastern part of the Station site. The ponds were periodically drained, and the accumulated ash was removed and used as fill for an area on the east side of the Station (Hardy, 1981). Based on an evaluation of monitoring wells in the area, Meyer and Tucci (1979) determined that seepage from these ponds, estimated at 2 million gallons per day (MGD), created a groundwater mound that extended into the National Lakeshore and caused several lowlands to be flooded year-round. This seepage mound acted as a north-south flow divide in the vicinity of the Station (Cohen and Shedlock, 1986). However, the seepage mound created by the unlined settling ponds extended no further than about 3,000 ft from the ponds. This fact suggests that seepage from the settling ponds prior to the sealing discussed below did not affect water levels in the Great Marsh shown in Figure 3.2-1 (Cohen and Shedlock, 1986).

In late 1979, the Station discontinued use of the easternmost settling pond, which was dewatered, dredged, and backfilled with sand. In 1980 and 1981, the remaining settling ponds were sealed by lining with a 1 ft thick layer of clay and a 0.12 inch thick polyvinylchloride liner. Sealing the ponds changed the shallow groundwater flow at the Station. The artificial north-south groundwater divide created by pond leakage was eliminated which allowed the lowlands to dry (Cohen and Shedlock, 1986).

The quality of groundwater in the vicinity of the Bailly Generating Station was investigated by Hardy (1981) before the settling ponds were sealed. He noted that the artificial shallow groundwater mound north of the settling ponds contained elevated levels of calcium, sulfate, potassium, and some trace constituents (boron, cadmium, fluoride, iron, manganese, molybdenum, nickel, zinc, arsenic, and strontium) relative to background levels outside the mound area. After the settling ponds were sealed, the concentration of some of these constituents decreased; whereas, some constituents showed no consistent trends, but remained above background levels. Cohen and Shedlock (1986) suggested that the constituents remaining at concentrations above background had previously sorbed or precipitated onto aquifer materials and were leached back into the groundwater. Hardy (1981) determined that seepage of wastewater from the Station's settling ponds did not appreciably impact water chemistry in the deeper aquifer systems (confined aquifers) beneath the Station.

Most of the wells within 10 miles of the Bailly Station were drilled for test purposes by the Indiana Toll Road Commission and State Highway Department. Other wells are used primarily for domestic and public water supply sources. There is only one well within 1-mile of the station, and a total of three wells at a distance of 2 miles. The nearest municipal water system is that of Dune Acres. In Dune Acres, three wells have been drilled to a depth of about 30 ft, approximately 300 ft from the shoreline of Lake Michigan. Dune Acres water contains iron (1 to 6.6 ppm), tannin (2 ppm), and is relatively hard (10 grains/gal).

For household purposes, without treatment, groundwater in the vicinity of the Bailly Station is of marginal quality. Tannin is found in groundwater throughout the Bailly Station area. This indicates that a portion of the groundwater originates from the percolation of rain and surface water through the sandy soils of the dune forests and through the bogs and peaty areas in the region.

3.3.2 SURFACE WATER

There are a number of springs, streams, rivers, and bogs in the general area of the Station. However, there are no natural wetlands on the Bailly Station property. The major watershed system is formed by the Little Calumet River and Kankakee River systems. The Little Calumet is an important system with respect to the Indiana Dunes National Lakeshore. Some marshy areas to the east and south of the Bailly Station empty into Lake Michigan via Dunes Creek in Indiana Dunes State Park. However, much of the National Lakeshore is within a subwatershed which drains directly toward Lake Michigan through porous soils. The Little Calument River drains from the Valparaiso Moraine headwaters in LaPorte County to Lake Michigan and the Chicago Sag Canal. This gradient is slight owing to the development of extensive subsurface clays which impede drainage.

Burns Ditch to the west of the Station is one ditch of an extensive system of ditches that were constructed to facilitate drainage. Burns Ditch is a highly polluted canal about 200 feet wide and 8 miles long which empties into Lake Michigan. The lower end of Burns Ditch is used as a docking and marina area. Salmon introduced into the lake use Burns Ditch for access to their spawning grounds in the Little Calument River.

Lake Michigan, to the north of the Station, is the third largest of the Great Lakes in area (22,400 square miles) and second in volume (173 trillion cubic feet). Water levels are highest in summer and lowest in late winter and early spring. The lake is divided into two basins by two parallel ridges running in an easterly direction from Milwaukee to Grand Haven. The Bailly Station is located on the shore of the southern basin.

Lake Michigan inshore waters are used for drinking water, recreation (fishing, swimming), and industry. This area represents 21 percent of the total area of Lake Michigan, including Green Bay.

The Lake Michigan beach water zone is the portion of water that extends from shore to a depth of 30 feet. It is a subarea of the inshore zone that comprises 7 percent of the lake surface, including Green Bay. In this zone are the water intake and discharge structures for the Bailly Station.

Over a 5-year study (March, 1974 to December, 1978), lake temperatures ranged from 37.4° to 73.4°F. Ice may cover the section of Lake Michigan near the Station from January to March. Ice melting and warming of lake waters generally occurs the latter part of March. During this period the so-called "thermal bar" is likely to develop. It is roughly parallel to the shore and is near the temperature of fresh water at its maximum density (39°F). The "thermal bar" limits the exchange of inshore-offshore waters.

Lake Michigan has two circulation periods each year, with overturns occurring early winter and early spring in the southern basin. During each approximately month-long period, vertical mixing is almost complete and the lake approaches an isothermal temperature gradient. These periods of overturn facilitate the upwelling of the nutrients from the bottom waters and may also stimulate phytoplankton growth. Water movements are also influenced by winds. Prevailing winds blowing in one direction for several days will induce inshore water movement generally parallel to the shore, but bottom topography will alter the direction of the current somewhat.

Shoreline "run-up" dissipates waves rapidly. Maximum current velocities in the upper layer measured at the Station were 40 cm/s. Seiches occur occasionally at the southern end of the lake.

An examination of the Federal Emergency Management Agency Flood Insurance Rate Maps and Flood Insurance Studies for Porter County, Town of Dune Acres and Town of Burns Harbor, indicates that the Bailly Generating Station and associated AFGD System are above the

10-, 50-, 100-, and 500-year flood elevations of Lake Michigan, as shown in Table 3.3-1. These elevations vary from approximately 583 to 585 feet; whereas, the Station and AFGD project are at an elevation of approximately 620 feet based on the U.S. Geological Survey 7.5 minute quadrangle map for Dune Acres, Indiana. Thus, the AFGD System will be constructed approximately 36 feet above the 100-year flood elevation.

3.4 ECOLOGICAL RESOURCES

The area occupied by and surrounding the Bailly Station has a diverse community of terrestrial and aquatic life. The dune region along Lake Michigan in Porter County is estimated to contain at least 40 to 50 percent of the plant species native to Indiana. Various vegetation types as well as commercial, residential and industrial areas are located within the lake region of the Bailly Station. Each area has its own distinguishing characteristics. The terrestrial environments provide a beach succession series - dunes, swales, bogs, and oak forests. Freshwater habitats include drainage streams, ponds, bogs, springs and Lake Michigan. None of the State of Indiana or federally listed threatened or endangered species of plants, amphibians, reptiles, birds or mammals reside on the site of the proposed AFGD System or on the Bailly Station. In addition, the current habitats or migratory patterns of wildlife will not be disturbed in any way by the proposed construction of the AFGD System.

3.4.1 TERRESTRIAL

The major terrestrial habitats near the Bailly Station are the dunes and wind-cleared blow-outs of the Ogden Dunes to the west and the Indiana Dunes National Lakeshore to the east, and old field (former farmland) and associated forest components further inland. Each of these areas has its particular floral composition and

TABLE 3.3-1

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

LAKE MICHIGAN FLOOD ELEVATIONS
(NATIONAL GEODETIC VERTICAL DATUM - 1929)

10-Year	50-Year	100-Year	500-Year
583.0	583.9	584.2	584.8

Source: Federal Emergency Management Agency. 1981. Flood Insurance Study, County of Porter, Indiana Unincorporated Areas.

faunal components, although larger animals can be expected to move freely from place to place. The Cowles and Pinhook Bogs, within the National Lakeshore Boundaries, are two intensively studied bogs; they are typical of other bogs and wetlands within the vicinity of the Station. Outside the National Lakeshore boundaries, there are a number of drainage ditches. Burns Ditch is of major importance because it may be a source of locally significant nutrient enrichment of Lake Michigan inshore waters.

The forebeach along Lake Michigan is a riprap zone and is visited principally by insects that feed on carrion (fish and birds) cast up on the shoreline. These insects in turn are preyed upon by shore birds and other insects. Plant life per se is essentially nonexistent. Literature information indicates that most land vertebrates are merely transients, and a large variety of birds use the shore on their migrations.

The area in the Bailly Station where the AFGD system will be constructed contains only a small amount of vegetation on the north-facing slope. Some of this area will be filled during construction, however becuase of the minimal vegetation cover the area presumably does not provide suitable habitat for many animal species.

3.4.1.1 Vegetation

In the vicinity of the Baily Station the mid-beach supports a few hardy pioneer plant species (i.e., coarse plants such as the cocklebur and sea rocket). Immediately adjacent to this area, the plant community consists of American beachgrass which is a clump type grass serving to stabilize the sands. These plants and other grasses are typical of a beach succession ecosystem. In some areas successful changes may be inhibited or halted along Lake Michigan by the constant shifting of sands, a feature of the normal development of such an ecosystem.

The dune line (foredune) has both active and temporarily stabilized dunes. Many of the stabilized dunes have forest vegetation, but none is climax. The dominant plants on the more stable foredunes are shrubs, such as cherry and little bluestem grass. Vegetation first develops on the leeward (south) sides of the dunes. The ridges are dominated by open forest stands of small black oak, jack pine, large tooth aspen, chokecherry, and witch hazel. Herbaceous forms such as false solomons' seal, bearberry, huckleberry, sunflower, and bittersweet predominate and are interspersed with seedlings and saplings of black oak and basswood in the understory. White pine are present principally as mature trees. On active dunes, the north-facing slopes are covered with bearberry, common junipers, cottonwood, and willow which provide good vertical and horizontal wind shielding.

Forest communities are adjacent to the dunes. The canopy trees are almost all black oak, although basswood is occasionally present. Oak seedlings, wild cherry, sassafras, and witch hazel comprise the understory. The oak forest is classified as both immature and mature. The vegetational array is similar in these two habitats, but the mature forest has older oaks and a more spotty distribution of herbaceous plants and woody shrubs. Shade-tolerant forms such as bracken fern live under the oaks. There are open areas of sand which are stabilized by sedges and little bluestem grasses. In general, as one goes inland the soils become increasingly clayey (lacustrine deposits) so that they have a higher water and nutrient retention than the dunes. The forests provide diverse microhabitats in the rotting logs, fallen leaves and branches of the forest litter.

The National Lakeshore has a native stand of predominantly red maple and white oak. Sassafras trees and large black oaks are occasionally found in this forest habitat with some

12 additional tree species. Most of the saplings are flowering dogwood and red maple. Arrowwood seedlings form dense clumps.

Old field habitats exist within the boundaries of the National Lakeshore and ponds are common in the sand dunes. Old field vegetational types are characteristically mosses, sedges and grasses, cattails and herbs, and maple, cherry and oak seedlings.

Cowles and Pinhook Bogs are located to the east of the Station. These are quaking bogs because they have floating mats of sphagnum moss surrounding areas of open water. Other plants are arborvitae and tamarack trees, species which are rare or absent in other places in Indiana. The soils in the bogs support a variety of small indigenous plants such as pitcher plant, cranberry, dwarf birch, leather leaf, bog rosemary, sundew, and lady's slipper orchid. There are also dense stands of cattails in the center of Cowles Bog.

3.4.1.2 Vertebrates

Vertebrates in the Bailly Generating Station area include small rodent species such as white-footed mice, shrews, voles and squirrels, as well as opossum, skunk, rabbit, and woodchuck. Scats (animal feces) or footprints of deer, raccoon, and fox also have been observed in the area.

Lower vertebrates encountered in the Station area include the red backed salamander, green frog, wood frog, garter snake, and Dekay's snake.

Seventy-nine species of birds have been identified in the Station area. Eighteen are permanent residents, 29 are summer residents, six are winter residents, and 26 are

migrants. Table 3.4-1 lists the most abundant species in the area. A bald eagle, a rare and endangered species throughout the continental United States has been seen in the National Lakeshore; however, it has been established that the species is not a resident of, or nests in the Lakeshore area. The eagle is a migratory bird, and makes its habitat in bluffs and flood plains, and around lakes, rivers, seacoasts and mangroves.

Within the vicinity of the Bailly Station are flyways (migration corridors) of several types of migratory waterfowl, including the "dabbling ducks" (e.g., mallard, black duct and pintail), the "diving ducks" (e.g., redhead and canvasback), Canada goose and the blue goose, also known as the "lesser snow goose". These birds rest and feed in the near shore waters of the lake and in the interdunal ponds near the lake.

No threatened or endangered amphibian, reptile, bird or mammalian species are presently known to reside within the confines of the Bailly Generating Station. Due to heavy human habitation and the encroachment of industry along the Lake Michigan shoreline of the Chicago-Hammond-Gary area, the Indiana Dunes National Lakeshore and surrounding forested areas provide habitat for a number of species once present throughout the area.

3.4.2 AQUATIC

The various surface waters in the project area support a variety of aquatic biota. These include fish, benthic macroinvertebrates, zooplankton, and phytoplankton as described below.

TABLE 3.4-1

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

ABUNDANT BIRD SPECIES KNOWN TO NEST
IN THE INDIANA DUNES AREA

Common Name	Common Name
Pied-Billed Grebe	Veery
Great Blue Heron	Cedar Waxwing
Green Heron	Starling
Canada Goose	Yellow-Throated Vireo
Mallard	Red-Eyed Vireo
Blue-Winged Teal	Warbling Vireo
Turkey Vulture	Blue-Winged Warbler
Red-Tailed Hawk	Yellow Warbles
Common Bobwhite	Cerulean Warbler
Sora	Ovenbird
Common Gallinule	Common Yellowthroat
American Coot	American Redstart
Killdeer	House Sparrow
American Woodcock	Bobolink
Spotted Sandpiper	Eastern Meadlowlark
Black Tern	Red-Winged Blackbird
Rock Dove	Northern Oriole
Mourning Dove	Common Grackle
Yellow Billed Cuckoo	Brown-Headed Cowbird
Chimney Swift	Scarlet Tanager
Belted Kingfisher	Cardinal
Common Flicker	Rose-Breasted Grosbeak
Red-Headed Woodpecker	Indigo Bunting
Downy Woodpecker	American Goldfinch
Eastern Kingbird	Rufous-Sided Towhee
Great Crested Flycatcher	Chipping Sparrow
Acadian Flycatcher	Field Sparros
Willow Flycatcher	Swan Sparrow
Eastern Wood Peewee	Song Sparrow
Horned Lark	Tufted Titmouse
Tree Swallow	House Wren
Bank Swallow	Marsh Wren
Barn Swallow	Gray Catbird
Purple Martin	Brown Trasher
Blue Jay	American Robin
Common Crow	Wood Thrush

Source: Krekeler, C. H., et al. 1981. Ecosystem Study of the Indiana Dunes National Lakeshore, Vols. One and Two. Indiana Dunes National Lakeshore Research Program Report No. 81-01. National Park Service, Midwest Region.

3.4.2.1 Fish

Fourteen fish species in seven families have been verified in Lake Michigan and several ponds near the Bailly Station (there are no ponds on the Northern Indiana property). Five of these species were salmonids, and salmonids comprised the third largest number of organisms, except for alewives and spottail shriners. Perch were also an important species. There are no known rare or endangered fish species in the aquatic community (Lake Michigan, rivers, bogs, marshes, streams, ponds) in the Bailly Station vicinity. Table 3.4-2 lists the fish species identified in the area.

The Bailly Station's thermal plume in Lake Michigan supports moderate to heavy sport fishing in the summer. The fish near the Station, probably attracted by the warmer water of the plume, include such game fish as yellow perch, bluegill, and large mouth bass. Several species of minnows and two species of suckers also have been found in the area. These fish are important as forage for the game species, but are not sought after for sport or food. Five species of importance for sport or food, especially in the spring, are coho salmon, lake trout, steelhead trout, chinook salmon, and alewives. Other fish of marginal importance, such as carp, bullhead, and goldfish, may also appear near the Station.

Three fish species have been found in ponds in the Bailly Station vicinity. These are the green sunfish, mudminnow, and black bullhead, with the green sunfish the most abundant species.

TABLE 3.4-2

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

FISH SPECIES VERIFIED IN THE AQUATIC COMMUNITY
OF THE BAILLY GENERATING STATION VICINITY

Scientific Name	Common Name
Family Clupeidae	Herring Family
Dorosoma cepedianum	Gizzard Shad
Alosa pseudoharengus	Alewife
Family Salmonidae	Salmon, Trout and Whitefish Family
Oncorhynchus tschawytscha	Chinook Salmon
Oncorhynchus kisutch	Coho (Silver) Salmon
Salmo trutta	Brown Trout
Salmo gairdneri	Rainbow (Steelhead) Trout
Salvelinus namaycush	Lake Trout
Coregonus clupeaformis	Lake Whitefish
Family Umbridae	Mudminnow Family
Umbra limi	Central Mudminnow
Family Cyprindae	Minnow Family
Cyprinus carpio	(European) Carp
Notropis hudsonius	Spottail Shiner
Family Ictaluridae	Catfish Family
Ictalurus melas	Black Bullhead
Family Centrarchidae	Sunfish Family
Leponis cyanellus	Green Sunfish
Family Percidae	Perch Family
Perca flavescens	Yellow Perch

Source: 1974-1975 Annual Report - Bailly Nuclear-1 Site prepared for Northern Indiana Public Service Company by Texas Instruments Inc. June, 1975. Dallas, TX.

3.4.2.2 Benthic Macroinvertebrates

The hard sand bottom and seasonal water temperatures along the shore of Lake Michigan restrict the number and types of soft-bodied, bottom-dwelling macroinvertebrates. Tubificid worms are normal inhabitants of Lake Michigan bottom sediments and have been estimated to comprise slightly more than half of the total benthic organisms present. Some species are highly pollution tolerant. Most of the other species of benthic organisms are of a type characteristic of conditions elsewhere in the lake and include leeches, fingernail clams, scuds, and midge larvae.

Crayfish also have been observed in the Station area. The Bailly Station region has extensive areas of riprap, a favorite habitat of crayfish. Crayfish are a valuable food source for many fish, especially yellow perch.

Table 3.4-3 identifies the macroscopic animals native to the ponds, bogs, creeks, rivers, marshes, and ditches that are part of the non-Lake Michigan aquatic community that surround the Bailly Station site.

3.4.2.3 Zooplankton

Zooplankton, by nature of their trophic (feeding) position, serve as the interface between energy contained in the lower trophic levels and the energy requirements higher in the food chain. In a 1970 study conducted by Texas Instruments of the ecosystems in the Bailly Station vicinity, 111 taxa of zooplankton were identified, 46 percent of which were cladocerans, 35 percent copepods, and 19 percent non-crustacean invertebrates (it should be noted that during this study, zooplankton samples were

TABLE 3.4-3

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

BENTHIC MACROINVERTEBRATES COMMON TO NON-LAKE MICHIGAN AQUATIC
COMMUNITIES OF THE BAILLY GENERATING STATION VICINITY

Family Name	Common Name
Libellulidae	Dragonflies
Coenagrionidae	Damselflies
Corixidae	Water Boatmen
Nepidae	Water Scorpions
Gerridae	Water Striders
Mesoveliidae	Water Treaders
Lymnaeidae	Pond Snails
Aeschnidae	Dragonflies
Notonectidae	Backswimmers
Hebridae	Velvet Water Bugs
Gyrinidae	Whirligig Beetles
Hydrophilidae	Water Scavenger Beetles
Chrysomelidae	Leaf Beetles
Gammaridae	Scuds
Hydracarina	Water Mites
Physidae	Pouch Snails
Hirudinea	Leeches
Chironomidae	Midges
Ephemeroptera	Mayflies
Lestidae	Damsel Flies
Belostomatidae	Giant Water Bugs
Veliidae	Smaller Water Striders
Dytiscidae	Predaceous Diving Beetles
Planorbidae	Orb Snails
Sphaeriidae	Fingernail Clams
Haliplidae	Crawling Water Beetles
Astacidae	Cray Fish
Pleidae	Pygmy Backswimmers
Sialidae	Alder Flies
Gelastocoridae	Toad Bugs
Asellidae	Sow Bugs
Elmidae	Riffle Beetles
Naucoridae	Creeping Water Bugs

Source: Krekeler, C.H., et al. 1981. Exosystem Study of the Indiana Dunes National Lakeshore, Vols. One and Two. Indiana Dunes National Lakeshore Research Program Report No. 81-01. National Park Service, Midwest Region.

collected on one day only). Of these, Bosmina longirostris and copepod copepodids were the most abundant organisms, both temporally and spatially. Other organisms occurring regularly included Cyclops bicuspidatus thomasi, Daphnia retrocurva (lake stations), and Chironomidae larvae (pond stations). Numerical density ranges from 0.44 to 117.79 organisms/liter in the lake and 50.00 to 964.74 organisms/liter in the sampled ponds, an indication of the higher productivity in the ponds. Spatial and temporal statistical differences were detected between groups of zooplankton stations and reflect the changing habitat or niche structure at the various stations with changing seasons and current characteristics.

Compilation of zooplankton species composition and quantitative distribution indicates that these microcrustaceans were over three times more abundant within the thermal plume than outside of it. These data suggest that certain species of zooplankton are either seeking out the warmer water of the plume, reproducing faster in the warmer discharge water, or a combination of the two factors.

A large portion of the zooplankton found in the thermal plume had large infestations of fungus on their bodies. This was especially apparent in Eurytemora affinis and Daphnia retrocurva, the most abundant organisms in the thermal plume. These same species outside of the thermal plume did not exhibit any infestations of fungus. Copepods and cladocerans in Lake Michigan are rarely observed infested with fungus in offshore waters, but this sometimes occurs in polluted areas such as in southern Green Bay.

3.4.2.4 Phytoplankton

Phytoplankton populations in Lake Michigan reflect seasonal changes in available light, temperature, nutrients and predation. Diatoms dominate the lake flora from mid-fall through early spring. Blue-green algae become briefly dominant in late spring, and green algae dominate in the summer. Diatoms and green algae share dominance in the ponds.

Productivity levels in the lake are very low, particularly as compared to nearby river systems. Productivity levels in the ponds are somewhat higher but still within a low range. A relationship between productivity, biovolume and density of the phytoplankton is apparent. Productivity at the lake stations in the discharge plume is negligible in all months except August, and levels are lower than in the lake, indicating some localized inhibition of the phytoplankton population.

After diatoms, the predominant algal group is the dinoflagellates (Pyrrophyta). Ceratium hirudinella and Peridinium sp. are the more abundant dinoflagellates. These forms have been previously reported from Lake Michigan but not in these concentrations. These organisms are especially abundant in the warm water discharge from the Bailly Station.

Blue-green algae (Cyanophyta) are also abundant in the warm water. The major species in this population is Gomphosphaeria lacustris.

Other golden-brown algae and green algae are present in smaller concentrations. Dinobryon sp. is commonly found throughout Lake Michigan. The green algae Scenedesmus protuberans is found throughout the area aquatic habitats,

but is found in highest volumes in Burns Ditch. With increasing distance from Burns Ditch, this species is found in lower volumes. This condition is an indication that water and related materials from Burns Ditch are drifting eastward into the vicinity of Bailly Station discharge plume.

Periphyton are abundant in the discharge area of the Station in summer and fall. Most of the genera collected are found in the lake in normal and unpolluted situations. Cladophora glomerata and Lyngbya dignetti, filamentous green and blue-green algae, respectively, are the first and second most common forms encountered near the Bailly Station. Although Cladophora is normally observed in shoreline habitats of Lake Michigan, it should be noted that its growth is responsive to temperature and nutrient concentration. Under conditions of accelerated growth this species has become a nuisance since it can slough off of its substrate, wash ashore, and decompose, producing foul odors. The attached algae harbors several protozoan species and small crustaceans (Gammarus sp.).

3.5 SOCIOECONOMIC RESOURCES

3.5.1 POPULATION

The residential populations for the incorporated communities within 5 miles of the Bailly Station are presented in Table 3.5-1. In 1989, approximately 42,081 individuals lived in the area. The smallest town, Dune Acres, is a private community to which the public in general is not admitted, and is the closest to the Northern Indian property. Portage is the largest city in the 5-mile vicinity, with a population in 1980 of 27,409.

TABLE 3.5-1

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

POPULATION DATA FOR INCORPORATED COMMUNITIES
WITHIN 5 MILES OF THE BAILLY GENERATING STATION [a]

Community	Miles/Direction From Site	Census 1970	Census 1980	% Change
Dune Acres	2.0 ENE	301	291	-3.3
Burns Harbor	2.5 SSW	1,284	920	-20.2
Porter	3.2 SE	3,058	3,441	12.5
Ogden Dunes	3.5 WSW	1,361	1,489	9.4
Portage	4.5 SSW	19,127	27,409	43.3
Chesterton	4.5 SE	6,177	8,531	38.1
Porter County	-	87,114	119,816	37.5

Footnote: [a] - No census data are kept on unincorporated communities.

Sources: U.S. Department of Commerce, Bureau of the Census. U.S. Census of Population: 1980. Number of Inhabitants, Indiana.

Northwestern Indiana Regional Planning Commission. 1987. County Profile: Porter County.

In 1980, the population of Porter County was 119,816. It was projected to be 127,850 in 1990. No population projections are made below the county level, so no data are available on migrational trends. The available labor force in 1987 was 53,500 with a 7.6 percent unemployment rate countywide. Unemployment figures for individual communities are not available, so no estimate can be made of the unemployment rate within the Bailly Station vicinity.

3.5.2 LAND USE

3.5.2.1 Regional

The Bethlehem Steel Corporation, Burns Harbor complex borders the site on the west and south perimeter. The east and south sides of the site are bordered by the Indiana Dunes National Lakeshore and U.S. Route 12, respectively.

Within 2 miles of the Bailly Station there is very little permanent residential population because of the wide use of the land for purposes other than housing. A windshield survey of the Lakeshore area (January 1989) revealed a moderate amount of residential construction underway. Within selected portions of a 5-mile radius of the Bailly Station, however, almost no new homes or condominia were observed under construction.

3.5.2.2 Industrial

The Bailly Generating Station site consists of about 300 acres of land. The Station's land use is related to coal-fired electric generation activities and include buildings housing the steam boilers and generating equipment, a coal storage area and associated facilities, wastewater ponds and treatment facilities, and parking areas. The Station has a 300 ft greenbelt to the east which serves as a buffer between the Station and the National Lakeshore.

The area around the site, and in particular the area to the west, is very heavily industrialized. Lake County, 5 miles west of the site, includes Gary, Hammond and East Chicago, all of which are centers of heavy industry, particularly the steel manufacturing industry. Besides the steel industry, construction companies and firms producing fabricated metal products as well as petroleum and coal products have a large number of employees. Table 3.5-2 illustrates the larger manufacturing concerns in the region. Nearly half of the work force in Porter County is involved with manufacturing, and much of this work force is employed by Bethlehem Steel adjacent to the Bailly Station.

3.5.2.3 Agricultural

Very little of the land north of U.S. Route 12 is either suitable or used for agriculture. To the south of the Indiana Toll Road, the land in Porter, Lake and LaPorte Counties is largely devoted to growing corn and soybeans. Approximately 60 percent of the land in Porter County is used for agricultural purposes.

TABLE 3.5-2

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

MAJOR MANUFACTURING ACTIVITY WITHIN A 5-MILE
RADIUS OF THE BAILLY GENERATING STATION [a]

City	Miles/Direction From Site	Industry	Product	No. of Employees
Chesterton	1/SE	Bethlehem Steel (Burns Harbor)	Steel mill	6,200
Chesterton	4.5/SE	Luria Brothers	Scrap metal processing	122
Chesterton	4.5/SE	Manley Brothers	Stone, clay, glass products	125
Portage	4.5/SSW	Bethlehem Steel	Steel mill	6,000
Portage	4.5/SSW	The Levy Co.	Stone, clay, glass products	300
Portage	4.5/SSW	Metro Metals Corp.	Steel foundry	150
Portage	4.5/SSW	National Steel Corp. (Midwest Div.)	Steel Mill	1,700

Footnote: [a] - Major manufacturers include those industries with 100 or more employees.

Sources:

Manufacturers News, Inc. 1988. Indiana Manufacturers Directory. Chicago, Ill.

Association of Iron and Steel Engineers. 1986. Iron and Steel Plants Directory. Pittsburgh, PA.

The Dunn & Bradstreet Corporation. 1988. Million Dollar Directory. Parsippany, NJ.

3.5.3 PUBLIC SERVICES

3.5.3.1 Schools, Hospitals and Nursing Homes

Table 3.5-3 lists the six hospitals within a 12-mile radius of the Bailly Generating Station and their respective bed counts. There are no hospitals within 5 miles; the closest major hospital to the station is Porter Memorial in Valparaiso.

Table 3.5-4 describes the number of public schools in the area and provides total student enrollment. Public special education, elementary, junior high, and high schools are covered by these data. Day care centers and pre-school facilities are not required to be monitored by the Indiana Department of Education, so no enrollment or location information is available.

Table 3.5-5 indicates the nursing homes and number of beds in the station area.

3.5.3.2 Transportation

The Bailly Station is located in an area where access to transportation facilities is readily available. The two-lane U.S. Route 12 borders the Station boundary on the south as does the Chicago South Shore & South Bend Railroad (CSS&SB). A six-lane segment of an interstate highway, I-94, is located about 4 miles south of the Station; another four-lane road, Highway 20, is situated 2.5 miles southeast of the Station. Because the Bailly Station is located on the edge of Lake Michigan, it is possible to reach it by way of the lake. Figure 3.5-1 indicates the various routes of transportation near the station. Northern Indiana has a relatively high density

TABLE 3.5-3

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

HOSPITALS WITHIN A 12-MILE
RADIUS OF THE BAILLY GENERATING STATION

Hospital	Location	No. of Beds
Porter Memorial	Valparaiso	379
Methodist	Gary	355
St. Mary Medical Center	Hobart	300
Michigan City Memorial	Michigan City	102
St. Anthony	Michigan City	190
Kingwood	Michigan City	89

Source: Indiana Department of Public Health, Acute Care Services Division. January 1989. Indianapolis, IN. Personal communication with Laura Kowalsky, Enviroplan, West Orange, NJ.

TABLE 3.5-4

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

PUBLIC SCHOOL ENROLLMENT FOR COMMUNITIES WITHIN A 12-MILE
RADIUS OF THE BAILLY GENERATING STATION

Community	No. of Schools	1988 Pupil Enrollment
Chesterton	6	4,018
Porter	1	353
Portage	9	8,059
Hebron	3	1,425
Valparaiso	19	8,737

Source: Indiana Department of Education, Educational Information. January 1989. Indianapolis, IN. Personal communication with Laura Kowalsky, Enviroplan, West Orange, NJ.

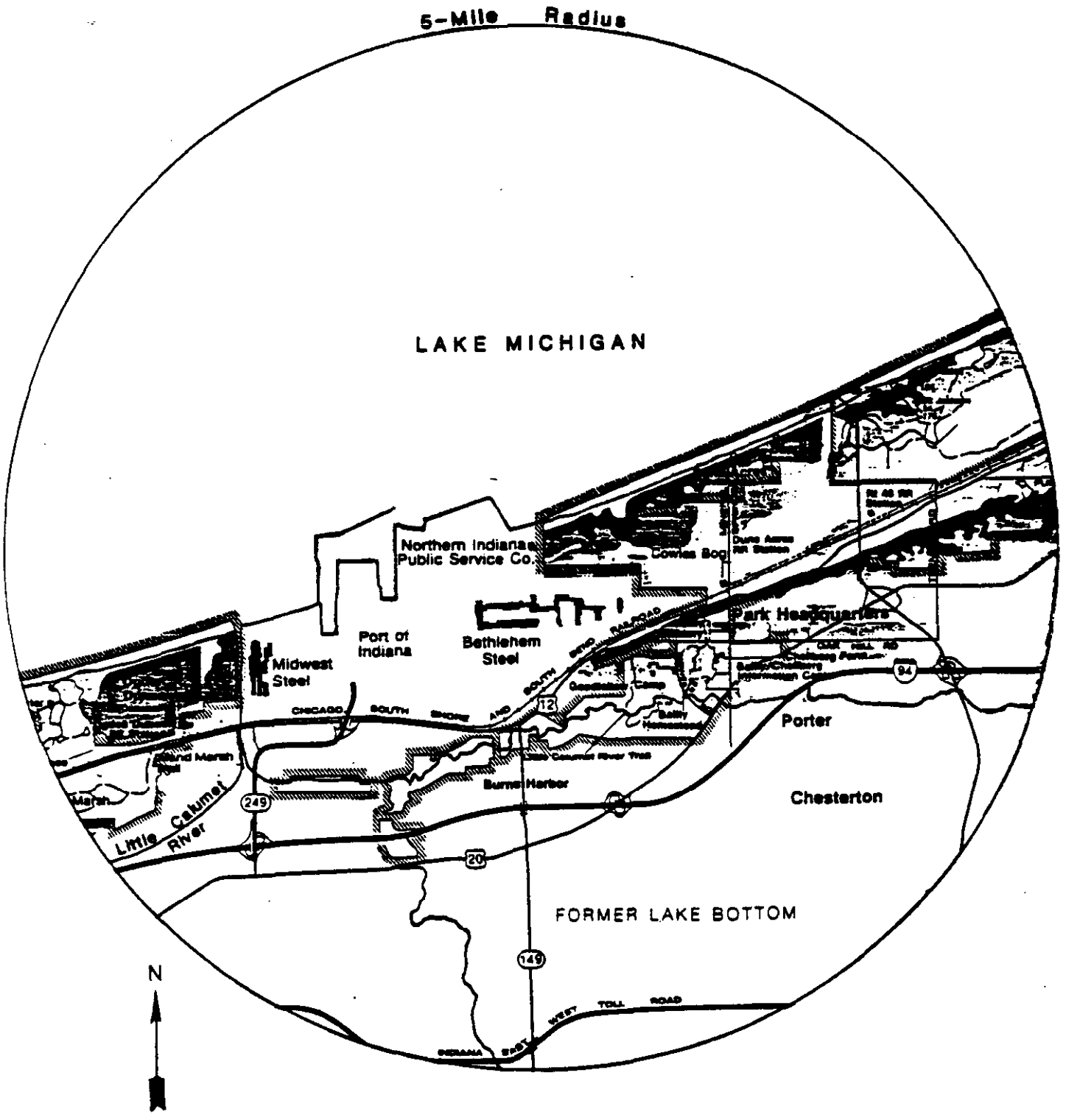
TABLE 3.5-5

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

NURSING HOMES AND BED TOTALS WITHIN A 12-MILE
RADIUS OF THE BAILLY GENERATING STATION

Community	No. of Nursing Homes	Total Beds
Chesterton	1	100
Portage	2	215
Valparaiso	4	578

Source: Indiana Department of Education, Educational Information. January 1989. Indianapolis, IN. Personal communication with Laura Kowalsky, Enviroplan, West Orange, NJ.



Source: Indiana Dunes National Park map, distributed by the National Park Service.

Pure Air
a joint venture company
ADVANCED FLUE GAS DESULFURIZATION

Major Roadways and Recreational Land Use

Figure 3.5-1 1/91

of railroad mainlines and principal highways that feed into Chicago from the east and south. The railroad lines that were operating within a 10-mile radius of the Station in 1988 include Conrail and CSX. Direct commuter passenger service to the station entrance is available via the CSS&SB electrified railroad.

Several principal highways pass within 10 miles of the Station, including Interstate Highways 80, 90 and 94, 20, 12 and 6, all of which run north-south through Gary. U.S. Route 12, known also as the Dunes Highway, passes closest to the lakeshore, and the Station entrance road leads directly to U.S. Route 12. At present U.S. Route 12 passes directly through land that is now part of the National Lakeshore. A study by the National Park Service (NPS) is in progress to determine the feasibility of redesignating U.S. Route 12 as a parkway according to NPS standards. Approval of the request by Congress may affect truck traffic along the highway by the Bailly-Bethlehem Steel sites. Results of the study are expected sometime in 1991.

3.5.3.3 Historical Sites and Natural Landmarks

There are no state-supported historical sites in Porter County. On the federal level, the Joseph Bailly Homestead and Cemetery are located within 2 miles of the Bailly Generating Station. The Bailly Homestead is listed in the National Register of Historic Places.

The South Shore Station at Beverly Shores has been nominated to the National Register of Historic Places as the only surviving example of stations from the early period of South Shore history. Northern Indiana owns the property on which the South Shore Station sits; it is

approximately 10 miles from the Bailly Station. The National Park Service has approved the application; the state is currently reviewing it and if the site passes state criteria, it will be submitted to and reviewed by the National Register of Historic Places.

There are no known significant deposits or archaeological materials within the Bailly Station boundaries, although three Registered Natural Landmarks are located within a few miles of the site. Cowles Bog, the closest, lies immediately to the east of the Station boundary. Dunes Nature Preserve is located within the Indiana Dunes State Park between the towns of Dune Acres and Beverly Shores. Pinhook Bog is situated about 12 miles east of the Station.

3.5.3.4 Recreation

Except for the 3 miles of industrial lakeshore occupied by the Bailly Station, the steel mill properties, and the Port of Indiana, most of the 15 miles of lakeshore in Porter County is used as either public or private swimming beach. Because of the natural sand accumulation, the water is generally shallow within 50 ft of the shore line and is thus a relatively safe water-sport area. The boat docks in the area are primarily in the private marinas that line the shore of Burns Ditch and the public harbor at Michigan City.

The Indiana Dunes State Park and the Indiana Dunes National Lakeshore occupy the area to the east and south of the Station. It consists of about 8,000 acres of lakeshore, bogs and marshes. Public Law, 89-761, passed in November 1966, authorized the Secretary of the Interior to establish The Indiana Dunes National Lakeshore when sufficient lands had been acquired to be administered

effectively as a unit. The Lakeshore was formally established in 1972 and is now administered by the National Park Service.

Fishing in Lake Michigan is a popular recreational pastime. Anglers fish from boats anchored near the end of the Bailly Station circulating water discharge plume where salmon, trout and perch are frequently in abundance. The construction and operation of the AFGD system will not prevent anglers from continuing to use this excellent fishing spot.

Inland fishing is very limited. The inland lakes are not stocked by the Department of Natural Resources so local fisherman deplete the fish population by the end of the season. Lake Palomara in Chesterton has no fish in it at all. Local fisherman also fish in the Kankakee and Little Calumet Rivers, and on a chain of small lakes in the Valparaiso area.

3.6 ENERGY AND MATERIALS RESOURCES

Northern Indiana currently operates two electric generating units at the Bailly Generating Station. The units are coal-fired and rated at 528 MW total for both. The Station consumes approximately 1.1 million tons of coal per year to generate about 3,200,000 MWH, of which the Station consumes 200,000 MWH. Natural gas can also be used as an alternative fuel. The coal is delivered to the Station by railcar and stockpiled at the site, whereas the natural gas is delivered by an underground pipeline.

The Generating Station receives process/cooling water from Lake Michigan at an average of 221 million gallons per day (MGD).

Every 2 to 3 years the Station must dredge the area surrounding the intake pipe. The dredging is done with the approval of the Army Corps of Engineers and is permitted by the Indiana Department of Natural Resources. The material dredged is generally used for beach enrichment at area beaches.

3.7 REFERENCES

Association of Iron and Steel Engineers. 1986. Directory of Iron and Steel Plants. Pittsburgh, PA.

Cohen, D.A. and Shedlock R.J. 1986. Shallow Ground-Water Flow, Water Levels, and Quality of Water, 1980-84, Cowles Unit, Indiana Dunes National Lakeshore. USGS Water-Resources Investigations Report 85-4340.

Cohen, D.A. September 18, 1989. U.S. Geological Survey, Indianapolis, Indiana. Personal communication to D.G. Jernigan, Oak Ridge National Laboratory, Oak Ridge TN.

Collings, E. January 9, 1989. Indiana Department of Public Health, Acute Care Division. Indianapolis, Indiana. Personal communication with Laura Kowalsky, Enviroplan, West Orange, NJ.

Dorell, S. January 9, 1989. State Board of Health, Division of Public Health Statistics. Indianapolis, Indiana. Personal communication with Laura Kowalsky, Enviroplan, West Orange, NJ.

Enviroplan. February 3, 1988. Studies to Support the Use of ISCST (Rural) and SIP Development in Porter, County, Indiana. West Orange, NJ.

Federal Emergency Management Agency. 1981. Flood Insurance Study, County of Porter, Indiana Unincorporated Areas.

Federal Emergency Management Agency. 1980. Flood Insurance Study, Town of Burns Harbor, Indiana Porter County.

Federal Emerge
Study, C
Communit
Indiana

Federal Emerge
Maps: C
Communit
Harbor,
0001B ar

Krekeler, C.H., Reshkin, M., Kiefer, W.E., Weber, N.V., and Brunansky, L. 1981. Ecosystem Study of The Indiana Dunes National Lakeshore, Vols. One and Two. Indiana Dunes National Lakeshore Research Program 81-01. National Park Service, Midwest Region.

Lane, K. January 9, 1989. Indiana Department of Education, Educational Information Systems, Indianapolis, Indiana. Written communication with Laura Kowalsky, Enviroplan, West Orange, NJ.

Manufacturers New, Inc. 1988. Indiana Manufacturers Directory. Chicago, Il.

Martin, M. L. January 20, 1989. Indiana Natural Heritage Program, Division of Nature Preserves, Indiana Department of Natural Resources. Indianapolis, Indiana. Written communication with Laura Kowalsky, Enviroplan, West Orange, NJ.

Maassel, M.T. September 15, 1989. Northern Indiana Public Service Company, Hammond, Indiana. Written communication to Lance McCold, Oak Ridge, National Laboratory, Oak Ridge, TN.

Meyer, W., and Tucci, P. 1979. Effects of Seepage from Fly-Ash Settling Ponds and Construction Dewatering on Groundwater Levels in the Cowles Unit, Indiana Dunes National Lakeshore, Indiana. U.S. Geological Survey Water-Resources Investigation Report 78-138.

Meyers, R.A., ed. 1981. Coal Handbook. Marcel Dekker, Inc. New York, NY.

Northern Indiana Public Service Company. 1973. Bailly Generating Station Nuclear 1 - Final Environmental Statement Related to Construction.

Northern Indiana Public Service Company. 1974-1981. Annual Report - Bailly Nuclear-1 Site. Prepared by Texas Instruments Inc., Ecological Services. Dallas, TX.

Northern Indiana Public Service Company. 1981. Bailly Generating Station Nuclear 1 - Environmental Report.

Parch, D. January 9, 10, 11 and 13, 1989. Historian. Indiana Dunes National Lakeshore, Porter, Indiana. Personal communication with Laura Kowalsky, Enviroplan, West Orange, NJ.

Pierce, F. January 9, 1989. Indiana Department of Public Health, Health Facilities Division. Indianapolis, Indiana. Personal communication with Laura Kowalsky, Enviroplan, West Orange, NJ.

Porter Country Convention, Recreation and Visitor Commission. January 1989. Chesterton, Indiana. Written communication with Laura Kowalsky, Enviroplan, West Orange, NJ.

Rand McNally Company. 1985. Rand McNally Handy Railroad Atlas.

Rhein, L. January, 1989. Local Population Estimates, 1982, 1984 and 1986; Population Projection, 1990 - 2020; County Profile: Porter County; Community Profiles: Burns Harbor, Chesterton, Dune Acres, Portage, Ogden Dunes, Porter. Northwestern Indiana Regional Planning Commission, Census and Statistical Data Center, Highland, Indiana. Written communication to Laura Kowalsky, Enviroplan, West Orange, NJ.

Ritter, K. September 6, 1989. Indiana Department of Environmental Management. Personal communication with Mark Mitckes, EBASCO, Oak Ridge, TN.

Ritter, K. September 13, 1989. Indiana Department of Environmental Management (IDEM), Indianapolis, Indiana. Monitoring data report sent to Mark Mitckes, EBASCO, Oak Ridge, TN.

Thom, H.C.S. 1963. Tornado Probabilities. Monthly Weather Review 91:730-736.

Thompson, T.A. 1987. Sedimentology, Internal Architecture and Depositional History of the Indiana Dunes National Lakeshore and State Park. Ph.D dissertation, Indiana University, Bloomington, unpublished.

U.S. Department of Commerce, Bureau of Census. 1982. U. S. Census of Population: 1980 - Number of Inhabitants, Indiana. Washington, D.C.: U. S. Government Printing Office.

SECTION 4.0

CONSEQUENCES (IMPACTS) OF THE PROJECT

The impacts of the project on the environmental disciplines described in Section 3.0 Existing Environment, were evaluated. The evaluation was for impacts during construction and operation of the AFGD system as discussed in the EIV and EA. The impact discussion presented below reflects current design.

4.1 ATMOSPHERIC RESOURCES IMPACTS

4.1.1 Construction

Atmospheric resources impacts from AFGD system and associated facilities construction will occur over approximately 24 months. These impacts will be primarily associated with vehicle emissions and fugitive emissions or dust. However, they are expected to be temporary and localized. In addition, project specifications indicate that water will be sprayed on roads to reduce fugitive dust during construction and other methods of fugitive emissions control will be used on an as-needed basis.

The vehicle emissions will include small amounts of CO, NO_x, hydrocarbons and particulate matter. The EA indicates that approximately 0.7 ton/month of fugitive emissions will be generated during construction. This emission rate was used to model fugitive emissions over a receptor grid for comparison with National Ambient Air Quality Standards (NAAQS). This analysis indicated that there will be no violation of NAAQS for particulate matter (PM_{10}).

4.1.2 Operation

During operation of the AFGD system, both overall emissions and ground-level concentrations of SO_2 will be reduced. When the AFGD system is not in operation or during an upset condition, combustion products will be directed through the existing stack and will be within existing Bailly Station emission permit requirements as discussed below. Thus, no additional impact to that currently prevailing will be observed. The area is currently classified as an attainment area with respect to SO_2. During operation total NO_x emissions will remain unchanged, although concentrations of NO_x at ground level may increase as a result of the lower temperature of the plume. Air pollution dispersion modeling using the U.S. Environmental Protection Agency (EPA) approved ISCST (Rural) predicted no contravention of NAAQS for SO_2, NO_x and PM_{10} even with conservative emission rate estimates and without subtracting the contributions of the existing stack from the background concentrations.

Operation of the AFGD system may slightly increase fugitive emissions in the area. This would be due to material handling (limestone, hydrated lime, gypsum) and associated truck traffic. However, the small increase in fugitive emissions should not cause any discomfort to visitors to the National Lakeshore or to residents of nearby communities. This will be assured by compliance with applicable fugitive dust regulations and appropriate design to minimize fugitive dust emissions.

The only air emissions from the AFGD system will be in the flue gas exiting the scrubber and stack. The existing and new emission rates and emission standards for the regulated parameters are shown in Table 4.1-1. As can be seen from this table, the IDEM, OAM has placed limits on SO_2, particulate matter and opacity. Additional details on IDEM, OAM permit requirements are provided in Section 6.2 Compliance Monitoring (Class II Monitoring).

TABLE 4.1-1

PURE AIR, NORTHERN INDIANA

BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

BAILLY STATION AND AFGD SYSTEM IDEM, OAM PERMIT LIMITS AND AIR EMISSIONS

	Bailly Station		AFGD System	
Parameter	Existing Emissions	Permit Limits	Proposed Emissions	Permit Limits
SO_2 (lb/MMBTU)	5.2	6.0	0.52	1.2
NO_x (lb/MMBTU)	1.70	NONE	1.70	NONE
Particulate Matter (lb/MMBTU)	0.10	0.22	0.10	0.22
Opacity (%)	Average 6-17	40	Average 10-20	40

The AFGD system will reduce the SO_2 emission rate by 90 percent. This is a significant reduction in SO_2 emissions, and results in an SO_2 emission rate that is well below the New Source Performance Standard (NSPS) and AFGD system permit level of 1.2 lb/MMBtu. The process does not reduce or increase the present NO_x or particulate matter emission rates of 1.70 lb/MMBtu and 0.10 lb/MMBtu, respectively. The wet limestone slurry does not react with the NO_x so no NO_x is removed in the SO_2 absorber.

No additional particulate matter is expected to be emitted as a result of the AFGD system. In practice, all FGD systems receive some amount of particulate (nominally 0.10 lb/MMBtu for the Bailly Station) in the flue gas from the ESP. Approximately 50 percent of this particulate received from the ESP is removed by the AFGD system. The AFGD system in turn emits a minor amount (0.05 lb/MMBtu of scrubber generated particulate matter). Thus, there is no net increase in particulate matter as measured before and after the AFGD system.

The AFGD system opacity levels are expected to be slightly higher than existing levels, in particular during cold weather. The potential increased opacity levels will be due to the higher moisture content of the stack plume. However, the expected permit limit of 40 percent opacity will not be exceeded.

The AFGD system will be available to process all of the flue gas from the Bailly Station on a continuous basis. This will be accomplished by continuing to pass the Station's flue gas through the electrostatic precipitators before it enters the AFGD system. Once the flue gas passes through the AFGD system, it will then exit through the new stack. If there is an unscheduled outage of the AFGD system or during start-up or shutdown of the AFGD system, the Station's flue gas will flow through the electrostatic precipitators and the existing stack.

4.2 LAND RESOURCES IMPACTS

4.2.1 Construction

Land resources or use impacts during the 24-month construction period are projected to be minimal, primarily as a result of the industrial nature of the Bailly Station area. Additionally, the AFGD system will utilize less than 2 percent of the land presently dedicated to the Bailly Station.

Initial impacts will result from the installation of utilities and site preparation activities. Laydown areas will be provided for construction equipment, delivery and handling of materials. This land dedication of less than 2 acres will be temporary in nature, and following construction will be returned to its existing industrial state.

No quantities of oil will be utilized during construction sufficient to cause a spill warranting immediate action. Any construction-related spills will be quickly contained by soaking into the soil's surface dressing. If necessary, the affected surface dressing will be removed from the site for disposal in an appropriately-approved landfill.

The construction phase will have a minimal effect on the recreational land area adjacent to the Bailly Station. The National Lakeshore will be shielded from construction activities by the "green belt." The green belt is a 300-foot "L" shaped parcel of land that bounds the eastern side of the Bailly Station and a portion of the northern boundary of the site; both segments abut part of the Indiana Dunes National Lakeshore. This parcel, owned by Northern Indiana, has been left in its natural state to serve as a buffer zone. The Bethlehem Steel Plant to the south and west should also be unaffected by construction because of its industrial environment.

There will be no impact of construction activity on historic resources. No historic structures or sites have previously been recorded on the Northern Indiana property. Further, the Joseph Bailly Homestead and Cemetery, approximately 2 miles from the site, are not projected to be impacted by construction related activities. Likewise, the South Shore Station, 10 miles from the construction site, proposed for inclusion in the National Register of Historic Places, will not be impacted by construction activity.

4.2.2 Operation

Land-use impacts at the Bailly Station as a result of AFGD system operations will be minimal since operations will be taking place on a heavily industrialized site.

Pure Air is facilitating negotiations between Northern Indiana and manufacturers of wallboard to allow Northern Indiana to become a supplier of gypsum. Successful negotiation of a contract would result in this by-product being recycled into a useful product. Alternatively, the gypsum could be landfilled at an existing permitted disposal site. Although this latter disposal option would consume less than 4 acres of land annually, assuming disposal of 220,000 tons in 20-foot lifts, use of an existing appropriately-permitted landfill would result in minimal environmental impact. Currently there are landfills within Porter County that are appropriately permitted and that have their own approved environmental monitoring programs that they are responsible for.

The quantity of fly ash generated at the Bailly Station with the AFGD system will be slightly higher than that generated by existing operations as a result of the WES in the Unit 8 ductwork. If beneficial uses for the fly ash are not determined, it will be landfilled in an appropriately-approved facility. This will involve the use of land that has already been dedicated for

waste disposal and would have been used for normal Station ash disposal. Thus, the AFGD system may have minimal impact on available landfill capacity and no impact on water quality.

Operation of the AFGD system is projected to have no impact on existing or proposed historic resources.

4.3 WATER RESOURCES IMPACTS

4.3.1 Groundwater

4.3.1.1 Construction

The construction of the AFGD system at the Bailly Generating Station will not have any effect on the groundwater in the area. There will be no materials used during the construction period that are expected to cause any problem with groundwater.

Any construction-related oil spills will be quickly contained by soaking into the soil's surface dressing. If necessary, the affected surface dressing will be removed from the site for disposal in an appropriately-approved landfill.

4.3.1.2 Operation

The AFGD system will be designed to minimize wastewater generation. However, there will be wastewater from the sanitary waste system and some process-related high chloride content wastewater. These wastewaters will be discharged to the wastewater system at the Bailly Station per modification of the Station's NPDES permit.

Solid wastes (e.g., ash and potentially gypsum) generated from operation of the AFGD system may be put to beneficial use or disposed in previously mentioned appropriately-permitted landfill facilities. On-site gypsum will be stored in buildings prior to removal from the site. Also, the limestone and hydrated lime reagents will be stored in silos prior to use in the AFGD system, and fly ash will be stored in a silo prior to removal from the Bailly Station. Thus, the impact on groundwater should be minimal.

4.3.2 Surface Water

4.3.2.1 Construction

Water for construction of the AFGD system will be obtained directly from Lake Michigan. This usage is not anticipated to have any effect on the lake, nor to affect recreation thereon. No additional outfall or docking facilities (permanent or temporary) are planned during construction of the AFGD system.

A review of the area wetlands indicates that the AFGD system structures will not be built on any existing wetlands.

4.3.2.2 Operation

Lake Michigan will provide all process water and meet other lesser water requirements, estimated to average 770 gallons per minute (gpm), or 400,000,000 gallons annually. Emergency fire and quench water will be supplied at 500 and 4,500 gpm, respectively, if ever required. This water consumption is negligible compared with other withdrawals from Lake Michigan, such as the

1.4×10^6 gpm withdrawal at Chicago. Thus, the lake will not be impacted by this use, nor will the wetlands that are characteristic of the National Lakeshore area.

Surface water impacts from the operation of the AFGD system will be negligible since the system will be designed to comply with NPDES permit conditions according to IDEM, OWM. The relevant existing and new discharges, and permit limits for the regulated parameters are shown in Table 4.3-1.

The Bailly Station currently has discharge through two outfalls to Lake Michigan and several internal outfalls as follows and shown on Figure 4.3-1

- Outfalls 001 and 002 are to Lake Michigan and consist of the total plant discharge, which is mostly once through condenser cooling water discharged at Outfall 001. Outfall 002 is an intermittent discharge in front of the plant intake structure to prevent freezing in cold weather. Chlorine may be used in the cooling water, but generally is not needed.

- Outfall 101 is the internal discharge from the ash ponds to Outfall 001. This water is usually recycled in-plant causing the discharge to be intermittent. Outfall 301 (boiler blowdown) also contibutes to the main Outfall 001.

- Periodic metal cleaning wastes (Outfall 111) are discharged to the wastewater treatment facility, thence the ash ponds. Other waste streams contributing to the ash ponds are the discharge from the sewage plant (Outfall 201), ash sluicing and slag recovery, air heater wash, and precipitation on the surfaces of the ponds.

TABLE 4.3-1

PURE AIR, NORTHERN INDIANA

BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

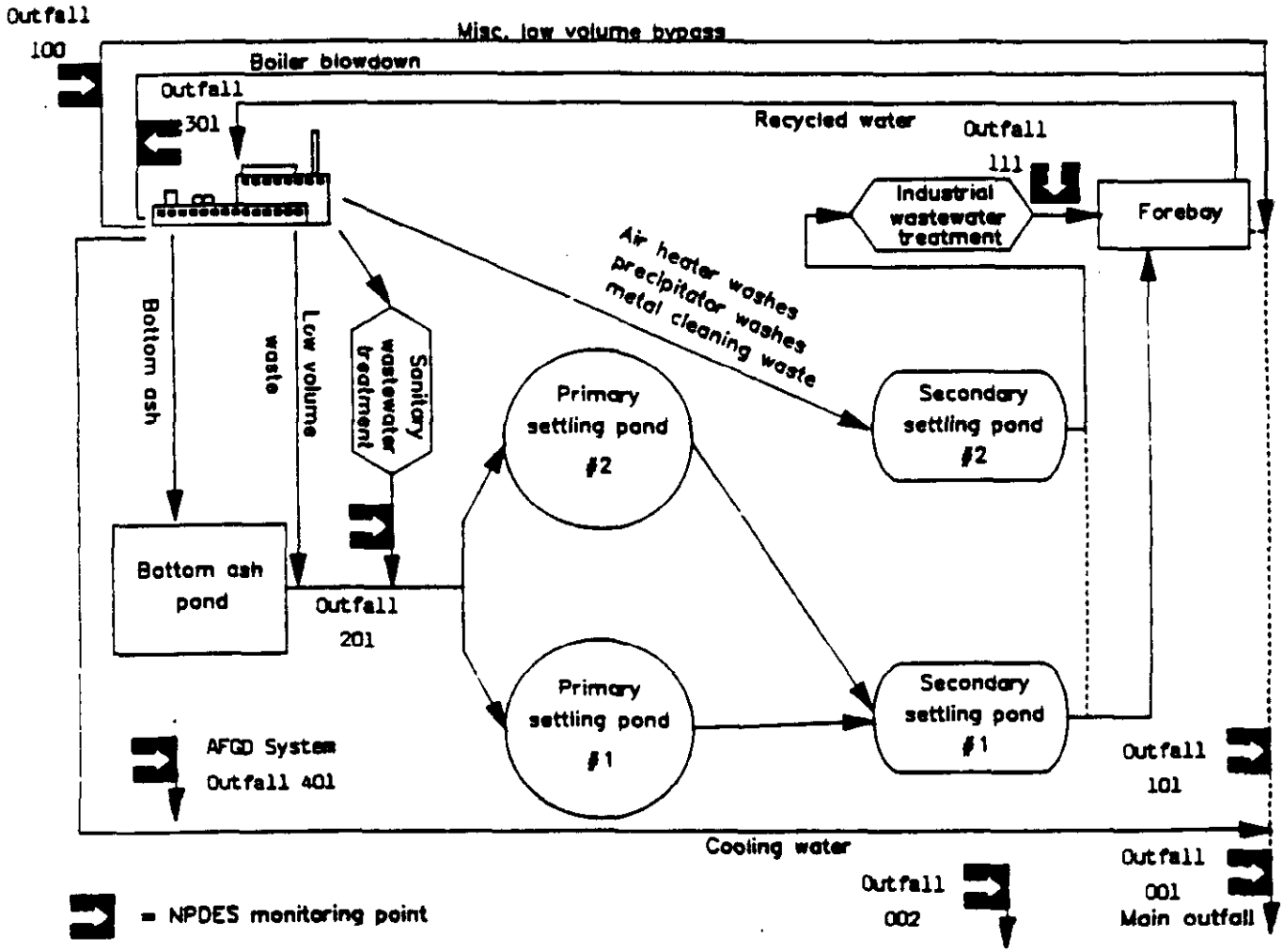
BAILLY STATION IDEM, OWM PERMIT LIMITS AND WASTEWATER DISCHARGES,
AND BAILLY STATION/AFGD SYSTEM COMBINED DISCHARGES AND PERMIT LIMITS

Parameter	Bailly Station Existing Discharge (mg/l)	Bailly Station Permit Limits (mg/l)	Combination of Bailly Station Discharge With Treated AFGD System Wastewater Proposed Discharge (mg/l)	Combination of Bailly Station Discharge With Treated AFGD System Wastewater Permit Limits (mg/l)
Outfall 001 (Main Outfall)				
Flow (MGD)	220.9 (443.2)[a]	Report	221.1 (443.4)	Report
TSS	6.2[b]	None	<30 (<100)	30 (100)
Oil and Grease	No Data	None	<15 (<20)	15 (20)
Chloride	10.6	None	29.0 (29.0)[b]	30 (40)
TDS	No Data	None	241.8 (241.8)	394 (400)
Sulfate	23.6	None	24.6 (24.6)	52 (100)
Fluoride	No Data	None	0.4	1.4 (2.0)
Outfall 201 (Sewage Treatment Plant)				
Flow (MGD)	0.008 (0.015)	Report	0.009 (0.016)	Report
BOD_5	24	30 (45)	24	30 (45)
Fecal Coliform (count/100ml)	119 (TNTC)[c]	- (400)	119	- (400)
Total Residual Chlorine	0.45 (1.90)	- (2.0)	0.45 (1.90)	- (2.0)

Footnotes: [a] Average and maximum concentrations are shown if known, with the maximum indicated in parentheses.

[b] Where the concentration of the average condition from both the Bailly Station and the AFGD system is greater than the maximum for both facilities due to a lower flow, the higher concentration is listed for the maximum.

[c] TNTC indicates too numerous to count.



Pure Air
a joint venture company
ADVANCED FLUE GAS DESULFURIZATION

BAILLY STATION/AFGD SYSTEM
WASTEWATER FLOWS

Figure 4.3-1 1/91

- Outfall 100 is an emergency bypass of the ash ponds of certain low volume wastestreams (floor drains, filter backwash, and water treatment wastes).

- Sanitary wastewater (201) is treated by an actived sludge plant with chemical coagulation capability, sand filtration, and effluent chlorination. Coal pile run off (Outfall 003) is allowed to discharge to the ground according to the existing wastewater discharge permit.

The AFGD system will have domestic sewage wastes and process related wastewater. The domestic sewage wastes will be routed through the Bailly Station's existing on-site sewage treatment facility; whereas, the process wastewater will be directed to a wastewater treatment system prior to combining with the Station's recirculating water. Thus, the AFGD system will impact only Outfalls 001 (main outfall) and 201 (sewage treatment plant) and only this information is presented in Table 4.3-1.

As can be seen from Table 4.3-1, for the parameters which data are available, the AFGD system will generally increase the discharge concentrations. However, the concentrations still will be within IDEM, OWM permit limits. In addition, additional monitoring requirements than that currently required at the Bailly Station, will be imposed for the Station/AFGD system combined discharge at the main outfall (001). IDEM, OWM permit requirements are described in more detail in Section 6.2 Compliance Monitoring (Class II Monitoring).

4.4 ECOLOGICAL RESOURCES IMPACTS

4.4.1 Construction

Construction activity related to development of the AFGD system is anticipated to have little or no impact on the area's ecological systems. The area proposed for construction is presently free of vegetation thus negating the need for clearing of potential wildlife habitat. The major potential impact of construction on wildlife will result from increased human activities. This impact may be observed on the less mobile species such as amphibians, reptiles and small rodents, and to a lesser degree on avian species, if present. However, it is believed that sufficient habitat exists adjacent to the construction area to permit relocation.

It is anticipated that construction activity will not increase the silt load on any surface water because of the implementation of erosion and sedimentation control methods.

4.4.2 Operation

As a result of the increased human activity associated with operation, it is expected that resident animals, if any, may leave the area to seek new habitat. None of the species known to occur in the area has a restricted home range. Overall, there is no detrimental effect projected for the species identified in the site area, as a result of human activity during AFGD system operation.

No state or federally listed threatened or endangered plant or animal species, or critical habitat for such species, are present on the Bailly Station. Also, based on the DOE consultation with the U.S. Fish and Wildlife Service, no special status species are expected to be negatively impacted by the proposed project within the site area.

The AFGD system will conform to the requirements of the NPDES permit as administered by the IDEM, OWM. This will assure strict effluent discharge limitations and thus no detrimental impact on aquatic resources are expected.

4.5 SOCIOECONOMIC RESOURCES IMPACTS

4.5.1 Construction

An assessment of the relative impact of the construction of the AFGD system on population, employment and housing in Porter County indicates a benefit will result with respect to these attributes of the area. The construction work force for the system will consist of up to approximately 400 construction employees at the peak level. In terms of population changes, no significant increase is expected due to plant construction, as the area presently experiences limited construction activity on a regular basis. Also, no unusual demands for additional school or emergency medical services are anticipated.

Experience from previous projects indicates that most of the workers will commute to the job site. This suggests that a number of workers may come from within Porter County and adjacent counties. A permanent work force up to 30 to 35 full-time employees will be required once the AFGD system is operational. This will contribute to an improved employment outlook in Porter County.

Construction of the AFGD system will not have any significant impact on the housing demands in the area. Only those employees who live too far from the site to commute, and those who will be permanently assigned to the site once the AFGD system is operational, will have a need initially for temporary and subsequently for permanent housing. This will constitute a relatively small percentage of employees requiring permanent residence, but will provide a positive benefit to the local economy.

4.5.1.1 Transportation

Primary access to the proposed construction site will be from U.S. Route 12 and the nearby interstate highway system. The anticipated increase in traffic volumes averaging from 100 to 200 vehicle trips per day will easily be accommodated by the existing transportation network. Vehicles associated with construction of the AFGD system will be requested to enter the Bailly Station property from the west on U.S. Route 12 in order to avoid increased traffic in the National Lakeshore. Parking will be provided on-site at existing and temporary facilities. This will further minimize impact. The lack of residential and commercial enterprise in the area will further minimize impacts or disruption of activities as a result of construction activities.

4.5.1.2 Noise

Increased sound levels will be generated from AFGD system construction activities and from delivery of materials to the site by truck. However, the proposed location of the site, where the majority of construction activity will occur, is such that the closest residence is approximately 8,400 ft (1.6 miles) away. At this distance, there will be a significant attenuation in the levels of construction noise at the nearest residential receptor.

4.5.1.3 Visual

Visual exposure of construction activities will be obscured except during construction of the new stack.

4.5.2 Operation

The impact on population, employment and housing as a result of operation of the AFGD system will be positive for Porter County and the region surrounding the Bailly Station. Permanent employees of Pure Air will require housing, but will not place a large demand on the real estate market.

4.5.2.1 Transportation

The addition of from 110 to 120 vehicle-trips on a 24-hour basis will not impact the existing vehicular network. All vehicles associated with operation of the AFGD system will be requested to enter the Bailly Station property from the west on U.S. Route 12 in order to avoid increased traffic in the National Lakeshore. Parking will be easily accommodated on-site on a permanent basis.

4.5.2.2 Noise

Because of the industrial nature of the Bailly Station area and the distance to sensitive noise receptors, the net increase in area noise will be imperceptible. The results of an area sound level survey conducted in October, 1989, indicate that sound levels in the Bailly Station area vary from approximately 47 to 63 dBA, depending on location. Sound levels in the area as a result of AFGD system operation are expected to increase less than 1 dBA. As indicated, this level is considered imperceptible and also cannot be accurately measured in the field.

4.5.2.3 Visual

In all likelihood, because of appropriate painting, the AFGD system will be perceived as visually blending with the other structures on-site at the Bailly Station. The only exception may be the new stack that will be required for operation of the system. The new stack height will be approximately 480 feet or less to ensure a successful and environmentally sound operation. Operation of the new stack also may produce a visible steam plume characteristic of FGD systems, in particular during cold weather.

4.6 ENERGY AND MATERIALS RESOURCES IMPACTS

4.6.1 Construction

During the construction phase of the AFGD system heavy construction equipment as well as construction materials such as steel, cement and concrete will be needed. Electrical connections and other auxiliaries will be necessary. Power will be supplied from the existing Bailly Generating Station. Temporary structures and warehousing will be erected to accommodate the equipment and materials necessary during construction.

4.6.2 Operation

Limestone, hydrated lime and coal will be the main raw materials and gypsum will be the by-product from the AFGD system. The raw materials to be consumed and gypsum produced for this project have been estimated as follows:

Estimated Annual Consumption

Coal	1,300,000 tons/yr
Limestone	124,000 tons/yr
Hydrated Lime	1,451 tons/yr

Estimated Annual Production

Gypsum	220,000 tons/yr

In addition, water and electricity will be required for AFGD system operation as follows:

Estimated Average Consumption

Process water	770 gallons per minute
Electrical usage	8.25 MW

Projected Emergency Consumption

Fire water	500 gallons per minute
Quenching water	4,500 gallons per minute

The annual estimates are based on an estimated capacity factor of 65 percent and an operating coal with 3.1 weight percent sulfur. The average and emergency water and electricity consumption estimates are based on the AFGD system design coal with a 4.51 weight percent sulfur.

Limestone will be used as an absorbent. It is inexpensive and widely available: 46 of the 50 states produce limestone. Depending on market condition and availability, limestone can be acquired from one of the main limestone producers (Illinois, Ohio, Michigan or Indiana).

Hydrated lime will be used intermittently in the AFGD system to control absorber chemistry upsets. These upsets are expected to occur infrequently and estimated at once every 1 to 2 months. Hydrated lime also will be used to neturalize the filtrate from the gypsum centrifuges in the gypsum by-product handling area. Hydrated lime is readily available throughout the United States and will be purchased from a source near the Bailly Station.

Lake Michigan will serve as the source for the additional water necessary for the AFGD system.

SECTION 5.0

PROJECT MITIGATION MEASURES

Section 5.0 of the EMP focuses on the mitigation measures to be implemented to minimize the impacts on the environmental disciplines described in Section 4.0 Consequences (Impacts) of the Project. Mitigation measures are described for both construction and operation.

The description of mitigation measures presented below is based on information presented in the EIV and the EA, and reflects current design.

Because the AFGD system will be installed in a heavily industrialized area, no significant Environmental, Health, Safety and Socioeconomic (EHSS) impacts are expected during the construction and operation of the system, other than the beneficial impact of the reduction of SO_2 emissions. However, the mitigation measures discussed will be implemented for the indicated areas to minimize potential impacts.

In addition to improved air quality, implementation of the demonstration program will create permanent employment and produce a potentially saleable by-product (gypsum). More importantly, however, the successful operation of the system will substantially reduce a precursor of acid rain with a technology applicable at other locations throughout the United States.

5.1 ATMOSPHERIC RESOURCES MITIGATION MEASURES

During construction all applicable regulations and good engineering practice will be followed to minimize fugitive dust emissions, including no open burning.

The AFGD system will reduce SO_2 emissions to the environment during normal operations, thus enhancing air quality. When not on-line or during an upset condition, stack emissions will be redirected to the

existing stack, thus avoiding an unexpected impact on ground-level concentrations. This mitigation measure will be accommodated in the system design.

The AFGD system's limestone and hydrated lime reagents will be stored in silos with bin vent filters to minimize fugitive emissions. In addition, some hydrated lime will be stored in bags in the dewatering building. The by-product gypsum will be stored in a completely enclosed building. Fly ash will be stored in the existing Bailly Station fly ash silo prior to removal from the site.

Bulk loading of limestone, hydrated lime and by-product gypsum will be done with enclosed transfer systems, minimizing fugitive emissions from these activities. Trucks transporting limestone, hydrated lime or by-product gypsum will be enclosed or covered, further minimizing on-site emissions to the atmosphere. Fugitive emissions resulting from vehicular traffic will be further controlled by a weekly water flushing of the Bailly Station's paved roadways.

5.2 LAND RESOURCES MITIGATION MEASURES

During construction, the primary impact on land use in the immediate area may result from the occasional increase in sound levels resulting from this activity.

The site is sufficient to absorb parking for the work force in existing and planned permanent parking areas. During operation the increase in traffic from trucks and the work force will not significantly impact traffic flow, because of the existing capacity of the road network; therefore, no mitigation measures are planned.

Disposal of ash and other solid wastes will be in appropriately designated landfill areas. Thus, mitigation measures are not required for this aspect of the project.

Finally, compliance with zoning requirements and the remote location of the AFGD system within a highly industrialized area will mitigate any significant impact of construction and operation of the AFGD system.

5.3 WATER RESOURCES MITIGATION MEASURES

As part of construction, a soil erosion and sedimentation control plan will be implemented. It incorporates features such as treating open areas to avoid erosion of these areas by wind and precipitation runoff. Any spills will be cleaned up immediately. These procedures will eliminate contaminating surface and ground water resources. Additionally, any excessive surface runoff will be directed to a stormwater collection system, construction areas will be closed and graded upon completion of construction, and most of the immediate AFGD project area will be stoned.

Small quantities of office waste materials, resulting from normal operations, will be stored in covered containers or trash bins to minimize potential contamination of surface water. These materials will consist primarily of paper, cardboard boxes, plastic bags, small cans, bottles and jars, light bulbs, food scraps and floor sweepings. Subsequently they will be disposed by a contract hauler.

The ash generated from the AFGD system will be placed in an existing storage silo prior to removal from the site for disposal. Any material spilled around the silo will be removed to avoid potential contamination of surface and ground water, as is current practice.

Limestone, hydrated lime and gypsum also will be stored in either silos or a building (hydrated lime and gypsum) to prevent run-off to the surrounding area. Any material spilled around these structures will be collected and returned to the system to avoid potential contamination of surface and groundwater.

The WES will be designed to evaporate part of the wastewater from the process, and result in lower wastewater discharges from the process. Provisions will be made to dispose of the remainder of the process wastewater under a modification of the existing Bailly Station NPDES permit in order to protect the water quality of the area.

5.4 ECOLOGICAL RESOURCES MITIGATION MEASURES

No major impacts of construction or operation of the AFGD system are projected for the negligible ecological resources of the Bailly Station. The mitigating measures specified in Section 5.3 to protect water resources will also protect aquatic resources.

5.5 SOCIOECONOMIC RESOURCES MITIGATION MEASURES

No mitigation measures are proposed for socioeconomic impacts, since no significant impacts are projected during construction and operation of the AFGD system. The AFGD system is viewed as a benefit to the area's socioeconomic setting.

5.6 ENERGY AND MATERIALS RESOURCES MITIGATION MEASURES

The generation of electrical power is by nature consumptive of natural resources. However, the production of a useful by-product, gypsum, constitutes a mitigation of this overall activity. A large portion of the SO_2 in the stack gas will be converted to a saleable by-product. Finally, the plant will gain the flexibility of burning a widely available high-sulfur coal, while lowering SO_2 emissions from their present levels.

SECTION 6.0

ENVIRONMENTAL MONITORING

The environmental monitoring program for the AFGD system addresses the three classes of monitoring during preconstruction, construction, and operation/demonstration phases of the project. These monitoring activities are briefly described below in general terms. More detailed information on AFGD project environmental monitoring follows the general discussion for each class of monitoring. The three classes of environmental monitoring for the AFGD system, the associated environmental media, sampling locations, parameters, and frequency of sampling are summarized in Tables 6.0-1, 6.0-2, and 6.0-3. It should be noted that the environmental monitoring activities are based on expected project needs and current regulatory agency requirements. If these project needs and regulatory agency requirements change, the EMP will be revised or amended to reflect the change.

The three classes of environmental monitoring are as follows:

1. Class I Monitoring, Environmental Baseline or Characterization Monitoring

   Class I monitoring activities address the environmental characteristics of the AFGD project and associated operations of the Bailly Generating Station. This monitoring will be designed to develop information for the identification, assessment and mitigation of potential environmental problems associated with replication of the AFGD process. Monitoring activities to support this objective will include measurements of feedstocks (coal, limestone, hydrated lime), operating conditions, information on discharges (air emissions, wastewater, solid waste), ambient environmental conditions, and impacts on worker industrial hygiene. For the AFGD project, baseline environmental monitoring activities are shown in Table 6.0-1.

TABLE 6.0-1

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

ENVIRONMENTAL CHARACTERIZATION MONITORING
(CLASS I MONITORING)

Environmental Media	Sampling Location	Parameters	Frequency
Solid			
Coal Solid	Coal Used for APC-200 Test[a]	NO_3, SO_3, CO_3, Proximate Analysis-% (Moisture, Volatiles, Fixed Carbon, Ash), Ultimate Analysis-% (S, H, C, N, O, Btu/lb as received, Btu/lb dry), General/Metals[b], Radioactivity[c]	1 - During APC-200 Test and 1 - During AFGD System Operation with Similar Coal Used for APC-200 Test
Coal Solid	Coals Used During Demonstration Period	% S, SO_3	1 - Each Coal with Different Sulfur Content During AFGD System Operation
Raw Limestone	Limestone Used for APC-200 Test	NO_3, SO_3, CO_3, Particle Size Distribution, General/Metals, Radioactivity	1 - During APC-200 Test and 1 - During AFGD System Operation with Similar Limestone Used for APC-200 Test
Raw Hydrated Lime	Hydrated Lime Silo Outlet	NO_3, SO_3, CO_3, General/Metals, Radioactivity	1 - During AFGD System Operation

TABLE 6.0-1 (CONTD)

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

ENVIRONMENTAL CHARACTERIZATION MONITORING
(CLASS I MONITORING)

Environmental Media	Sampling Location	Parameters	Frequency
Gypsum	Gypsum	General/Metals, $CaSO_4 \cdot 2H_2O$, $CaSO_3 \cdot 1/2H_2O$, SiO_2, Fe_2O_3, R_2O_3 (other metal oxides), pH, Free H_2O, Radioactivity, Corrosivity, Ignitability, Reactivity, Toxicity Characteristic Leaching Procedure (TCLP) Test[d], Indiana Neutral Leaching Method Test[e], Total Water Soluble Salts, Mean Particle Size	1 - During APC-200 Test and 1 - During AFGD System Operation with Similar Coal Used for APC-200 Test
Gypsum	Gypsum without WES in Operation[f]	$CaSO_4 \cdot 2H_2O$, $CaSO_3 \cdot 1/2H_2O$, SO_4, Sulfide as S	1 - During AFGD System Operation with Each Different Sulfur Content Coal
Gypsum	Gypsum with WES in Opeation[f]	$CaSO_4 \cdot 2H_2O$, $CaSO_3 \cdot 1/2H_2O$, SO_4, Sulfide as S	1 - During AFGD System Operation with Each Different Sulfur Content Coal
Ash	Ash From APC-200 Test	General/Metals, Radioactivity, Corrosivity, Ignitability, Reactivity, TCLP Test, Indiana Neutral Leaching Method Test	1 - During APC-200 Test

TABLE 6.0-1 (CONTD)

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

ENVIRONMENTAL CHARACTERIZATION MONITORING
(CLASS I MONITORING)

Environmental Media	Sampling Location	Parameters	Frequency
Ash	Ash Storage Silo without WES in Operation	General/Metals, Corrosivity, Ignitability, Reactivity, TCLP Test, Indiana Neutral Leaching Method Test, Radioactivity, $CaCl_2$, $Ca(OH)_2$, $MgCl_2$, $CaSO_4 \cdot 2H_2O$, CaF_2	1 - During AFGD System Operation with Similar Coal Used for APC-200 Test
Ash	Ash Storage Silo with WES in Operation	General/Metals, Corrosivity, Ignitability, Reactivity, TCLP Test, Indiana Neutral Leaching Method Test, Radioactivity, $CaCl_2$, $Ca(OH)_2$, $MgCl_2$, $CaSO_4 \cdot 2H_2O$, CaF_2	1 - During AFGD System Operation with Similar Coal Used for APC-200 Test
Ash	Ash Storage Silo without WES in Operation	$CaSO_4 \cdot 2H_2O$, SO_4 Sulfide as S	1 - During AFGD System Operation with Each Different Sulfur Content Coal
Ash	Ash Storage Silo with WES in Operation	$CaSO_4 \cdot 2H_2O$, SO_4 Sulfide as S	1 - During Testing with Each Different Sulfur Content Coal

TABLE 6.0-1 (CONTD)

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

ENVIRONMENTAL CHARACTERIZATION MONITORING
(CLASS I MONITORING)

Environmental Media	Sampling Location	Parameters	Frequency
Wastewater	AFGD System Wastewater Treatment Facility Influent	Sulfate	1 - During AFGD System Operation with Each Different Sulfur Content Coal
Wastewater	AFGD System Wastewater Treatment Facility Effluent	General/Metals, pH, Flow, TSS, Oil and Grease, TDS	1 - During AFGD System Operation With Similar Coal Used For APC-200 Test
Wastewater	AFGD System Wastewater Treatment Facility Effluent	Sulfate	1 - During AFGD System Operation With Each Different Sulfur Content Coal
Air			
Air Emissions	Bailly Station Stack	SO_2, Opacity, Particulate Matter	Daily Coal Analysis, Continuous, Once in 1990, 1992 and 1994
Air Emissions	AFGD System Stack Without WES in Operation	Air Metals[9], Unburned Hydrocarbons, Particle Size Distribution, Particulate Matter, NO_x, SO_3/H_2SO_4	1 - During AFGD System Operation with Coal Used for APC-200 Test

TABLE 6.0-1 (CONTD)

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

ENVIRONMENTAL CHARACTERIZATION MONITORING
(CLASS I MONITORING)

Environmental Media	Sampling Location	Parameters	Frequency
Air Emissions	AFGD System Stack with WES in Operation	Air Metals, Unburned Hydrocarbons, Particle Size Distribution, Particulate Matter, NO_x, SO_3/H_2SO_4	1 - During AFGD System Operation with Similar Coal Used For APC-200 Test
Air Emissions	AFGD System Stack without WES in Operation	SO_2, SO_3/H_2SO_4	1 - During AFGD System Operation with Each Different Sulfur Content Coal
Air Emissions	AFGD System Stack with WES in Operation	SO_2, SO_3/H_2SO_4	1 - During AFGD System Operation with Each Different Sulfur Content Coal
Air Emissions (Flue Gas)	Before AFGD System Absorber Vessel without WES in Operation	Air Metals, Unburned Hydrocarbons, Particle Size Distribution, Particulate Matter, NO_x, SO_3/H_2SO_4	1 - During AFGD System Operation with Similar Coal Used for APC-200 Test
Air Emissions (Flue Gas)	Before AFGD System Absorber Vessel with WES in Operation	Air Metals, Unburned Hydrocarbons, Particle Size Distribution, Particulate Matter, NO_x, SO_3/H_2SO_4	1 - During AFGD System Operation with Similar Coal Used for APC-200 Test
Air Emissions (Flue Gas)	Before AFGD System Absorber Vessel without WES in Operation	SO_2, SO_3/H_2SO_4	1 - During AFGD System Operation with Each Different Sulfur Content Coal

TABLE 6.0-1 (CONTD)

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

ENVIRONMENTAL CHARACTERIZATION MONITORING
(CLASS I MONITORING)

Environmental Media	Sampling Location	Parameters	Frequency
Air Emissions (Flue Gas)	Before AFGD System Absorber Vessel with WES in Operation	SO_2, SO_3/H_2SO_4	1 - During AFGD System Operation with Each Different Sulfur Content Coal
Sound	Locations on Bailly Station Property and Surrounding Area (including National Lakeshore)	dBA, Leq, Octave Band Spectrum	1 to 2 Times Depending on Location during Daytime and Nighttime

Footnotes: a. The APC-200 test is a pilot plant operation at the Hiroshima Research and Development Center in Hiroshima, Japan. The test was designed to model typical flue gas process conditions for the Bailly Generating Station AFGD project using typical coal and limestone. The test was conducted in March, 1990.

b. General/Metals consists of the following: Al, Sb, As, Ba, B, Be, Cd, Ca, Cl, Cr, Co, Cu, Cn, F, Fe, Pb, Li, Mg, Mn, Hg, Mo, Ni, K, Se, Ag, Na, SO_4, Sulfide as S, Sn, Ti, U, V, and Zn.

c. Radioactivity analyses consists of gross alpha and beta, lead-210, polonium-210, radium-226, radon-222, and thorium-230.

d. TCLP Test analyses include As, Ba, Cd, Cr, Pb, Hg, Se, and Ag.

TABLE 6.0-1 (CONTD)

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

ENVIRONMENTAL CHARACTERIZATION MONITORING
(CLASS I MONITORING)

Footnotes: (Contd)

e- Indiana Neutral Leaching Method Test is the TCLP Test without the addition of acetic acid and includes the analyses for the following: Ba, B, Cl, Cu, Cn, F, Fe, Mn, Ni, Phenols, Na, SO_4, Sulfide as S, TDS, Zn, and pH.

f- Where environmental characterization monitoring is indicated without or with the WES, this monitoring is contingent on operation of the WES. The project will proceed with monitoring environmental media without and with the WES when the Station is utilizing the base or normal sulfur content coal and the first different sulfur content coal for the parameters indicated in Table 6.0-1. If there are no significant differences in the analytical results, the project will propose terminating the analyses of appropriate environmental media either without or with the WES for the remaining sulfur content coals. Subsequent monitoring will then be contingent on the operation of the WES as previously indicated.

g- Air metals consists of the following: Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, and Zn.

TABLE 6.0-2
PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

COMPLIANCE ENVIRONMENTAL MONITORING
(CLASS II MONITORING)

Environmental Media	Sampling Location	Parameters	Frequency[a]
Solid			
Coal Solid	Bunkered Coal	% S, % Ash, Btu/lb Dry	Daily
Gypsum	Gypsum Storage Area	To Be Determined if Considered a Waste Material, But May Include General/Metals[b], Radioactivity[c], Corrosivity, Ignitability, Reactivity, TCLP Test[d], Indiana Neutral Leaching Method Test[e]	To Be Determined By Regulatory Agency Requirements
Ash	Ash Storage Silo	To Be Determined By Regulatory Agency Requirements, and Method of Disposal But May Include: General/Metals, Radioactivity, Corrosity, Ignitability, Reactivity, TCLP Test, Indiana Neutral Leaching Method Test	To Be Determined By Regulatory Agency Requirements
Wastewater Treatment System Solids	AFGD System Wastewater Treatment System	To Be Determined By Regulatory Agency Requirements and Method of, Disposal, But May Include: General/Metals, Radioactivity, Corrosivity, Ignitability, Reactivity, TCLP Test, Indiana Neutral Leaching Method Test	To Be Determined By Regulatory Agency Requirements

TABLE 6.0-2 (CONTD)
PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

COMPLIANCE ENVIRONMENTAL MONITORING
(CLASS II MONITORING)

Environmental Media	Sampling Location	Parameters	Frequency[a]
Liquid			
Wastewater	Bailly Station Main Discharge (Outfall 001)	Flow, Temperature, Total Residual Chlorine, Duration and Frequency of Chlorination, Chloride, TDS, Sulfate, Fluoride, pH	Varies From Daily, Two Times Weekly to Monthly Depending on the the Parameter
Wastewater	Bailly Station Sewage Treatment Facility Discharge (Outfall 201)	Flow, BOD_5, Fecal Coliform, Total Residual Chlorine	Varies From Two Times Weekly to Weekly
Wastewater	AFGD System Wastewater Treatment Facility Influent	Flow, TSS, Oil and Grease, Chloride TDS, Sulfate, Fluoride	Varies From Two Times Weekly to Monthly
Wastewater	AFGD System Wastewater Treatment Facility Effluent (Outfall 401)	Flow, TSS, Oil and Grease, Chloride, TDS, Sulfate, Fluoride	Varies From Two Times Weekly to Monthly
Air			
Air Emissions	Bailly Station Stack	SO_2, Opacity, Particulate Matter	Daily Coal Analysis, Continuous, Once in 1990, 1992 and 1994
Air Emissions	Bailly Station Units No. 7 and 8 Inlet Ducts to AFGD System	Opacity	Continuous

TABLE 6.0-2 (CONTD)
PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

COMPLIANCE ENVIRONMENTAL MONITORING
(CLASS II MONITORING)

Environmental Media	Sampling Location	Parameters	Frequency[a]
Air Emissions	Bailly Station Units No. 7 and 8 Combined Inlet Duct to AFGD System	SO_2, % O_2 or CO_2	Continuous
Air Emissions	AFGD System Stack	SO_2, % O_2 or CO_2, Particulate Matter	Continuous, Once in 1992 and 1994

Footnotes: [a] The frequency of sampling will be set by permit conditions. Therefore, the indicated frequency should be considered preliminary until appropriate permits are issued.

[b] General/metals consists of the following: Al, Sb, As, Ba, B, Be, Cd, Ca, Cl, Cr, Co, Cu, Cn, F, Fe, Pb, Li, Mg, Mn, Hg, Mo, Ni, K, Se, Ag, Na, SO_4, Sulfide as S, Sn, Ti, U, V, and Zn.

[c] Radioactivity analyses consists of gross alpha and beta, lead-210, polonium-210, radium-226, radon-222, and thorium-230.

[d] TCLP Test analyses include As, Ba, Cd, Cr, Pb, Hg, Se, and Ag.

[e] Indiana Neutral Leaching Method Test is the TCLP Test without the addition of acetic acid and includes the analyses for the following: Ba, B, Cl, Cu, Cn, F, Fe, Mn, Ni, Phenols, Na, SO_4, Sulfide as S, TDS, Zn, and pH.

TABLE 6.0-3

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

SUPPLEMENTAL ENVIRONMENTAL MONITORING
(CLASS III MONITORING)

Environmental Media	Sampling Location	Parameters	Frequency[a]
Sound	Locations on Bailly Station Property and Surrounding Area (including National Lakeshore)	dBA, Leq, Octave Band Spectrum	1 - Before and 1 or 2 - After AFGD System Start-up[a]

Footnote:[a]- Sound level surveys will be conducted before and after AFGD system start-up. If the after start-up survey is not conducted during a time (Fall or Winter) when vegetation and insect noise are less likely to interfere with sound level measurements, a second after start-up survey will be conducted. This survey will be done at the earliest possible date after start-up, at a time that is consistent with AFGD system operations.

2. Class II Monitoring, Compliance Monitoring

Class II monitoring will be the monitoring that is required by federal, state and local governments to satisfy statutes and regulations concerning the environment, occupational and public health and safety, and permits. Compliance monitoring activities for the AFGD project are shown in Table 6.0-2.

3. Class III Monitoring, Supplemental Environmental Impact Monitoring

Class III monitoring addresses the potential need to identify and quantify environmental impacts not included in Class I and II monitoring activities. Supplemental environmental monitoring activities for the AFGD project are shown in Table 6.0-3 and are limited to sound level measurements before and after AFGD system start-up.

The aforementioned classes of environmental monitoring are based on the classes specified in DOE's document, "Environmental Guidance Manual for Innovative Clean Coal Technology Program Selectees". However, DOE verbally commented to the AFGD project team that a two class scheme of environmental monitoring activities could be used: Class I (compliance monitoring) and Class II (supplemental monitoring). Class I monitoring in this scheme is the same as Class II monitoring (compliance monitoring) used in this EMP; whereas, Class II includes the EMP Class I (environmental baseline or characterization monitoring) and Class III (supplemental monitoring) monitoring activities.

6.1 BASELINE STUDIES (ENVIRONMENTAL CHARACTERIZATION FOR CLASS I MONITORING)

6.1.1 INTRODUCTION

Prior to construction and during operation of the AFGD system, studies will be conducted to develop an information base to identify, assess and mitigate potential environmental problems. This category of monitoring involves both environmental and engineering studies or operating performance tests.

6.1.2 ENVIRONMENTAL STUDIES

The focus of the baseline environmental studies has been the EIV and EA. As part of the development of the EIV and EA for the AFGD project, existing environmental conditions were described for the Bailly Station and surrounding area. Information was obtained on several disciplines described in Section 3.0 Existing Environment.

Based on process and other information, predictions were made on the impact of the AFGD project on the area environment and appropriate mitigation measures were developed. The potential impacts and mitigation measures were described in Section 4.0 Consequences (Impacts) of the Project and Section 5.0 Project Mitigation Measures, respectively.

6.1.3 OPERATING PERFORMANCE TESTS

During the baseline monitoring studies the engineering phase will utilize both information on the Bailly Station and the AFGD system (Table 6.0-1). Tests will be conducted to identify limitations of the AFGD process and operating parameters that may affect environmental discharges and other aspects of the environment. The information from these tests will be related to historical as well as then operating conditions of the Bailly Station.

6.1.3.1 Bailly Station Operating Conditions

Several Bailly Station operating conditions will be examined based on existing information. These include primarily those associated with air emissions, wastewater discharges, solid waste disposal, and ESP performance. This information will be compared with information obtained during compliance monitoring in order to determine the impact of the AFGD system on Bailly Station operations.

Tables 6.1-1 and 6.1-2 show the Station's existing monitoring requirements for air emissions and the wastewater discharges which will be impacted by the AFGD system. Air emissions are currently monitored for SO_2, particulate matter and opacity. Wastewater at the main discharge in Lake Michigan (Outfall 001) is monitored for flow, temperature, total residual chlorine, and duration and frequency of chlorination; whereas, at the internal discharge for the sewage treatment plant (Outfall 201) monitoring is for flow, BOD_5, fecal coliform and total residual chlorine. Additional details are provided on the existing monitoring requirements for air emissions and wastewater discharges in Section 6.2 Compliance Monitoring (Class II Monitoring).

The only process waste generated at the Bailly Station is fly ash from the ESP's. This ash is sold to a broker for resale for beneficial use or for disposal. Thus, the Station does not routinely analyze the ash. However, if appropriate data is available during baseline monitoring, it will be incorporated in the monitoring program for comparison with compliance monitoring.

6.1.3.2 Process Operating Conditions

Numerous AFGD operating conditions will be monitored. These will include solid or liquid samples, as appropriate, which will be analyzed for the parameters indicated in Table 6.0-1. The sample media will include the following:

- raw coal;
- limestone and hydrated lime reagents, and
- process makeup water.

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

BAILLY STATION EXISTING STACK IDEM, OAM
PERMIT LIMITS FOR OPERATION OF AIR POLLUTION CONTROL FACILITIES

Parameter	Permit Limits	Monitoring Frequency	Averaging Approach	Monitoring Method/Location	Permit Expiration Date
SO_2 (lb/MMBTU)	6.0	Daily	30-day rolling weighted average	Bunked or as burned coal, or natural gas [a]	July 1, 1992
NO_x (lb/MMBTU)	None	None	None	None	None
Particulate Matter (lb/MMBTU)	0.22	Once each during calendar years 1990 and 1992[c]	N/A	EPA Method 5, Stack	July 1, 1992
Opacity (%)	40 [b]	Continuous	All periods 40% on a 6-minute average basis	CEM, Stack	July 1, 1992

Footnotes:

a - Coal samples are analyzed for heat content, and % sulfur, ash and moisture.

b - Temporary exemptions are allowed for opacity during boiler startups and shutdowns. During boiler start-ups an exemption from the 40% opacity limit is allowed for up to 10 (ten) six-minute average periods or until the flue gas temperature entering the electrostatic precipitator reaches 250 degrees F, which ever occurs first. During boiler shutdowns an exemption from the 40% opacity limit is allowed for up to 10 (ten) six-minute average periods.

c - The existing Bailly Station Operation Permit specifies that for particulate matter monitoring, "The first test shall be performed during calendar year 1990 with another test to be performed during calendar year 1992."

TABLE 6.1-2

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

BAILLY STATION PERMIT LIMITS AND MONITORING REQUIREMENTS
FOR WASTEWATER DISCHARGES PRIOR TO NPDES PERMIT MODIFICATION [a]

	Permit Limits		Measurement Frequency	Sample Type
	Monthly Average	Daily Maximum		
Outfall 001 (Main Outfall)				
Flow (MGD)	Report	Report	Daily	24-Hr Total
Temperature (°F)	Report	Report	Daily	Continuous
Total Residual Chlorine (mg/l)	N/A [b]	0.2	During Discharge of Chlorine Bearing Wastewater	Grab
Duration of Chlorination (Hrs)	N/A	N/A	Monthly Report	Hrs
Chlorination Frequency	N/A	N/A	Monthly Report	Frequency
Outfall 201 (Sewage Treatment Plant)				
Flow (MGD)	Report	Report	Weekly	24-Hr Total
BOD_5 (mg/l)	30	45	Weekly	8-Hr Composite
Fecal Coliform (per 100 ml)	N/A	400	Weekly	Grab
Total Residual Chlorine (mg/l)	N/A	2.0	2 x Weekly	Grab

Footnotes: [a] - The indicated permit conditions were in effect from November 1, 1988 until midnight March 31, 1990.

[b] - N/A indicates no applicable limit.

During the 3-year demonstration period, Indiana-Illinois coals with different sulfur contents will be used to test operation of the AFGD system on these different coals. Because sulfur is the main parameter of concern, each coal will be tested for percent sulfur and SO_3 as shown in Table 6.0-1.

6.1.3.3 Environmental Emissions and Discharges

Sound levels, potential solid wastes, wastewater discharges and air emissions also will be analyzed for the parameters indicated in Table 6.0-1. The sample parameters will include the following:

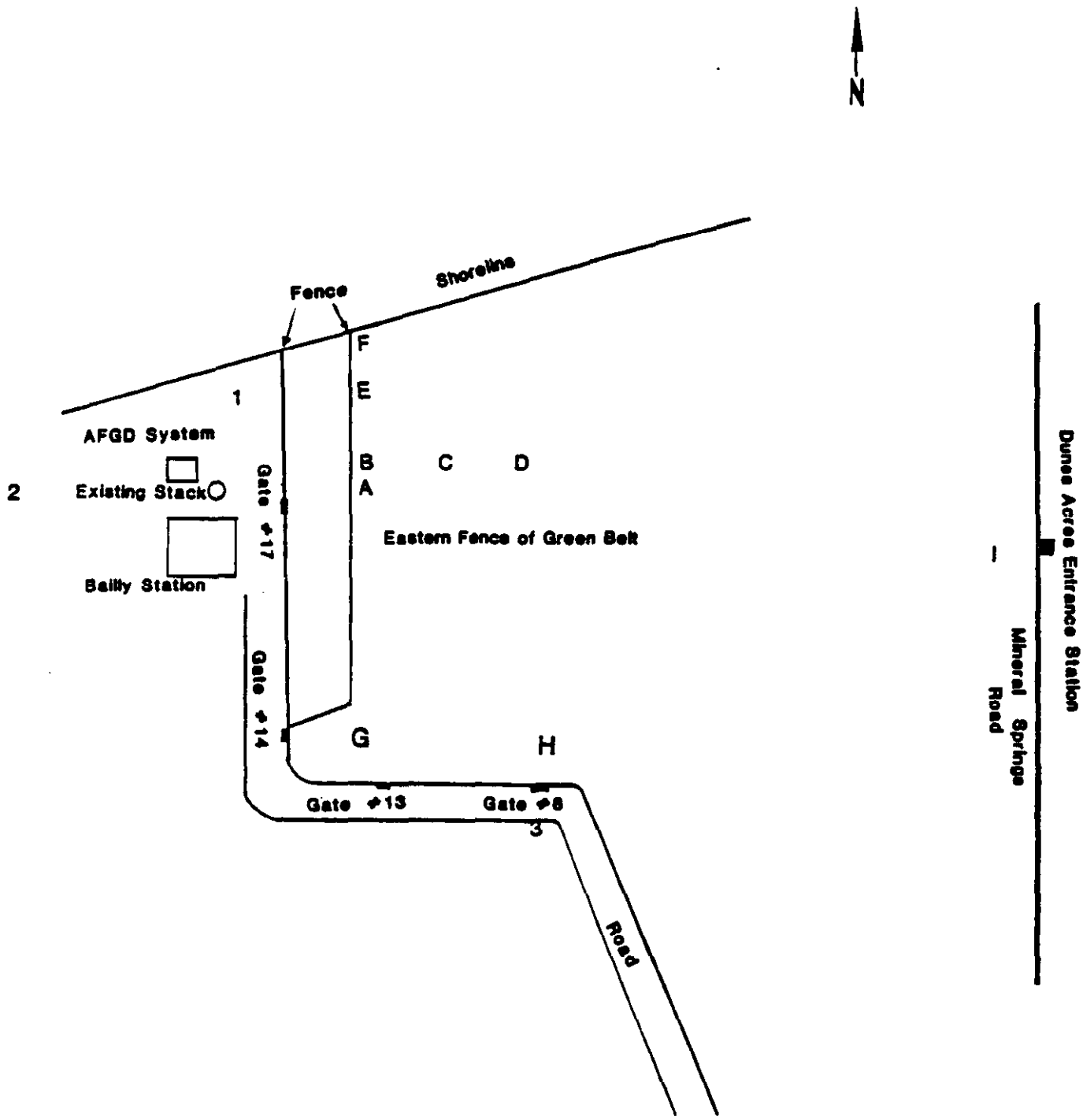
Sound Levels

° sound levels on Bailly Station property and surrounding area (this monitoring activity was conducted at the locations shown in Figure 6.1-1 and described in Table 6.1-3 during February, April and October, 1989).

Solid Wastes

° gypsum from APC-200 test, and during AFGD system operation with similar coal used for APC-200 test and coals with different sulfur content, and

° ash from APC-200 test, and during AFGD system operation with and without WES in operation when using similar coal to that used for APC-200 test and coals with different sulfur content.



Notes:

1. Figure Not to Scale.

2. Sound-Level Measurement Locations 4 (Along U.S. Route 12) and 5 (Bailly Homestead) Are Not Shown on the Figure.

Pure Air a joint venture company ADVANCED FLUE GAS DESULFURIZATION
Sound-Level Measurement Locations
Figure 6.1-1 1/91

TABLE 6.1-3

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

SOUND LEVEL MONITORING STATIONS[a]

Monitoring Station	Station Description	Monitoring Period	Frequency[b]	Parameters
1	Northeast of Station, approx. 102 ft west of western greenbelt fence, 360 ft northwest of support steel for Unit No. 7 ductwork on northeast corner.	April	Daytime	Leq[c], Octave Band Spectrum[d]
			Nighttime	Leq, Octave Band Spectrum
		October	Daytime	Leq, Octave Band Spectrum
			Nighttime	Leq, Octave Band Spectrum
2	At Station/Bethlehem Steel Plant property line	April	Daytime	Leq, Octave Band Spectrum
			Nighttime	Leq, Octave Band Spectrum
3	Across from gate #8, 50 ft from western greenbelt fence	April	Daytime	Leq, Octave Band Spectrum
			Nighttime	Leq, Octave Band Spectrum
		October	Daytime	dBA[e], Leq, Octave Band Spectrum
			Nighttime	dBA, Leq, Octave Band Spectrum
4	1.5 miles from Station along U.S. Route 12	February	Nighttime	Leq
		April	Daytime	Leq, Octave Band Spectrum
			Nighttime	Leq, Octave Band Spectrum

TABLE 6.1-3 (CONTD)

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

SOUND LEVEL MONITORING STATIONS[a]

Station	Station Description	Monitoring Period	Monitoring Frequency[b]	Parameters
5	2 miles from Station at Bailly Homestead	February	Daytime	Leq
			Nighttime	Leq
		April	Daytime	Leq, Octave Band Spectrum
			Nighttime	Leq, Octave Band Spectrum
A	Across from existing stack, 15 ft east of eastern greenbelt fence on area below crest of hill on flat area. Hill slopes down to north and A is about 50-75 ft from hill crest facing north	October	Daytime	dBA, Octave Band Spectrum
			Nighttime	dBA, Octave Band Spectrum
B	130 ft north of A, 15 ft east of eastern greenbelt fence on back side of hill facing east	October	Daytime	Leq, Octave Band Spectrum
			Nighttime	Leq, Octave Band Spectrum

TABLE 6.1-3 (CONTD)

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

SOUND LEVEL MONITORING STATIONS[a]

Station	Station Description	Monitoring Period	Monitoring Frequency[b]	Parameters
C	375 ft east of B on top of hill	October	Daytime	dBA, Octave Band Spectrum
			Nighttime	dBA, Octave Band Spectrum
D	About 500 ft east of C on flat area on western side of hill facing Station, 125 ft from crest of hill to east	October	Daytime	Leq, Octave Band Spectrum
			Nighttime	Leq, Octave Band Spectrum
E	About 450 ft north of B across from 1. On downward slope of hill facing Station 100 ft below crest of hill to east. 15 ft east of eastern greenbelt fence.	October	Daytime	dBA, Octave Band Spectrum
			Nighttime	dBA, Octave Band Spectrum
F	About 250 to 300 ft north of E. 15 ft east of eastern greenbelt fence at base of sand dunes to south. Area turns from forest to grassy area until it reaches Lake Michigan.	October	Daytime	dBA, Octave Band Spectrum
			Nighttime	dBA, Octave Band Spectrum

TABLE 6.1-3 (CONTD)

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

SOUND LEVEL MONITORING STATIONS[a]

Station	Station Description	Monitoring Period	Monitoring Frequency[b]	Parameters
G	180 ft south of gate #14 along curving fence, then 221 ft northeast to area on south facing downslope side of small hill. Crest of hill towards Station about 100 ft to north	October	Daytime	dBA, Octave Band Spectrum
			Nighttime	dBA, Octave Band Spectrum
H	Across from gate #8 about 40 ft from western greenbelt fence	October	Daytime	dBA, Octave Band Spectrum
			Nighttime	dBA, Octave Band Spectrum
I	About 100 ft west from the Dune Acres entrance Station (Mineral Springs Road) on Cowles Bog Area Trail in long flat area.	October	Daytime	Leq, Octave Band Spectrum
			Nighttime	Leq, Octave Band Spectrum

TABLE 6.1-3 (CONTD)

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

SOUND LEVEL MONITORING STATIONS[a]

Footnotes:

a - The sound level monitoring periods during 1989 were as follows: February 21, April 17 to 18 and October 29 to 31.

b - The monitoring frequency varied from one to two times for each station per monitoring period for both daytime and nighttime.

c - dBA measurements at 10 second intervals for 20 minute periods were used to calculate equivalent sound levels or Leq.

d - Sound level measurements were made for the octave band spectrum with center frequencies of 31.5, 62, 125, 250, 500, 1,000, 2,000, 4,000 and 8,000 Hertz (Hz).

e - For the indicated stations, the lowest A-weighted sound level (dBA) measurements were recorded during a 1-minute period at the beginning and end of each designated sampling.

Wastewater Discharges

- Bailly Station Main Outfall 001 prior to AFGD system start-up, and during AFGD system operation with different sulfur content coals;

- Bailly Station Sewage Treatment Facility Discharge Outfall 002 prior to AFGD system start-up, and

- AFGD system wastewater before and after wastewater treatment facility during AFGD system operation with different sulfur content coals.

Air Emissions

- Bailly Station stack before AFGD system start-up;

- AFGD system stack without WES in operation with different sulfur content coals;

- AFGD system stack with WES in operation with different sulfur content coals;

- Flue gas before AFGD system absorber vessel without WES in operation with different sulfur content coals, and

- Flue gas before AFGD system absorber vessel with WES in operation with different sulfur content coals.

For both the monitoring of wastewater discharges and air emissions, the sampling methods and types will be the same as those described for compliance monitoring in Section 6.2. The parameters selected for monitoring are based on the following:

1. Parameters which are not required to be monitored by regulatory agencies;

2. Parameters which have been analyzed in similar studies;

3. Parameters which are analyzed as part of the APC-200 test and followed through various environmental media using coal typical of that currently burned at the Bailly Station, and

4. Parameters that could be affected in various environmental media when different sulfur content coals are used.

6.1.4 SCHEDULE

6.1.4.1 Duration

Environmental characterization sampling will be initiated before start-up of the AFGD system and will continue for the 3-year demonstration period, depending on the environmental media to be sampled as follows:

- February, April and October, 1989: Sound Surveys on Bailly Station and surrounding area as indicated above;

- March, 1990 through January, 1991: APC-200 test and analyses with coal, limestone, ash and gypsum;

- Spring, 1990 to Spring or Summer, 1992: Bailly Station air emissions and wastewater monitoring;

- Summer to Fall, 1992: Raw hydrated lime sampling, and

- Summer, 1992 (Startup) through 3-Year Demonstration Period: quarterly makeup water collection and analyses; coal, limestone gypsum and ash (with and without WES in operation) analyses; wastewater before and after AFGD

system wastewater treatment system; air emissions from AFGD system stack and flue gas before absorber vessel with and without WES in operation.

6.1.4.2 Frequency

Environmental characterization sampling will be conducted once during an APC-200 test before AFGD system start-up for coal, limestone, gypsum and ash. Similar sampling will occur for these media and hydrated lime, one time during AFGD system operation with a coal similar to that used during the APC-200 test. When coals with different sulfur content are used during the 3-year demonstration period, these coals will be analyzed once each for SO_3 and % S. Sound levels on Bailly Station property and the surrounding area will be determined once prior to start of construction of the AFGD system. Bailly Station operating data (air emissions and wastewater discharges) will be examined during construction of the AFGD system. Process makeup water for the AFGD system will be monitored on a quarterly basis during the 3-year demonstration period. Air emissions and wastewater discharges associated with the AFGD system will be monitored one time during periods with and without the WES in operation, also when the system is operating with a coal similar to that used for the APC-200 test. During the demonstration period when different sulfur content coals are used, wastewater at various locations will be monitored once each for sulfate; air emissions at select locations will be monitored once each for SO_2 and SO_3/H_2SO_4 with and without WES in operation; gypsum will be analyzed once each for $CaSO_4 \cdot 2H_2O$, $CaSO_3 \cdot 1/2\ H_2O$, SO_4 and sulfide as S with and without operation of the WES. It should be noted that the proposed monitoring with and without operation of the WES is contingent on the schedule for operating the WES. There is the possibility when different sulfur content coals are used, that the WES may not be in operation.

6.2 COMPLIANCE MONITORING (CLASS II MONITORING)

6.2.1 INTRODUCTION

Compliance monitoring will consist of monitoring required by federal, state and local regulatory agencies. The extent of the monitoring required will be defined by the AFGD project's permits. Environmental permitting began with the initiation of the development of the EIV in the Fall, 1988. This was followed in the Spring, 1989 when work was begun on obtaining air emission and wastewater discharge permits. Environmental permitting was mostly completed in Spring, 1990, so that the appropriate permits were obtained prior to the start of construction. Other environmental permitting activities which were not required prior to the start of construction (e.g., solid waste characterization) will be started during the design and construction phase of the project, but may not be completed until the AFGD system is in operation. Environmental monitoring requirements based on contact with appropriate regulatory agencies and issued permits are shown in Table 6.0-2.

6.2.2 PERMITS AND CONDITIONS

Currently it is expected that there will be three major permits for operation of the AFGD system which will have monitoring conditions: (1) Permit for Construction of Air Pollution Control Facilities, (2) Permit for Operation of Air Pollution Control Facilities, and (3) NPDES permit modification for the discharge of wastewater (domestic sewage and process wastewater). In addition, the Bailly Station's existing permit for Operation of Air Pollution Control Facilities will remain in effect since the Station's stack will be used when the AFGD system is not in operation or during an upset condition. Copies of the existing

Permit for Operation of Air Pollution Control Facilities, the AFGD system's Permit for Construction of Air Pollution Control Facilities, and Station/AFGD system NPDES permit modification for the discharge of wastewater, are included in Appendix A. Details of the conditions in these permits and possibly other permits are provided below. Other permits may include those associated with solid waste disposal.

6.2.3 MONITORING REQUIREMENTS AND ENVIRONMENTAL MEDIA

Compliance monitoring requirements are those specified in the AFGD project's permits included in Appendix A and described below. Compliance monitoring will focus on sampling environmental media associated with air emissions, wastewater discharges and solid wastes, if necessary, as discussed below.

6.2.3.1 Air Emissions

Compliance Monitoring for Air Emissions: Because operation of the AFGD system will involve air emissions from both a new stack and the existing Bailly Station stack, there will be monitoring requirements for both stacks as discussed below and shown in Tables 6.1-1 and 6.2-1. As indicated in Section 4.1 Atmospheric Resource Impacts, the AFGD system's stack generally will be available to process all of the flue gas from the Station. However, if there is an unscheduled outage of the AFGD system or during system startup or shutdown, the Station's flue gas will flow to the existing stack.

Currently the Bailly Station has the air emissions permit limits shown previously in Table 6.1-1. As can be seen from this table, the IDEM, OAM has placed limits on SO_2, particulate matter and opacity. There are no

TABLE 6.2-1

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

AFGD SYSTEM IDEM, OAM
PERMIT LIMITS FOR CONSTRUCTION OF
AIR POLLUTION CONTROL FACILITIES

Parameter	Permit Limits	Monitoring Frequency	Averaging Approach	Monitoring Method/Location	Permit Expiration Date
SO_2 (lb/MMTBU)	1.2	Continuous	Daily average and 30-day rolling weighted average	CEM, New Stack	-[a]
SO_2 (lb/MMBTU)	N/A [b,c]	Continuous	Daily average and 30-day rolling weighted average	CEM, Combined Duct	-[a]
NO_x (lb/MMBTU)	None	None	None	None	None
Particulate Matter (lb/MMBTU)	0.22	Once within 180 days of AFGD system start-up and once during 1994 [d]	N/A	EPA Method 5b or 17, Stack	-[a]
Opacity (%)	40	Continuous	All periods 40% on a 6-minute average basis	CEM, Unit 7 and 8 Ducts Downstream of ESPs and Upstream of Combined Duct	-[a]
O_2, CO_2 (%)	N/A [b,e]	Continuous	Daily average and 30-day rolling weighted average	CEM, New Stack, Combined Duct	-[a]

TABLE 6.2-1 (CONTD)

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

AFGD SYSTEM IDEM, OAM
PERMIT LIMITS FOR CONSTRUCTION OF
AIR POLLUTION CONTROL FACILITIES

Footnotes:

a - The Construction Permit was effective April 4, 1990. The permit may be revoked if construction is not commenced within 18 months after receipt of the permit (the permit was received by Northern Indiana on March 20, 1990) or if construction is discontinued for a period of 1-year or more.

b - N/A indicates no applicable permit limit.

c - Combined duct monitoring for SO_2 is to be used for informational purposes only to provide data on % SO_2 removal thru the AFGD system.

d - Particulate matter testing shall be conducted in the new AFGD system stack with the AFGD system and the Wastewater Evaporation System (WES) in service. If the WES system is not fully operational in the first 180 days, Northern Indiana has the option to retest at a later date with the WES in service. In this instance, Northern Indiana shall perform testing within 90 days after the WES is fully operational. Both Units 7 and 8 shall be in operation at 95% or greater load during the test (as an alternative each unit may be tested separately at 95% or greater load). If operation of the WES system is permanently discontinued then this requirement no longer applies.

e - O_2 and CO_2 monitoring is required in order to allow conversion of SO_2 monitoring data to the units of the permit limit or lb/MMBTU.

permit limits for NO_x. SO_2 emissions are calculated from bunkered or as burned coal, or natural gas sulfur content. A stack test for particulate matter is required once every 2 years; whereas, opacity is monitored continuously by an in-situ stack monitor (continuous emission monitor - CEM). The IDEM, OAM Permit for Operation of Air Pollution Control Facilities is in effect until July 1, 1992. Prior to this expiration date, a permit application for renewal will be submitted to IDEM, OAM.

The AFGD system's IDEM, OAM air emissions permit limits are also shown in Table 6.1-1. Like the existing Bailly Station permit, IDEM, OAM has placed limits only on SO_2, particulate matter and opacity. These parameters will be monitored by CEM's in the stack, combined duct or Unit 7 and 8 ducts. In addition to these monitoring requirements and permit limits, the IDEM, OAM requires the following:

- Particulate matter emissions from each of the limestone and hydrated lime bin vent filters shall be limited to 0.02 grains per dry acfm;

- Fugitive dust emissions shall be controlled by a roadway flushing program, and

- The emergency diesel generator fuel oil shall have a maximum sulfur content of 0.3 percent.

Rationale for Air Emissions to be Monitored. The Bailly Station will continue on an intermittent basis to have air emissions from the existing stack. The AFGD system and associated facilities potentially will have air emissions from the new stack, emergency diesel generator

and material handling. The rational for emissions monitoring requirements are discussed below.

The Bailly Station currently has air emissions monitoring requirements for SO_2, particulates and opacity; there are no requirements for NO_x or materials handling. Based on the Station's currrent permit, during the 3-year demonstration period, monitoring will continue for SO_2, particulates and opacity.

The AFGD system is not expected to change from current levels the NO_x and particulate stack emissions. Thus, the IDEM, OAM has imposed the same monitoring requirements for these two parameters as are currently required. The AFGD system will alter SO_2 and potentially opacity, and so the IDEM, OAM has specified more extensive monitoring requirements for these parameters.

The air emissions from the AFGD system's emergency diesel generator are below EPA's Prevention of Significant Deterioration (PSD) significant levels and therefore no emissions monitoring requirements are necessary. Likewise, because of the roadway flushing program and design of the materials handling system, the air emissions from materials handling are below the PSD significant levels and IDEM, OAM has not specified air emissions monitoring requirements for this emissions source.

6.2.3.2 Wastewater Discharges

Compliance Monitoring for Wastewater Discharges: During the initial phases of the project, discussions were held with IDEM, OWM on how to approach permitting the AFGD

system's wastewater discharges. It was decided that because the AFGD system will continue using the same discharge points as currently permitted at the Bailly Station, the then in effect NPDES permit would be modified to include information on the system's wastewater discharges. These discharges involve process wastewater from a wastewater treatment system (NPDES internal discharge from Outfall 401), the combined AFGD system treated process wastewater and Station's recirculating water (Outfall 001, main outfall in Lake Michigan), and domestic sewage to the Station's existing sewage treatment facility (internal discharge from sewage treatment plant, Outfall 201). Thus, the monitoring requirements for these wastewater discharges or outfalls are discussed below as part of the environmental monitoring during the 3-year demonstration period.

Table 6.2-2 shows the IDEM, OWM permit limits and monitoring requirements for the combined Station/AFGD system discharge at Outfall 001, and the internal discharges for the sewage treatment facility (Outfall 201) and the AFGD system wastewater system discharge (Outfall 401). Table 6.1-2 shows the Bailly Station's wastewater permit limits and monitoring requirements for Outfalls 001 and 201 prior to the NPDES permit modification. Other wastewater discharges at the Station were previously discussed in Section 4.3 Water Resources Impacts.

As can be seen from Tables 6.1-2 and 6.2-2, as a result of combining the AFGD system process wastewater with the Bailly Station's recirculating water (Outfall 001), the IDEM, OWM is requiring additional monitoring for pH, chloride, total dissolved solids, sulfate, and fluoride. Monitoring for flow, temperature, total residual

TABLE 6.2-2

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

BAILLY STATION/AFGD SYSTEM PERMIT LIMITS AND MONITORING
REQUIREMENTS FOR WASTEWATER DISCHARGES [a]

Outfall/Parameter	Permit Limits Monthly Average	Permit Limits Daily Maximum	Measurement Frequency	Sample Type
Outfall 001 (Main Outfall)				
Flow (MGD)	Report [c]	Report	Daily	24-Hr Total
Temperature (°F)	Report	Report	Daily	Continuous
Total Residual Chlorine (mg/l) Grab	N/A [d]	0.2	During Discharge of Chlorine Bearing Wastewater	
Duration of Chlorination (Hrs)	N/A	N/A	Monthly Report	Hrs
Chlorination Frequency	N/A	N/A	Monthly Report	Frequency
pH [b]	6.0 to 9.0		2 x Weekly	Grab
Chloride [b]	30	40	2 x Weekly	24-Hr Composite
Total Dissolved Solids [b]	344	400	2 x Weekly	24-Hr Composite
Sulfate [b]	52	100	2 x Weekly	24-Hr Composite
Fluoride [b]	1.4	2.0	2 x Weekly	24-Hr Composite

TABLE 6.2-2 (CONTD)

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

BAILLY STATION/AFGD SYSTEM PERMIT LIMITS AND MONITORING
REQUIREMENTS FOR WASTEWATER DISCHARGES [a]

Outfall/Parameter	Permit Limits Monthly Average	Permit Limits Daily Maximum	Measurement Frequency	Sample Type
Outfall 201 (Sewage Treatment Plant)				
Flow (MGD)	Report	Report	Weekly	24-Hr Total
BOD_5 (mg/l)	30	45	Weekly	8-Hr Composite
Fecal Coliform (per 100 ml) Grab	N/A	400	Weekly	
Total Residual Chlorine (mg/l) Grab	N/A	2.0	2 x Weekly	
Outfall 401 (AFGD System Discharge)				
Flow (MGD)	Report	Report	2 x Weekly	24-Hr Total
TSS (mg/l)	30	100	2 x Weekly	24-Hr Composite
Oil and Grease (mg/l)	15	20	Monthly	Grab
Chloride (mg/l)	Report	Report	2 x Weekly	24-Hr Composite
Total Dissolved Solids (mg/l)	Report	Report	2 x Weekly	24-Hr Composite
Sulfate (mg/l)	Report	Report	2 x Weekly	24-Hr Composite
Fluoride (mg/l)	Report	Report	2 x Weekly	24-Hr Composite

TABLE 6.2-2 (CONTD)

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

BAILLY STATION/AFGD SYSTEM PERMIT LIMITS AND MONITORING
REQUIREMENTS FOR WASTEWATER DISCHARGES [a]

Footnotes: a - The NPDES permit was effective April, 1990 and expires at midnight August 31, 1993.

b - The indicated parameters are to be monitored only during discharge of AFGD system process water from Outfall 401 to Outfall 001.

c - Report indicates that there are no permit limits for the indicated parameters and the information only has to be provided to IDEM, OWM.

d - N/A indicates no applicable limit.

chlorine, and duration and frequency of chlorination will continue as previously required by IDEM, OWM.

At the internal Station Outfall 201 (sewage treatment plant), the IDEM, OWM will continue requiring monitoring for flow, BOD_5, fecal coliform, and total residual chlorine.

Because of the addition of an internal discharge from the AFGD system's wastewater treatment system, the IDEM, OWM has added monitoring requirements for this discharge (Outfall 401). The parameters to be monitored include the flow, TSS, oil and grease, chloride, total dissolved solids, sulfate, and fluoride.

Depending on the parameter, wastewater generally will be monitored by collecting grab or composite samples on a daily, twice weekly (2 x weekly) or monthly basis. The monitoring requirements at Outfall 401 and for pH, chloride, total dissolved solids, sulfate and fluoride at Outfall 001, are applicable only during periods of discharge from Outfall 401.

Rationale for Wastewater Discharges to be Monitored:

Operation of the AFGD system at the Bailly Station will result in the addition of only two wastewater streams: domestic sanitary sewer wastes and AFGD system process wastewater. The Station currently treats domestic sanitary sewer wastes that are similar to those to be discharged from operation of the AFGD system. Thus, monitoring will continue to be for the same parameters previously monitored from Outfall 201, the sewage treatment plant.

Outfall 401, process water from the AFGD system, will be a new discharge. Thus, the IDEM, OWM developed internal monitoring requirements for this discharge based on a predicted wastewater characterization of key parameters submitted to IDEM, OWM by the project. Also, IDEM, OWM modified the monitoring requirements at the main discharge (Outfall 001) to Lake Michigan based on the addition of the discharge from Outfall 401.

6.2.3.3 Solid Wastes

Compliance Monitoring for Solid Waste: Operation of the AFGD system will result in the generation of potentially three wastes: ash, gypsum, and wastewater treatment system solids.

Preliminary discussions have been held with the IDEM, OSHWM concerning disposal of AFGD system related solid wastes. The IDEM, OSHWM has indicated that by regulation they cannot require the project to analyze the coal ash prior to disposal in a sanitary landfill. However, if it is placed in a sanitary landfill, the operator of the landfill may require some analyses as shown in Table 6.0-2. The Bailly Station currently sells its ash to a broker for resale for other uses or for disposal. Thus, the Station does not analyze the ash.

If gypsum from the AFGD system is disposed in a landfill, the IDEM, OSHWM will require a TCLP Test and the Indiana Neutral Leaching Method Test (TCLP Test without the addition of acetic acid) as shown in Table 6.0-2. Similar requirements are expected for the wastewater treatment system solids.

Rationale for Solid Wastes Monitoring: As indicated above, the monitoring activities for solid waste were developed based on preliminary discussions with IDEM, OSHWM. As the AFGD project progresses, IDEM, OSHWM will be consulted concerning their then existing requirements for solid waste disposal. The project will then evaluate these requirements in relation to existing disposal requirements and revised plans for analyzing solid wastes will be developed for inclusion in the EMP, if necessary. All solid wastes will be disposed, if necessary, in appropriately approved facilities which have their own approved environmental monitoring programs that they are responsible for.

6.2.4 SCHEDULE

6.2.4.1 Duration

Compliance monitoring will be initiated as part of start-up activities and will continue through the commercial operation of the AFGD system. However, only the compliance monitoring data collected during the 3-year demonstration period (Summer, 1992 to Summer, 1995), will be provided to DOE per the Cooperative Agreement.

6.2.4.2. Frequency

The frequency of compliance monitoring for various parameters is based on the permit conditions for air emissions, wastewater discharges and solid wastes. The frequency of sampling is described in Tables 6.0-2, 6.2-1 and 6.2-2. The frequency for the general categories is summarized as follows:

- Air Emissions: Continuous, daily or once every 2 years depending on the parameter;

- Wastewater Discharges: Daily, two times weekly, monthly report or during appropriate or process discharge, and

- Solid Waste: To be determined by regulatory agency requirements as the project progresses and waste materials are generated. There may not be any regulatory requirements for monitoring solid waste.

6.3 SUPPLEMENTAL ENVIRONMENTAL IMPACT MONITORING (CLASS III MONITORING)

6.3.1 INTRODUCTION

The necessity for supplemental environmental impact monitoring, (1) addresses the potential need to identify and quantify environmental impacts (positive and negative) predicted in the Environmental Assessment, and (2) evaluates the need to monitor mitigation measures. Supplemental environmental monitoring for sound is shown in Table 6.0-3.

6.3.2 MONITORING PREDICTED IMPACTS

The area in which the Bailly Station is located is highly industrialized. Thus, impacts other than in the immediate vicinity of the Station, would be difficult to monitor. Therefore, the planned environmental characterization and compliance monitoring is believed to be adequate to monitor predicted impacts. The need for additional monitoring was based on the impact evaluation presented in the Environmental Assessment. However, changes in federal, state, and local rules or regulations as the project progress may require that supplemental monitoring be addressed in more detail than shown in Table 6.0-3 as discussed in Section 6.6 Future Regulations and Impacts on the Project.

6.3.3 MONITORING SUCCESS OF MITIGATION MEASURES

As indicated previously, the AFGD project is viewed as a positive influence on the Bailly Station area and additional monitoring is not believed to be required to determine the success of mitigation measures.

6.3.4 SUPPLEMENTAL MONITORING MEDIA

The AFGD project will be constructed and operated in accordance with all applicable governmental rules and regulations. This will involve compliance monitoring to meet various permit conditions and the utilization of good engineering practice to protect worker and surrounding area personnel health and safety. In addition, extensive information will be collected as part of the environmental characterization monitoring activities. Therefore, it is believed that the compliance and environmental characterization monitoring is generally adequate and supplemental monitoring will be minimal.

As can be seen from Table 6.0-3, the project is planning on supplemental monitoring for sound levels immediately before and after AFGD system start-up. All of the stations described in Table 6.1-3 and shown in Figure 6.1-1 will be monitored. At each of these stations, daytime and nighttime sound level measurements will be taken for the same parameters shown in Table 6.1-3. During all monitoring periods Stations 1 and 3 will be used as reference stations and sound level measurements always will be taken at these two stations.

As indicated above, the supplemental monitoring of sound levels will be conducted before and after AFGD system start-up. If the after start-up survey is not conducted during a time (fall or winter) when vegetation and insect noise are less likely to interfere with sound level measurements, a second after start-up survey will be conducted. This survey will be done at the earliest possible date after start-up, at a time that is consistent with AFGD system operations.

Following the supplemental sound level monitoring, the sound level data will be evaluated. If there are increased sound levels greater than 5 dBA which can be attributed to AFGD system operation, further sound level attenuation features will be considered for the AFGD facility. The 5 dBA action level is based on a level which project team members believe, based on extensive sound level survy experience, can be accurately measured by a sound level meter.

6.4 QUALITY ASSURANCE/QUALITY CONTROL PROGRAM

The quality assurance/quality control (QA/QC) program will ensure data quality and completeness from sample collection through analyses and report preparation. The quality assurance/quality control program will begin with determining the best locations to obtain representative samples. Sample collection procedures will then be defined and chain-of-custody procedures will be described to ensure that if a laboratory is involved, they will receive appropriate samples. The laboratories used for all analyses will be expected to have the appropriate certifications (including U.S. Environmental Protection Agency-EPA, certification), if appropriate, and a within laboratory quality assurance/quality control program. The laboratory will use EPA or IDEM approved analytical methods. Typical approved analytical methods for the majority of the parameters which are expected to be analyzed as part of the project's monitoring program are shown in Table 6.2-3. The methods for sampling these parameters are shown in Table 6.2-4.

6.4.1 AIR EMISSIONS MONITORING QA/QC PROGRAM

For monitoring of air emissions, the IDEM, OAM requires the installation of continuous emission monitors (CEMs). These will be installed, certified, calibrated, maintained, and operated pursuant to Indiana Administrative Code (IAC) and EPA requirements. Stack tests for particulate matter and SO_2 will also be performed per the IAC and EPA requirements.

The QA/QC program for the CEMs or collection of air emissions monitoring will include the following, which may vary depending on the gas or instrument being calibrated:

TABLE 6.2-3

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

POTENTIAL CHEMICAL AND PHYSICAL
PARAMETERS TO BE ANALYZED AND ANALYTICAL TECHNIQUES

PARAMETER	ANALYTICAL TECHNIQUE/METHOD
Al, Ba, Be, Ca, Cd, Cr, Co, Cu, Fe, Li, Mg, Mo, Ag, Si, V, Zn	Atomic Absorption Spectroscopy (AA) or Inductively Coupled Argon Plasma Emission Spectroscopy (ICAPES)
Hg, Ti	AA
Sb, As, B, Pb, Mn, Na, Ni, K, Se, U	ICAPES
$CaSO_3 \cdot 1/2\ H_2O$, $CaSO_4 \cdot 2H_2O$	Wallboard Manufacturer's Method
CO_3	Nonindispersive Infrared Analysis
F, Cl, NO_3, SO_4	Ion Chromatography
Fe_2O_3, SiO_2, R_2O_3	Wallboard Manufacturer's Method for Oxides
Corrosivity, Ignitability, Reactivity	EPA Publication SW-846
TCLP Test	40 CFR Part 261 Appendix II
Flow (Makeup Water and Wastewater)	In-Line Flow Monitors
Free H_2O	Dried at 45°C (113°F)
Particle Size Distribution	Coulter Electronic Counter
Indiana Neutral Leaching Method Test	Indiana Solid Waste Management Board Rules and Regulations
Mean Particle Size	20 Minimum per Sedigraph 5000D Plus Sieve Analysis
Morphology	Scanning Electron Microscope
NO_x	EPA Method 7 Series
Oil and Grease	40 CFR, Part 136
Opacity	CEM

TABLE 6.2-3 (CONTD)

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

POTENTIAL CHEMICAL AND PHYSICAL
PARAMETERS TO BE ANALYZED AND ANALYTICAL TECHNIQUES

PARAMETER	ANALYTICAL TECHNIQUE/METHOD
Particulate Matter	40 CFR 60 Appendix A, Method 5b or 17
pH	pH Meter and Electrode
Phenols	Gas Chromatography/Mass Spectrography
PM-10	
Radioactivity Analyses	Counting Instruments (e.g., Scintillation Counter)
Sound	Sound Meter
SO_2	40 CFR 60 Appendix A, Method 6c or 19
SO_3	Iodometric Titration
SO_3/H_2SO_4	Controlled Condensation
Solid Dissolution Procedures	Nitric Acid-Hydrogen Peroxide Dissolution; Lithium Borate Fusion
Specific Surface Area	4-Point BET Analysis
TDS, TSS	40 CFR Part 136
Temperature	Thermometer
Unburned Hydrocarbons	EPA Method 25A
Weight Percent Solids	Gravimetric Analysis

Table 6.2-4

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

SAMPLING METHODS FOR CHEMICAL
AND PHYSICAL PARAMETERS TO BE MONITORED

Sample Stream/Parameters	Sample Location	Sampling Method
CLASS I MONITORING		
Solid		
Coal Solid	Coal Used for APC-200 Test	Composite of Three Samples
NO_3, SO_3, CO_3, Proximate Analysis-% (Moisture, Volatiles, Fixed Carbon, Ash), Ultimate Analysis-% (S, H, C, N, O, Btu/lb as received, Btu/lb dry), General/Metals[a], Radioactivity[b]		
Coal Solid	Coals Used During Demonstration Period	Composite of Three Samples
% S, SO_3		
Raw Limestone	Limestone Used for APC-200 Test	Composite of Three Samples
NO_3, SO_3, CO_3, Particle Size Distribution, General/ Metals, Radioactivity		
Raw Hydrated Lime	Hydrated Lime Silo Outlet	Composite of Three Samples
NO_3, SO_3, CO_3, General/ Metals, Radioactivity		

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

SAMPLING METHODS FOR CHEMICAL
AND PHYSICAL PARAMETERS TO BE MONITORED

Sample Stream/Parameters	Sample Location	Sampling Method
CLASS I MONITORING (CONTD)		
Gypsum	Gypsum From APC-200 Test	Composite of Three Samples
General/Metals, $CaSO_4 \cdot 2H_2O$, $CaSO_3 \cdot 1/2H_2O$, SiO_2, Fe_2O_3 (other metal oxides), pH, Free H_2O, Radioactivity, Corrosivity, Ignitability, Reactivity, Toxicity Characteristic Leaching Procedure (TCLP) Test[c], Indiana Neutral Leaching Method Test[d], Total Water Soluble Salts, Mean Particle Size		
Gypsum	Gypsum without and with WES in Operation For Different Sulfur Content Coal	Composite of Three Samples
$CaSO_4 \cdot 2H_2O$, $CaSO_3 \cdot 1/2H_2O$, SO_4, Sulfide as S		
Ash	Ash From APC-200 Test	Composite of Three Samples
General/Metals, Radioactivity, Corrosivity, Ignitability, Reactivity, TCLP Test, Indiana Neutral Leaching Method Test		

Table 6.2-4 (CONTD)

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

SAMPLING METHODS FOR CHEMICAL
AND PHYSICAL PARAMETERS TO BE MONITORED

Sample Stream/Parameters	Sample Location	Sampling Method
CLASS I MONITORING (CONTD)		
Ash General/Metals, Corrosivity, Ignitability, Reactivity, TCLP Test, Indiana Neutral Leaching Method Test, Radioactivity, $CaCl_2$, $Ca(OH)_2$, $MgCl_2$, $CaSO_4 \cdot 2H_2O$, CaF_2	Ash Storage Silo without WES in Operation	Composite of Three Samples
Ash General/Metals, Corrosivity, Ignitability, Reactivity, TCLP Test, Indiana Neutral Leaching Method Test, Radioactivity, $CaCl_2$, $Ca(OH)_2$, $MgCl_2$, $CaSO_4 \cdot 2H_2O$, CaF_2	Ash Storage Silo with WES in Operation	Composite of Three Samples
Ash $CaSO_4 \cdot 2H_2O$, SO_4, Sulfide as S	Ash Storage Silo without and with WES in Operation For Different Sulfur Content Coal	Composite of Three Samples

Table 6.2-4 (CONTD)

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

SAMPLING METHODS FOR CHEMICAL
AND PHYSICAL PARAMETERS TO BE MONITORED

Sample Stream/Parameters	Sample Location	Sampling Method
CLASS I MONITORING (CONTD)		
Liquid		
Makeup Water	Incoming Process Water Line	
pH, Oil and Grease		Grab
Temperature, Flow		Continuous
Weight Percent Solids, NO_3, SO_3, CO_3, TSS, TDS, General/Metals		24 hour composite[e]
Outfall 001	Main Discharge	
Flow, Temperature		Continuous
TRC		Grab during discharge of chlorine bearing water
Duration of Chlorine		Report
Frequency of Chlorine		Report
Sulfate		24 hour composite

Table 6.2-4 (CONTD)

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

SAMPLING METHODS FOR CHEMICAL
AND PHYSICAL PARAMETERS TO BE MONITORED

Sample Stream/Parameters	Sample Location	Sampling Metnod
CLASS I MONITORING (CONTD)		
Outfall 201	Sewage Treatment Plant Discharge	
Flow		24 hour total
BOD_5		8 hour composite
Fecal Coliform, TRC		Grab
AFGD System Wastewater Treatment Facility Influent and Effluent	Process Lines	
General/Metals, TSS, TDS, Sulfate		24 hour composite
pH, Oil and Grease		Grab
Flow		24 hour total
Air		
Air Emissions from Boiler	Bailly Station Stack	

Table 6.2-4 (CONTD)

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

SAMPLING METHODS FOR CHEMICAL
AND PHYSICAL PARAMETERS TO BE MONITORED

Sample Stream/Parameters	Sample Location	Sampling Method
CLASS I MONITORING (CONTD)		
SO_2		Coal Analysis
Opacity		Continuous Emission Monitor
Particulate Matter		EPA Method 1-5
Air Emissions from AFGD System without WES	AFGD System Stack and Combined Inlet Ducts to AFGD System	
Air metals[f]		EPA Method 5/ITM-001
Unburned Hydrocarbons		EPA Method 25A
Particle Size Distribution (PM-10)		Cascade Impactor (EPA Method 201)
NO_x		EPA Method 7 Series
SO_2		Continuous Emission Monitor

Table 6.2-4 (CONTD)

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

SAMPLING METHODS FOR CHEMICAL
AND PHYSICAL PARAMETERS TO BE MONITORED

Sample Stream/Parameters	Sample Location	Sampling Method
SO_3/H_2SO_4		Controlled Condensation
Air Emissions from AFGD System with WES	AFGD System Stack and Combined Inlet Ducts to AFGD System	
Air metals		EPA Method 5/ITM-001
Unburned Hydrocarbons		EPA Method 25A
Particle Size Distribution (PM-10)		Cascade Impactor (EPA Method 201)
NO_x		EPA Method 7 Series
SO_2		Continuous Emission Monitor
SO_3/H_2SO_4		Controlled Condensation
Sound		
dBA, Leq, Octave Band Spectrum	Locations on Bailly Station Property and Surrounding Area (including National Lakeshore)	Type 1 General Radio Model 1988-9700 Precision Integrating Sound - Level Meter and Analyzer with Model 1962-9610 Microphone and Model 1560-P42 Preamplifier or equals

Table 6.2-4 (CONTD)

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

SAMPLING METHODS FOR CHEMICAL
AND PHYSICAL PARAMETERS TO BE MONITORED

Sample Stream/Parameters	Sample Location	Sampling Method
CLASS II MONITORING		
Solid		
Coal Solid	Bunkered Coal	ASTM D2234-86
% S, % Ash, Btu/lb Dry		
Gypsum	Gypsum Storage Area	Composite of Three Samples
To Be Determined if Considered a Waste Material, But May Include General/Metals, Radioactivity, Corrosivity, Ignitability, Reactivity, TCLP Test, Indiana Neutral Leaching Method Test		
Ash	Ash Storage Silo	Composite of Three Samples
To Be Determined By Regulatory Agency Requirements and Method of		

Table 6.2-4 (CONTD)

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

SAMPLING METHODS FOR CHEMICAL
AND PHYSICAL PARAMETERS TO BE MONITORED

Sample Stream/Parameters	Sample Location	Sampling Method
CLASS II MONITORING (CONTD)		
Liquid		
Disposal, But May Include: General/Metals, Radioactivity, Corrosivity, Ignitability, Reactivity, TCLP Test, Indiana Neutral Leaching Method Test		
Wastewater Treatment System Solids	AFGD System Wastewater Treatment System	Composite of Three Samples in Accordance with EPA Publication SW-846 Guidelines
To Be Determined By Regulatory Agency Requirements and Method of Disposal, But May Include: General/Metals, Radioactivity, Corrosivity, Ignitability, Reactivity, TCLP Test, Indiana Neutral Leaching Method Test		

Table 6.2-4 (CONTD)

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

SAMPLING METHODS FOR CHEMICAL
AND PHYSICAL PARAMETERS TO BE MONITORED

Sample Stream/Parameters	Sample Location	Sampling Method
CLASS II MONITORING (CONTD)		
Outfall 001	Main Discharge	
Flow		Estimated from Pump Curves
Temperature		Continuous
TRC, pH		Grab
Chlorination Duration		Report
Chlorination Frequency		Report
Chloride, TDS, Sulfate, Fluoride		24 Hour Composite
Outfall 201	Sewage Treatment Plan	
Flow		Continuous
BOD_5		8 Hour Composite
Fecal Coliform, TRC		Grab

Table 6.2-4 (CONTD)

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

SAMPLING METHODS FOR CHEMICAL
AND PHYSICAL PARAMETERS TO BE MONITORED

Sample Stream/Parameters	Sample Location	Sampling Method
CLASS II MONITORING (CONTD)		
AFGD System Wastewater Treatment Facility Influent		
Flow		Continuous
Oil and Grease		Grab
Chloride, TSS, TDS, Sulfate, Fluoride		24 Hour Composite
Outfall 401	AFGD System Wastewater Treatment Facility Effluent	
Flow		Continuous
Oil and Grease		Grab
Chloride, TSS, TDS, Sulfate, Fluoride		24 Hour Composite
Air		
Air Emissions from Unit No. 7 and No. 8	Bailly Station Stack	

Table 6.2-4 (CONTD)

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

SAMPLING METHODS FOR CHEMICAL
AND PHYSICAL PARAMETERS TO BE MONITORED

Sample Stream/Parameters	Sample Location	Sampling Method
CLASS II MONITORING (CONTD)		
SO_2		Coal Analysis - ASTM
Opacity		Continuous Emission Monitor
Particulate Matter		EPA Method 1-5
Air Emissions from Unit No. 7 and No. 8	Unit No. 7 and No. 8 Inlet Ducts to AFGD System	
Opacity		Continuous Emission Monitor
Air Emissions from Unit No. 7 and No. 8	Unit No. 7 and No. 8 Combined Inlet Duct to AFGD System	
SO_2, % O_2, CO_2		Continuous Emission Monitor
Air Emissions from AFGD System	AFGD System Stack	
SO_2, % O_2 or CO_2		Continuous Emission Monitor
Particulate Matter		EPA Method 1-5

Table 6.2-4 (CONTD)

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

SAMPLING METHODS FOR CHEMICAL
AND PHYSICAL PARAMETERS TO BE MONITORED

Sample Stream/Parameters	Sample Location	Sampling Method
CLASS III MONITORING		
Sound		
dBA, Leg, Octave Band Spectrum	Locations on Bailly Station Property and Surrounding Area (including National Lakeshore)	Type 1 General Radio Model 1988 - 9700 Precision Integrating Sound-Level Meter and Analyzer with Model 1962 - 9610 Microphone and Model 1560 - P42 Pre-amplifier or equals

Footnotes: a - General/metals consists of the following: Al, Sb, As, Ba, B, Be, Cd, Ca, Cl, Cr, Co, Cu, Cn, F, Fe, Pb, Li, Mg, Mn, Hg, Mo, Ni, K, Se, Ag, Na, SO_4, Sulfide as S, Sn, Ti, U, V, and Zn.

b - Radioactivity analyses consists of gross alpha and beta, lead-210, polonium-210, radium-226, radon-222, and thorium-230.

c - TCLP Test analyses include As, Ba, Cd, Cr, Pb, Hg, Se, and Ag.

d - Indiana Neutral Leaching Method Test is the TCLP Test without the addition of acetic acid and includes the analyses for the following: Ba, B, Cl, Cu, Cn, F, Fe, Mn, Ni, Phenols, Na, SO_4, Sulfide as S, TDS, Zn, and pH.

Table 6.2-4 (CONTD)

PURE AIR, NORTHERN INDIANA
BAILLY GENERATING STATION ADVANCED FLUE GAS
DESULFURIZATION PROJECT

SAMPLING METHODS FOR CHEMICAL
AND PHYSICAL PARAMETERS TO BE MONITORED

e - A 24 hour composite per the NPDES permit consists of at least three individual flow-proportioned samples which are taken at approximately equally spaced time intervals during a 24 hour period and which are combined prior to analysis.

f - Air metals consists of the following: Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, and Zn.

- Documentation of all work on appropriate forms;

- Automatic system calibration check and data adjustment by computer system typically every 24 hours;

- Manual calibration of monitors or analyzer using a calibration gas (SO_2, O_2/CO_2) or standard (opacity) per criteria for initiating calibration;

- Calibration of strip chart recorders;

- Monitor or analyzer drift determination and adjustment;

- Preventive maintenance including bi-weekly QA/QC checks to determine if there are any problem areas which need corrective action. This will include monitors or analyzers and strip chart recorders;

- Scheduled maintenance program including checking sample extractive systems, filters, lines and pump-assemblies;

- Daily evaluation of appropriate monitoring data;

- Quarterly cylinder gas audits;

- Annual relative accuracy test audit;

- Initiation of corrective action when either the monitors/ analyzers are out-of-control or the routine QA/QC checks indicate that there is a problem with a monitoring system, and

- Maintain appropriate spare parts and replacement list.

6.4.2 WASTEWATER DISCHARGES MONITORING QA/QC PROGRAM

Methods for ensuring quality assurance and quality control of

wastewater sampling will be incorporated into the standard methods used to measure wastewater flows. These include keeping the monitoring equipment clean and calibrated, in both the field and laboratory. In addition the analytical laboratory will be required to be an approved EPA laboratory and to participate in EPA's certification program.

The QA/QC program for monitoring wastewater discharges will be incorporated in the Bailly Station's Chemical Department's QA/QC program. This program includes the following:

- Annual analyses of spiked water samples from EPA containing known concentrations of the parameters specified in the NPDES permit;

- Semiannual analyses of spiked samples from a reliable outside source for evaluation of parameters in the NPDES permit;

- Routine QA/QC testing consisting of analyzing duplicate samples from a minimum of 10 percent of all analyses;

- QA/QC audit team review of NPDES monitoring activities including review with Bailly Station Manager and Chief Chemist, and

- QA/QC audit on outside laboratory.

6.4.3 SOLID AND SOLID WASTES MONITORING QA/QC PROGRAM

The sampling and analyses of solid materials (e.g., coal, gypsum) will follow standard procedures approved by the appropriate regulatory agency, if any or the applicable industry (e.g., gypsum according to wallboard manufacturer analytical methods). For sampling and analyzing solid wastes, the project will follow IDEM, OSHWM's "Waste Sampling Guidelines" and "Laboratory Analysis

Documentation", and EPA's "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (EPA publication SW-846). Because most of the solid or solid waste sampling and analyses will be conducted by a contract laboratory, the laboratory will be expected to follow the procedures outlined in these documents and to have its own QA/QC program. The program will have the following general characterics:

- Participation in performance evaluation studies as a means of comparing analytical results;
- The use of written analytical methodologies that address calibration requirements;
- Preventative maintenance on all equipment and instrumentation as recommended by the manufacturer, and maintenance of service contracts on critical pieces of instrumentation;
- Control charts for routine chemical analyses;
- Periodic submission of internal check samples for routine analyses, and
- The use of bound notebooks to record research activities and archive in permanent storage.

6.4.4 SOUND LEVEL MONITORING QA/QC PROGRAM

The QA/QC program for sound level monitoring will focus on using typical standard sampling procedures, equipment and calibration procedures. These will be similar to the following procedures used during the October, 1989 sound level survey.

During the October, 1989 survey, sound level measurements were taken with a Type 1 General Radio Model 1988-9700 precision

integrating sound level meter and analyzer, Model 1962-9610 microphone and Model 1560-P42 preamplifier. A General Radio Model GR1987 Minical 1 KHz sound level calibrator was used to calibrate the sound level meter. The sound level meter was calibrated at 94 dB before and after each measurement period. A wind screen was used on the microphone for all measurements. The sound level meter and analyzer battery were checked before and after each measurement period. All measurements were taken with the microphone approximately 5-ft above the ground surface, at a 70° angle above the horizontal towards the noise source. In addition, meteorological conditions were observed and recorded for each measurement. The parameters noted were wind speed, wind direction, cloud cover, and temperature. Wind speed was measured with a cup anemometer. Throughout the measurement period, wind speeds were considered to be acceptable when less than 12 mph; temperatures were above freezing, and sky's were clear to partly cloudy.

6.5 INDUSTRIAL HYGIENE MONITORING REQUIREMENTS

6.5.1 PURPOSE AND SCOPE

The purpose for conducting industrial hygiene monitoring is to determine if process control measures are sufficient to protect workers from excessive exposure to harmful physical or chemical agents. The Occupational Safety and Health Act of 1970 requires that employers provide a workplace that is free of recognized hazards. Determining potential hazards present in the workplace, designing and engineering controls and operating procedures to limit exposure, and periodically measuring control effectiveness will assure a safe and healthful workplace.

The scope of these requirements are limited to the hazards that may be anticipated during the operation of the AFGD system. In developing these requirements, it is assumed that the potential hazards have been identified and will be adequately controlled.

Should other potential hazards be identified once the facility is in operation, the industrial hygiene monitoring requirements may be modified.

6.5.2 EVALUATION CRITERIA

The Occupational Safety and Health Administration (OSHA) has established allowable exposure standards, known as Permissible Exposure Limits (PELs) with which the law requires compliance. Other exposure criteria called Threshold Limit Values (TLVs) are not law but are recommended guidelines by the American Conference of Governmental Industrial Hygienists (ACGIH), a recognized advisory group of governmental occupational health professionals. Most exposure criteria such as the OSHA PELs and the ACGIH TLVs represent time-weighted average (TWA) concentrations to which it is believed most members of the working population may be exposed repeatedly, during an 8-hour day, 40-hour week, for a working lifetime without adverse health effects.

The chemicals and exposure limits of interest for the AFGD process are as follows:

Chemical	Source	Exposure Limit
Limestone	OSHA (TWA)	
(calcium carbonate)	total dust	15 mg/m3
	respirable fraction	5 mg/m3
	ACGIH (TWA)	
	total dust	10 mg/m3
Calcium oxide	OSHA (TWA)	5 mg/m3
	ACGIH (TWA)	2 mg/m3

Chemical	Source	Exposure Limit
Calcium sulfate	OSHA (TWA)	
	total dust	15 mg/m3
	respirable fraction	5 mg/m3
	ACGIH (TWA)	
	total dust	10 mg/m3
Noise	OSHA (TWA)	90 dBA
	OSHA Hearing Conser. Amend. (TWA)	85 dBA

In those cases where exposure levels are not the same, the more stringent standard will be used to evaluate the measured exposure.

6.5.3 EXPOSURE MONITORING

Air monitoring will be conducted early in the project to evaluate worker exposure to calcium carbonate, calcium oxide, and calcium sulfate. Due to the closed system design of the AFGD process, air monitoring may be limited to infrequent tasks associated with maintenance or other ancillary activities. Decisions regarding the type and number of samples to be taken, as well as the frequency of monitoring, will be determined during facility startup based on an examination of equipment operations.

Sound level measurements and personal noise dosimetry measurements will be obtained. Hearing protection will be required for all employees working in areas where sound levels exceed 85 dBA. These areas will be posted accordingly. If 8-hour TWA noise exposures exceed 85 dBA a hearing conservation program will be established. Affected employees will receive annual audiograms and hearing conservation training. Noise exposure assessments will also continue to be conducted on an annual basis.

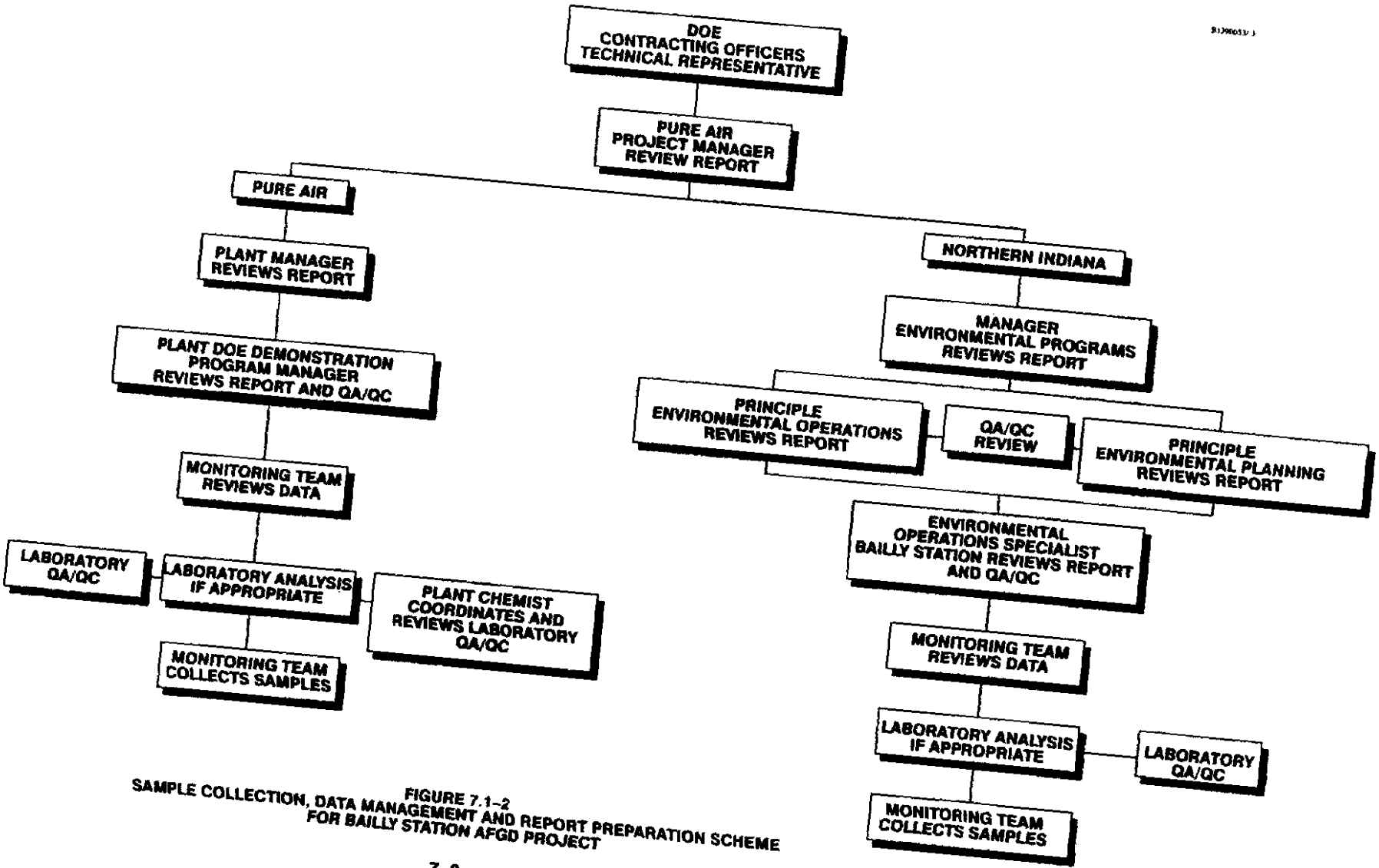


FIGURE 7.1-2
SAMPLE COLLECTION, DATA MANAGEMENT AND REPORT PREPARATION SCHEME
FOR BAILLY STATION AFGD PROJECT

During Phase 1, activities associated with environmental monitoring will include APC-200 tests at the Hiroshima Research and Development Center. AFGD project coal and limestone used as part of these tests will be analyzed for various parameters indicated in Table 6.0-1. In addition, the gypsum and ash generated from the tests will be analyzed for the parameters shown in Table 6.0-1.

7.2.2 PHASE 2 - CONSTRUCTION AND START-UP

This phase of the project also will involve minimal environmental monitoring. As indicated in Table 6.0-1, prior to start-up, hydrated lime to be used in the AFGD system will be analyzed for several parameters. Also, Table 6.0-3 indicates that sound level measurements will be taken prior to start-up.

7.2.3 PHASE 3 - OPERATIONS AND DISPOSITION

The majority of the environmental monitoring described in Tables 6.0-1, 6.0-2 and 6.0-3 will be conducted during this project phase. Monitoring will be conducted by both Pure Air and/or Northern Indiana. Instrument output connections between the Bailly Station and the AFGD system will allow for the collection on a routine basis of much of the AFGD system operational data and basic station data. This information will be supplemented by operational logs from the Station and the AFGD system.

Emissions information will be collected from a monitoring system that will be interfaced with a PC-based data collection and management system. Additional emissions information will be provided by supplemental source testing.

7.3 MONITORING MEDIA

The environmental media to be monitored include solid, liquid, and gas streams. Tables 6.0-1, 6.0-2 and 6.0-3 summarize the sampling points,

environmental media to be sampled, parameters to be measured for each media and the frequency of sampling. More details were provided in Tables 6.1-1, 6.1-2, 6.1-3, 6.2-1 and 6.2-2.

Monitoring samples or data initially will be collected by either a Pure Air or a Northern Indiana Monitoring Team (Figure 7.1-2). If appropriate, samples will be sent to a laboratory for analyses. The resultant data will be reviewed by a Monitoring Team before a monitoring report is prepared. When the report is finalized it will be sent to management personnel for review before being transmitted to DOE via Pure Air's Project Manager. Throughout the collection of samples, analyses and report preparation, their will be QA/QC procedures or reviews as discussed in Section 6.4 Quality Assurance/Quality Control Program.

SECTION 8.0

DATA MANAGEMENT AND REPORTS

8.1 DATA MANAGEMENT SYSTEM

A Data Management System will be implemented in order to maintain accurate records of the techniques, procedures and results of the monitoring activities associated with operation of the AFGD system. The Data Management System will establish a consistent procedure for both documenting compliance and generating any additional data.

Reviews and checks will be built into the Data Management System by virtue of the personnel handling the data. Figure 7.1-2 presented a scheme for data processing. The frequency with which data will be reviewed is a function of the method of sampling. Data collected by Continuous Emissions Monitors (CEM's) will be stored on a personal computer (PC). Other data collected will be stored in hard copy form in Northern Indiana's archival system or in Pure Air's project files.

Resources for processing data will include experienced members of the staff in the field, office staff and Northern Indiana's data reduction group. Both hardware and software will be available for collection and reduction of the appropriate parameters. Personal computers at the AFGD system's Administration Building, Bailly Station and Northern Indiana's Environmental Programs Department may be used in assimilating data and reports.

8.2 REPORTING SCHEDULE

During Phase 3 of the project, environmental monitoring status reports will be provided to DOE on a quarterly basis with annual summaries included in a detailed annual report.

As previously described in Section 6 Environmental Monitoring, there are three classes of environmental monitoring associated with the AFGD

project. During the period of Class I Environmental Baseline or Characterization Monitoring, the parameters listed in Table 6.0-1 will be examined. Results of the APC-200 test will be documented after completion of the study, and summarized in the first quarterly report during the demonstration period. The sound level measurement information collected in 1989 also will be summarized in the first quarterly report. Details of these monitoring activities will be provided with the first yearly report.

A number of parameters collected (e.g., air emissions, wastewater discharges) in the first phase are part of the routine monitoring already done at the Bailly Station. This information will be summarized on a quarterly basis (when applicable) with annual reports in the fourth quarter throughout the demonstration period. The data collected as part of AFGD system operation, which are not routinely collected at the Bailly Station, will be summarized in a quarterly report as soon as possible and detailed in an annual report.

When Class II Compliance Monitoring begins, the gathered data will reflect what is required by federal, state and local governments. The frequency of sampling will be determined by governmental agencies and data will be summarized in quarterly reports with detailed annual reports. Summary reports should be submitted within sixty (60) days after the end of the quarter. Exceptions to this policy will be tests such as stack sampling for particulate matter which will occur every two years.

The data generated from the sound surveys conducted during Class III Supplemental Monitoring will be summarized as part of a quarterly report. The detailed information will be either a section of the yearly report or a separate document.

8.3 FORMAT AND CONTENT OF MONITORING REPORTS

The monitoring reports to be submitted to DOE will convey the environmental status of the project over a quarter, with a detailed yearly report. The progress of the AFGD project will be reflected in the

reports with comments concerning compliance and data characteristics when appropriate. All of the elements to be collected sampled, and/or monitored have been indicated in Tables 6.0-1 (Class I Monitoring), 6.0-2 (Class II Monitoring), and 6.0-3 (Class III Monitoring). The analytical techniques and methods used in collecting samples have been listed in Tables 6.2-3 and 6.2-4. The format of the monitoring reports is expected to be as follows:

I. Overview of Quarter or Year
II. Project Status
III. Source Emissions and Discharges
    A. Air Emissions
    B. Wastewater Discharges
    C. Solid and Solid Waste Discharges
        1. Products and By-products
    D. Plant Operations
IV. Compliance
    A. Compliance with Permit Limits
    B. QA/QC
V. Problems and Recommendations
VI. Appendices (to be included only in yearly reports)
    A. Copies of Original Data
    B. Useful Example Calculations
    C. Audit Reports
    D. Modifications to Sampling or Analytical Methods
    E. Other Miscellaneous Support for the Report

The contents of the report sections are briefly described below:

8.3.1 SECTION I OVERVIEW OF QUARTER OR YEAR

The first section of each report will be a summary of the quarters or years activities. Information on overall AFGD system operation will be discussed and the monitoring activities associated with each environmental media will be highlighted.

8.3.2 SECTION II PROJECT STATUS

With each quarterly report the status of the demonstration project will be described. This will include a description of the AFGD system process conditions for that quarter and the relationship to the overall demonstration period. Plans for AFGD system operation for the next quarter also will be described. More detailed information will be provided in the yearly report.

8.3.2 SECTION III SOURCE EMISSIONS AND DISCHARGES

Monitoring data for the various environmental media will be summarized in this section of each quarterly report and detailed in the annual report. Emphasis will be placed on air emissions, wastewater discharges and solid wastes or byproducts as described below.

8.3.3.1 Air Emissions

Each report will contain a section concerning air emissions. Parameters monitored by CEM's (SO_2, opacity, percent of O_2 or CO_2) will be collected and stored on a PC with backup data recorded on strip charts. These data will be reduced and accessible via the PC. The SO_2 content of coal at the Bailly Station will be determined by daily coal analysis in the Station laboratory. This data will be entered into the mainframe computer and reported on a monthly/quarterly average.

Particulate matter will be sampled once in 1990 and 1992. Northern Indiana engages a contractor to do the stack sampling and report test results to the appropriate Station personnel. This information will be forwarded to the Environmental Programs Department

and archived. All of the data discussed above will be collected for the existing Bailly Station stack and the new AFGD stack.

In order to minimize sampling costs, collection of AFGD system specific air emission data will be coordinated with other monitoring activities (e.g., CEM certification). The results of these analyses will be reported in the same format as Bailly Station air emission data.

8.3.3.2 Wastewater Discharges

Data collected for wastewater monitoring will comply with the National Pollutant Discharge Elimination System (NPDES) permit criteria. Analyses from a laboratory will be received by the Station's Environmental Operations Specialist or Air Monitoring Team in hard copy form. Results will be recorded in the appropriate log book and the original lab report will be forwarded to the Northern Indiana Environmental Programs Department or the Pure Air DOE Program Coordinator for retention.

Various parameters monitored with respect to wastewater discharges will be processed and reported at different intervals according to the Bailly Station operating permits. All of the data will be accumulated and organized in the reports similar to that reported to the Indiana Department of Environmental Management, Office of Water Management. A similar format will be used when makeup water monitoring is conducted.

8.3.3.3 Solid and Solid Waste Discharges

This section of each report will cover laboratory analyses of ash, gypsum, wastewater treatment system solids, and other solid materials (e.g., coal, limestone, hydrated lime). The reporting of these data will be similar to that used for reporting air emissions or wastewater discharges laboratory data. Data from a laboratory will be initially forwarded to Northern Indiana's Environmental Operations Specialist or the Pure Air Monitoring Team. It then will be reviewed and incorporated in a report for further review/dissemination by appropriate project personnel.

8.3.3.4 Plant Operating Conditions

Detailed descriptions of plant operating conditions will be reported to DOE in other topical reports. However, this information will be included in the environmental monitoring reports when operating conditions are pertinent to the data. This will include information such as the coal type to be used at the time of a particular monitoring activity or when the WES is being tested.

8.3.4 SECTION IV COMPLIANCE

An evaluation of compliance with applicable permit limits will be included in each report. Excursions, if any, will be discussed in relation to AFGD system operations.

An integral part of determining compliance will be an evaluation of the QA/QC procedures. As shown in Figure 7.1-2, QA/QC checks will be performed at least two times on data as it passes through the Northern Indiana and Pure Air

project team hierarchy's of data management and reporting. Comments related to QA/QC of the laboratory analyses and data will be reported in each report.

8.3.5 SECTION V PROBLEMS AND RECOMMENDATIONS

After commenting on monitoring data quality and discussing any problems with Bailly Station or AFGD system operations, the quarterly and final reports will include a section where recommendations will be made to rectify problems. Even if there are no problems during the demonstration period, improvements in operations may become apparent and will be summarized or discussed in this section of each report.

8.3.6 SECTION VI APPENDICES

Monitoring data which is too lengthy or detailed to include in the other sections of the yearly report will be placed in appendices. Typical examples are copies of original data, useful example calculations and audit results. This latter section will contain an explanation of any modifications to sampling or analytical methods used. The appendices will also contain any other miscellaneous data that would support discussions included in the report.

8.4 CONFIDENTIAL INFORMATION

The information obtained from the monitoring activities described in Section 6 Environmental Monitoring, and appropriate process information discussed below will not be considered confidential. However, if DOE requires process information beyond that included in the monitoring reports, the project will deal with this request on a case-by-case basis. Pure Air may not allow some process information to be released to the public, however, if necessary, in order to evaluate the performance of the project, the DOE Contracting Officer's Technical Representative

(COTR) or his designee, will have access to this process information. The COTR may either review the information at Pure Air's headquarters or request that certain items be forwarded to him. If proprietary process information is forwarded to the COTR, the information will have appropriate legends. If the COTR requires more process information than what was provided, then the COTR will be requested to provide Pure Air with specific questions. These questions will then be forwarded to MHI in Tokyo. MHI will provide specific answers to the questions by a single, nonreproducible copy or will allow the COTR to review the information at Pure Air's headquarters.

MHI has an extremely strong United States patent position both in the overall FGD process as well as in specific areas of process technology. This involves significant MHI proprietary information which has been provided to Pure Air in sufficient detail to carry out the AFGD project. The project team intends to leave proprietary process information out of the environmental monitoring reports.

The types of process information considered proprietary include the following items in relation to a "black box" flow diagram of the process which shows at least the major subsystems of the process sufficient to provide a general understanding of the process:

- composition of materials and energy entering and leaving the overall process, and each major process step, and

- composition of other feed streams into the "black box".

The types of information that are not considered proprietary include the following; which will be included in the environmental monitoring reports if necessary to interpret the data:

- flow rates of materials and stream temperature entering and leaving the overall process, and each major process step (e.g., consumption of coal, limestone and other feed streams);

- quantitative information on composition and flows for the existing Bailly Station streams for which the percent SO_2 can be calculated, and emissions of additional parameters (e.g., particulates);

- frequency of replacement of reagents or equipment since this can have major impact on process costs;

- information on quantities and composition of recycle streams within individual process steps only where the magnitude of the recycle streams is important to environmental monitoring;

- overall sizes or dimensions for major process units where size is a significant consideration in the commercial potential of the process and environmental monitoring (e.g., where size affects the degree of retrofittability of the technology), and

- information on process run duration indicative of process reliability or operability, and environmental monitoring.

SECTION 9.0

LIST OF PREPARERS AND PROFESSIONAL QUALIFICATIONS

The primary preparer's of the EMP were as follows by organization.

9.1 AIR PRODUCTS AND CHEMICALS, INC.

Kunz, Robert G., B.Ch.E, M.S., M.B.A, Ph.D., P.E.

Dr. Kunz, a Chemical and Environmental Engineer, is the Manager of Environmental Engineering Design for Air Products and Chemicals, Inc. Process System Group. He has over 20 years of industrial experience in chemical and refinery technology, process engineering, and environmental assessment, control and permitting. He has contributed to the published literature in the areas of environmental control and water and wastewater treatment, and is a recipient of the Harrison Prescott Eddy Medal from the Water Pollution Control Federation.

Reighard, Robert C., B.S. Ch.E.

Mr. Reighard, a Chemical Engineer, is the Director of Operations for Pure Air. He has over 20 years of industrial experience in PVC plant design, construction and maintenance; H_2, CO, O_2, N_2 and Ar industrial gas plant design, operation and maintenance; coal gasification technology; small fossil-fuel fired co-generation plant design; and flue gas desulfurization plant design. For 10 of the 20 years Mr. Reighard held positions as Plant Engineer and Plant Manager.

9.2 NORTHERN INDIANA PUBLIC SERVICE CO.

Ross, John M., B.A., M.B.A.

Mr. Ross is the Superintendent of Environmental Planning in Northern Indiana's Environmental Programs Department. He acted as Northern Indiana's project coordinator for the preparation of AFGD project environmental documents. During the past 11 years, Mr. Ross has held various environmental positions at Northern Indiana to include ambient air monitoring system design and operation, estimation of air pollution emissions, performance and review of EPA source tests, and application and operation of continuous emissions monitors. Mr. Ross has also been involved in the analysis of environmental regulation and policy to the extent that it impacts Northern Indiana operations.

9.3 PURE AIR

Bolinsky, Francis T., B.S.

Mr. Bolinsky, a Chemical Engineer, is the Senior Project Manager for Pure Air. He has over 18 years of experience in industrial plants and has been extensively involved in permitting in many states.

Brown, Gregory N., B.S.

Mr. Brown, a Process Engineer, is working on the process design for the AFGD project. His experience includes 3 years in the design and operation of industrial chemical facilities.

Heydorn, Edward C., B.S., M.S.

Mr. Heydorn, a Process Engineer, is the Principal Process Engineer for the AFGD project. He has over 10 years experience in the design and operation of industrial chemical facilities.

9.4 STEARNS-ROGER DIVISION OF UNITED ENGINEERS & CONSTRUCTORS INC.

Brown, Gary D., B.S., P.E.

Mr. Brown, a Chemical Engineer, served as a Process Engineer for preparation of the EMPO. He has 14 years of experience in the flue gas desulfurization (FGD) and air pollution control industry. This includes extensive experience in technical feasibility and economic studies of SO_2 control processes for the Electric Power Research Institute (EPRI) and private utilities. Mr. Brown is a Registered Professional Engineer in Colorado (Registration No. 20713) and is a Process Engineer in the Power Division of Stearns-Roger.

Dennis, D. Steve, B.S., M.S., Ph.D.

Dr. Dennis, an Environmental Project Supervisor, coordinated the overall development of the EMP. He has over 19 years experience with environmental studies and over 12 years experience with permitting industrial projects throughout the United States.

APPENDIX A

BAILLY GENERATING STATION AND AFGD PROJECT ENVIRONMENTAL PERMITS

- BAILLY GENERATING STATION PERMIT FOR OPERATION OF AIR POLLUTION CONTROL FACILITIES

- AFGD SYSTEM PERMIT FOR CONSTRUCTION OF AIR POLLUTION CONTROL FACILITIES

- BAILLY GENERATING STATION/AFGD SYSTEM NPDES PERMIT MODIFICATION FOR WASTEWATER DISCHARGES

BAILLY GENERATING STATION
PERMIT FOR OPERATION OF
AIR POLLUTION CONTROL FACILITIES
(DATE ISSUED APRIL 5, 1989)

OPERATION PERMIT

Control No. 2014

Page 1 of 2

OFFICE OF AIR MANAGEMENT

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
105 South Meridian Street
Indianapolis, Indiana 46225

Northern Indiana Public Service Company
Bailly Generating Station
at Burns Harbor
Chesterton, Indiana

is hereby authorized to operate

the cyclonic (subcritical) coal fired boiler (Unit #7), rated at 1638 million Btu's per hour energy input, used to generate up to 183 megawatts (gross) of electricity. Particulate matter emissions are controlled by an electrostatic precipitator. Controlled boiler emissions are exhausted to the atmosphere through a 400 foot tall stack having a 15.25 foot exit diameter that is shared with Unit #8.

This permit is issued under provisions of 326 IAC Article 2 with the following conditions:

1. That the data and information supplied in the application shall be considered part of this permit. Prior to any change in the operation which may result in an increase in potential emissions exceeding those specified in 326 IAC 2-1-1, this change must be approved by the Office of Air Management.
2. That the permittee shall comply with the provisions of the Indiana Environmental Management Law (IC 13-7), Air Pollution Control Law (IC 13-1-1) and the rules promulgated thereunder.
3. That the equipment shall be operated and maintained in accordance with the manufacturer's specifications.

Identification No. 64-07-92-0245

Expiration Date July 1, 1992

Date Issued April 5, 1989

Issued by James W. Rust
Commissioner

State Form 37079 R

Conditions Continued:

4. That pursuant to 326 IAC 6-2 Section 1(b), particulate matter emissions to the atmosphere from this boiler shall be limited to 0.22 pounds per million Btu's of energy input.

5. That pursuant to Section 4 (e) of 326 IAC 2-1, stack tests to determine particulate matter emissions from this boiler shall be conducted pursuant to 326 IAC 3-2. The first test shall be performed during calendar year 1990 with another test to be performed during calendar year 1992. The Office of Air Management (OAM) shall be notified of the test dates in advance pursuant with 326 IAC 3-2-3, and test reports shall be submitted to the OAM within 45 days of the test.

6. That pursuant to 326 IAC 7-1-21 (a)(2), sulfur dioxide emissions from Boiler Nos. 7 and 8 shall be limited to 6.0 lbs./MMBtu. Boilers 7 and 8 shall be fired with coal, fuel oil or natural gas.

7. That the station shall sample and analyze the coal used in Boiler Nos. 7 and 8 on a daily basis. (Note: Analysis based on composite samples for weekends and holidays will be acceptable.) The above analysis will include all of the following on an as bunkered or as burned basis: heat content, % sulfur, % ash and % moisture. Pursuant to 326 IAC 7-1-3, quarterly reports of the 30-day rolling weighted average emission rate (in pounds per million Btu) for each day of the quarter shall be submitted by the last day of the month following the end of the quarter. Records of the daily average sulfur content, heat content and sulfur dioxide emission rate (in pounds per million Btu) shall be retained at the station for three years and submitted with the quarterly reports or made available upon request.

8. That visible emissions shall be limited to 40% opacity pursuant to 326 IAC 5-1, Section 2(a)(1), for attainment areas.

9. That pursuant to Section 3(d) of 326 IAC 5-1, a special temporary exemption is hereby granted to allow, when necessary, the following visible stack emissions during boiler startups and shutdowns.

   (a) During boiler startups an exemption from the 40% opacity limit is allowed for up to 10 (ten) six-minute average periods, or until the flue gas temperature entering the electrostatic precipitator reaches 250 degrees F, which ever occurs first. In the event that the above is exceeded due to special circumstances (such as a cold startup after an extended outage), NIPSCO shall report this to the OAM within one working day of the occurrence. This report shall also include the total accumulated periods of excess opacity and the reason why the extended time was necessary. During these startup periods all reasonable efforts shall be made to minimize the number and magnitude of the exceedances.

   (b) During boiler shutdowns an exemption from the 40% opacity limit is allowed for up to 10 (ten) six-minute average periods. During these shutdown periods all reasonable efforts shall be made to minimize the number and magnitude of the exceedances.

10. That at no time shall the combined rate of heat input for Boiler Nos. 7 and 8 exceed a total of 5,012 million Btu's per hour.

OPERATION PERMIT

Control No. 2015

OFFICE OF AIR MANAGEMENT

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
105 South Meridian Street
Indianapolis, Indiana 46225

Northern Indiana Public Service Company
Bailly Generating Station
at Burns Harbor
Chesterton, Indiana

is hereby authorized to operate

the cyclonic (critical) coal fired boiler (Unit #8), rated at 3374 million Btu's per hour energy input, used to generate up to 345 megawatts (gross) of electricity. Particulate matter emissions are controlled by an electrostatic precipitator. Controlled boiler emissions are exhausted to the atmosphere through a 400 foot tall stack having a 15.25 foot exit diameter that is shared with Unit #7.

This permit is issued under provisions of 326 IAC Article 2 with the following conditions:

1. That the data and information supplied in the application shall be considered part of this permit. Prior to any change in the operation which may result in an increase in potential emissions exceeding those specified in 326 IAC 2-1-1, this change must be approved by the Office of Air Management.
2. That the permittee shall comply with the provisions of the Indiana Environmental Management Law (IC 13-7), Air Pollution Control Law (IC 13-1-1) and the rules promulgated thereunder.
3. That the equipment shall be operated and maintained in accordance with the manufacturer's specifications.

Identification No. 64-07-92-0246

Expiration Date July 1, 1992

Date Issued April 5, 1989

Issued by [signature]
Commissioner

State Form 37079 R

Conditions Continued:

4. That pursuant to 326 IAC 6-2 Section 1(b), particulate matter emissions to the atmosphere from this boiler shall be limited to 0.22 pounds per million Btu's of energy input.

5. That pursuant to Section 4 (e) of 326 IAC 2-1, stack tests to determine particulate matter emissions from this boiler shall be conducted pursuant to 326 IAC 3-2. The first test shall be performed during calendar year 1990 with another test to be performed during calendar year 1992. The Office of Air Management (OAM) shall be notified of the test dates in advance pursuant with 326 IAC 3-2-3, and test reports shall be submitted to the OAM within 45 days of the test.

6. That pursuant to 326 IAC 7-1-21 (a)(2), sulfur dioxide emissions from Boiler Nos. 7 and 8 shall be limited to 6.0 lbs./MMBtu. Boilers 7 and 8 shall be fired with coal, fuel oil or natural gas.

7. That the station shall sample and analyze the coal used in Boiler Nos. 7 and 8 on a daily basis (Note: Analysis based on composite samples for weekends and holidays will be acceptable.) The above analysis will include all of the following on an as bunkered or as burned basis: heat content, % sulfur, % ash and % moisture. Pursuant to 326 IAC 7-1-3, quarterly reports of the 30-day rolling weighted average emission rate (in pounds per million Btu) for each day of the quarter shall be submitted by the last day of the month following the end of the quarter. Records of the daily average sulfur content, heat content and sulfur dioxide emission rate (in pounds per million Btu) shall be retained at the station for three years and submitted with the quarterly reports or made available upon request.

8. That visible emissions shall be limited to 40% opacity pursuant to 326 IAC 5-1, Section 2(a)(1), for attainment areas.

9. That pursuant to Section 3(d) of 326 IAC 5-1, a special temporary exemption is hereby granted to allow, when necessary, the following visible stack emissions during boiler startups and shutdowns.

   (a) During boiler startups an exemption from the 40% opacity limit is allowed for up to 10 (ten) six-minute average periods, or until the flue gas temperature entering the electrostatic precipitator reaches 250 degrees F, which ever occurs first. In the event that the above is exceeded due to special circumstances (such as a cold startup after an extended outage), NIPSCO shall report this to the OAM within one working day of the occurrence. This report shall also include the total accumulated periods of excess opacity and the reason why the extended time was necessary. During these startup periods all reasonable efforts shall be made to minimize the number and magnitude of the exceedances.

   (b) During boiler shutdowns an exemption from the 40% opacity limit is allowed for up to 10 (ten) six-minute average periods. During these shutdown periods all reasonable efforts shall be made to minimize the number and magnitude of the exceedances.

10. That at no time shall the combined rate of heat input for Boiler Nos. 7 and 8 exceed a total of 5,012 million Btu's per hour.

OPERATION PERMIT

Control No. 2015

OFFICE OF AIR MANAGEMENT

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
105 South Meridian Street
Indianapolis, Indiana 46225

Northern Indiana Public Service Company
Bailly Generating Station
at Burns Harbor
Chesterton, Indiana

is hereby authorized to operate

the oil fired gas turbine (Unit #10), rated at 435 million Btu's per hour energy input, used to generate electricity during periods of peak demand. Emissions are exhausted to the atmosphere through a 40 foot tall stack having a 14 foot exit diameter.

This permit is issued under provisions of 326 IAC Article 2 with the following conditions:

1. That the data and information supplied in the application shall be considered part of this permit. Prior to any change in the operation which may result in an increase in potential emissions exceeding those specified in 326 IAC 2-1-1, this change must be approved by the Office of Air Management.
2. That the permittee shall comply with the provisions of the Indiana Environmental Management Law (IC 13-7), Air Pollution Control Law (IC 13-1-1) and the rules promulgated thereunder.
3. That the equipment shall be operated and maintained in accordance with the manufacturer's specifications.

Identification No. 64-07-92-0247

Expiration Date July 1, 1992

Date Issued April 5, 1989

Issued by Thomas W. Kenick
Commissioner

State Form 37079 R

OPERATION PERMIT

Control No. 2015

OFFICE OF AIR MANAGEMENT

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
105 South Meridian Street
Indianapolis, Indiana 46225

Northern Indiana Public Service Company
Bailly Generating Station
at Burns Harbor
Chesterton, Indiana

is hereby authorized to operate

the facilities associated with the fuel and dry flyash handling and storage systems, serving the coal fired boilers.

This permit is issued under provisions of 326 IAC Article 2 with the following conditions:

1. That the data and information supplied in the application shall be considered part of this permit. Prior to any change in the operation which may result in an increase in potential emissions exceeding those specified in 326 IAC 2-1-1, this change must be approved by the Office of Air Management.
2. That the permittee shall comply with the provisions of the Indiana Environmental Management Law (IC 13-7), Air Pollution Control Law (IC 13-1-1) and the rules promulgated thereunder.
3. That the equipment shall be operated and maintained in accordance with the manufacturer's specifications.
4. That fugitive dust emissions shall comply with 326 IAC 6-4.

Identification No. 64-07-92-0248

Expiration Date July 1, 1992

Date Issued April 5, 1989

Issued by _____
Commissioner

AFGD SYSTEM PERMIT FOR CONSTRUCTION OF AIR POLLUTION CONTROL FACILITIES

(DATE ISSUED MARCH 15, 1990)

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

105 South Meridian Street
P.O. Box 6015
Indianapolis 46206-6015
Telephone 317-232-8603

TO: All Permittees

FROM: Timothy J. Method
Assistant Commissioner
Office of Air Management

SUBJECT: Standard Permit Conditions

The enclosed permit is issued based on an application that you submitted to the Office of Air Management. In addition to the specific conditions in the permit, under Indiana Law it is subject to the following:

1. Pursuant to IC 13-7-10-2.5(b), IC 4-21.5-3-5(f), and IC 4-21.5-3-5(h), this permit takes effect 15 days from receipt of this notice unless a petition for review and a petition for stay of effectiveness are filed within this 15 day period. If a petition for review and a petition for stay of effectiveness are filed, any part of the permit within the scope of the petition for stay is stayed an additional 15 days. The portions of the permit for which a petition for stay has been filed will take effect at the expiration of the additional 15 day period, unless or until an Administrative Law Judge stays the permit in whole or in part.

2. This permit may be revoked or modified in accordance with the provisions of IC 13-7-10-5.

CONSTRUCTION PERMIT

Control No. 772

Page 1 of 6

OFFICE OF AIR MANAGEMENT

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
105 South Meridian Street
P.O. Box 6015
Indianapolis, Indiana 46206-6015

NORTHERN INDIANA PUBLIC SERVICE COMPANY
BAILLY GENERATING STATION
NEAR CHESTERTON, INDIANA

is hereby authorized to construct

the Advanced Flue Gas Desulfurization (AFGD) system at the above location. This system consists of a wet limestone scrubber to remove sulfur dioxide emissions from Units 7 and 8 flue gas stream, along with associated material handling and storage facilities and a 500 horsepower emergency diesel generator.

THIS PERMIT IS ISSUED UNDER PROVISIONS OF RULE 326 IAC 2-1, WITH CONDITIONS LISTED ON THE ATTACHED PAGES.

Identification No. PC (64) 1816

Expiration Date N/A

Date Issued 3/15/90

Issued by Timothy J. Method
Commissioner

State Form 37080 R

Construction Permit Conditions

1. That this permit to construct does not relieve Northern Indiana Public Service Company (Northern Indiana) of the responsibility to comply with the control strategy of the State Implementation Plan, as well as other applicable local, state, and federal requirements.

2. That the data and information supplied with the application shall be considered part of this permit. Any change or modification in the potential to emit shall be reported in writing to the Office of Air Management (OAM) for approval before making such change.

3. That the equipment shall be installed in accordance with the manufacturers specifications, and as stated in the application.

4. That pursuant to 326 IAC 2-1-9(b) the Commissioner may revoke this permit if construction is not commenced within eighteen (18) months after receipt of this approval or if construction is discontinued for a period of one (1) year or more.

5. (a) That pursuant to 326 IAC 3-1-8(1)(B), instruments for continuous monitoring and recording of AFGD system sulfur dioxide outlet emissions shall be installed. The oulet monitor shall be located in the new AFGD stack to measure the sulfur dioxide concentration in the gas stream after treatment by the AFGD scrubber.

   (b) That instruments for continuous monitoring and recording of AFGD system sulfur dioxide inlet emissions shall be installed. The inlet monitor shall be located to measure the sulfur dioxide concentration in the combined Unit 7 and 8 gas stream before the AFGD scrubber. (Note: The inlet monitor is to be used for informational purposes only to provide data on % SO2 removal thru the AFGD scrubber.)

6. (a) That pursuant to 326 IAC 3-1-8(1)(D), instruments for continuous monitoring and recording of outlet percent oxygen or carbon dioxide (necessary to convert sulfur dioxide continuous monitoring data to the units of the standard - lbs/MMBtu) shall be installed to provide data representative of the AFGD stack gas stream at the location that the outlet sulfur dioxide concentration is monitored.

   (b) That instruments for continuous monitoring and recording of inlet percent oxygen or carbon dioxide shall be installed to provide data representative of the combined Unit 7 and 8 flue gas stream before the AFGD scrubber at the location that the inlet sulfur dioxide concentration is monitored. (Note: The inlet monitor is to be used for informational purposes only to provide data on % SO2 removal thru the AFGD scrubber.)

7. That pursuant to 326 IAC 3-1-8(1)(A), instruments for continuous monitoring and recording of opacity from Unit 7 and Unit 8 shall be installed. These continuous opacity monitors shall be located in the individual unit ducts downstream of the ESP's but upstream of the AFGD system combined flow duct in a location that meets the EPA's continuous emission monitor location guidelines. Data from these opacity monitors shall not be combined but recorded and reported separately.

Construction Conditions Continued:

8. That an application for an operation permit must be made sixty (60) days before start-up.

9. That when the facility is constructed and placed into operation the following operation conditions shall be met:

Operation Conditions

Emission Limitations

1. That sulfur dioxide emissions from the AFGD system stack shall be limited to 1.2 pound per million Btu's of energy input. (This rate was used in the modelling and technical support for the construction permit.)

2. That pursuant to 326 IAC 6-2-1(b), particulate matter emissions to the atmosphere from the AFGD system stack shall be limited to 0.22 pounds per million Btu's of heat input.

3. That pursuant to 326 IAC 5-1-2(a)(1), visible emissions from the AFGD system stack shall be limited to 40% opacity.

Continuous Emission Monitoring Requirements

4. (a) That pursuant to 326 IAC 3-1-8(1)(B), instruments for continuous monitoring and recording of sulfur dioxide AFGD stack outlet emissions shall be certified, calibrated, maintained and operated pursuant to 326 IAC 3-1-9. (See Construction condition No. 5(a).)

   (b) That instruments for continuous monitoring and recording of sulfur dioxide combined Unit 7 and 8 AFGD scrubber inlet emissions shall be certified, calibrated, maintained and operated. (See Construction condition No. 5(b).) (Note: The inlet monitor is to be used for informational purposes only to provide data on % SO2 removal thru the AFGD scrubber.)

5. (a) That pursuant to 326 IAC 3-1-8(1)(D) instrument(s) for continuous monitoring and recording of AFGD stack outlet percent oxygen or carbon dioxide (necessary to convert sulfur dioxide continuous monitoring data to the units of the standard - lbs/MMBtu) shall be installed, calibrated, certified, maintained and operated pursuant to 326 IAC 3-1-9. (See Construction condition No. 6(b).)

   (b) That instruments for continuous monitoring and recording of combined Unit 7 and 8 AFGD scrubber inlet percent oxygen or carbon dioxide (necessary to convert sulfur dioxide continuous monitoring data to the units of the standard - lbs/MMBtu) shall be installed, calibrated, certified, maintained and operated. (See Construction condition No. 6(a).) (Note: The inlet monitor is to be used for informational purposes only to provide data on % SO2 removal thru the AFGD scrubber.)

Operation Conditions Continued:

6. That pursuant to 326 IAC 3-1-8(1)(A) instruments for continuous monitoring and recording of opacity from Unit 7 and Unit 8 shall be installed, certified, calibrated, maintained and operated pursuant to 326 IAC 3-1-9. These opacity monitors shall be located in the individual units ducts downstream of the ESP's but upstream of the AFGD system combined flow duct in a location that meets the EPA CEM location guidelines. Data from these opacity CEM's shall not be combined but recorded and reported separately.

Testing and Compliance Determination Requirements

7. That the sulfur content of the coal used at the Bailly Station shall not exceed 4.5%. The station shall sample and analyze the coal bunkered on a daily basis. The above analysis will include the heat content and %S on an as bunkered basis. Records of the above daily analysis shall be maintained at the station for at least the most recent 2 year period and made available to the OAM upon request.

8. That pursuant to 326 IAC 2-1-4(e), stack tests to determine compliance with the particulate matter limit contained in Condition No. 2 shall be conducted in accordance with 326 IAC 3-2 using EPA Method 5b or 17. The first test shall be conducted within 180 days of the initial operation of the AFGD (initial operation is defined as the first time the AFGD is in operation removing SO2 from a Unit 7 or 8 flue gas stream) with another test to be conducted during calendar year 1994 (or in the second calendar year following the initial start of operation, whichever is later). The OAM shall be notified of the test dates in advance in accordance with 326 IAC 3-2-3 and test reports shall be submitted to the OAM within 45 days of the test. Continuous opacity emission monitor and Method 9 visible emission data recorded during the test shall be submitted with the test report.

   Testing shall be conducted in the new AFGD system stack with the AFGD system and the Wastewater Evaporation System (WES) in service. If the WES system is not fully operational in the first 180 days, Northern Indiana has the option to retest at a later date with the WES in service. In this instance, Northern Indiana shall perform testing within 90 days after the WES is fully operational. Both Units 7 & 8 shall be in operation at 95% or greater load during the test. (As an alternative each unit may be tested separately at 95% or greater load). If operation of WES system is permanently discontinued then this requirement no longer applies.

9. That pursuant to 326 IAC 7 compliance with the sulfur dioxide emission limit can be determined at any time by a SO2 stack test conducted pursuant to 326 IAC 3-2. In addition, compliance shall be determined based on the 30-day rolling weighted average SO2 emission rate determined by using the continuous emission monitor data.

   The 30-day rolling weighted average SO2 emission rate (in pounds per million Btu's) for each day shall be reported to the OAM on a quarterly basis (see Condition No. 11). These rates shall be determined by using the hourly continuous monitoring data to calculate daily SO2 emission rates. Excess hourly average emission rates due to startup or shutdown may be excluded from the calculation of the daily average but shall be reported on a quarterly basis as required by Condition No. 10.

Conditions Continued:

9. (Continued)
A separate 30-day rolling weighted average shall be maintained for the AFGD stack and the previously existing Bailly station stack. Each day for which there is a period of more than one hour during which either stack is in use for the purpose of venting emissions from one or both of the Bailly Station units shall be included (on a weighted basis) in the 30 day rolling weighted average for that stack.

Reporting Requirements

10. That pursuant to 326 IAC 3-1-10 reports of the time, duration, magnitude and cause of periods of excess emissions (as below) or monitor malfunctions shall be submitted to the OAM on a quarterly basis as follows:

a) all periods of excess (greater than 40%) opacity in percent(%), on a six-minute average basis;
b) all periods of excess sulfur dioxide emissions, in pounds per million Btu's on a block three-hour average basis, during periods when the three hour average outlet SO2 emission rate exceeds 1.2 lbs/MMBtu's;
c) all periods in which any of the required continuous emission monitoring systems are inoperative, except for periods of zero and span checks.

11. That quarterly AFGD system stack SO2 compliance reports shall be submitted within 30 days of the end of the quarter being reported and shall include the following for each 24-hour period:

- date;
- daily average SO2 emission rate (in lbs/MMBtu);
- daily average SO2 % removal (based on inlet and outlet CEM);
- number of hourly periods that the daily average is based on;
- identification of and reason for any excluded hourly data;
- daily weighting factor (generation or coal burned);
- 30-day rolling weighted average SO2 emission rate (in lbs/MMBtu);
- reasons for noncompliance with the limit and description of corrective action taken (if applicable).

Material Handling Requirements

12. That the limestone to be used in the AFGD system shall be pulverized to the necessary size off-site and received on-site in a ready to use condition. Lime and limestone shall be delivered to the site in enclosed pneumatic trucks and unloaded pneumatically into storage silos equipped with bin vent filters. The lime and limestone transfer blowers shall be located in enclosed buildings.

13. That particulate matter emissions from each of the limestone and lime bin vent filters shall be limited to 0.02 grains per dry acfm.

Conditions Continued:

14. That dewatered gypsum will be transferred via an enclosed conveyor to an enclosed storage building.

15. That the fugitive dust plan as described on pages 5-1, 4-2, and 4-3 of the October 1989 document submitted by Northern Indiana, entitled "Fugitive Dust Control Plan - Addendum to Engineering Report", shall be implemented. (Referenced pages attached to permit).

Diesel Generator Requirements

16. That the oil burned in the Advanced Flue Gas Desulfurization AFGD system emergency diesel generator shall have a maximum sulfur content of 0.3 %. Records of sulfur content of all fuel oil used in the AFGD system emergency diesel generator shall be maintained for the most recent 2 year period and made available to the OAM upon request.

17. That operation of the AFGD system emergency diesel generator shall be limited to 24 hours per month (288 hours per year). Records of all periods AFGD emergency diesel generator operation shall be maintained for the most recent 2 year period and made available to the OAM upon request. These records shall include the times of the start and end of operation, the operating time for that period (in hours) and the total cumulative operating time (in hours) for that calendar month.

5. FUGITIVE PARTICULATE EMISSIONS CONTROL RESPONSIBILITIES

Operation of the AFGD system will be Pure Air's responsibility; whereas, Bailly Station operation including the roadway will be controlled by Northern Indiana. Thus, control of all fugitive emissions associated with the AFGD system will be the responsibility of Pure Air's on-site Plant Manager or his designee. The designated individual will be responsible for ascertaining that fugitive emissions associated with the reagent feed systems (limestone and hydrated lime), and conveyance and transfer of gypsum comply with the operating permit conditions. The Pure Air designated individual will have direct communication with the AFGD system Plant Manager to ensure compliance with these permit conditons.

As indicated above, Northern Indiana will be responsible for controlling fugitive emissions from vehicle resuspension. The Bailly Station's Plant Manager will be responsible for implementing the vehicle resuspension fugitive emissions control plan. The Station's Coal Handling Department will be responsible for carrying out the specific plan activities and for maintaining records of fugitive emissions control activities. Compliance will be monitored by Northern Indiana's Environmental Programs Department. This will also ensure compliance with IDEM, OAM permit conditions.

The fugitive emissions control plan will be implemented during startup activities of the AFGD system. The plan will be in effect on a year-round basis.

fugitive particulate emissions associated with the proposed AFGD system and the proposed road surface flushing program will be below the de minimis values for both TSP and PM-10 (25 ton/yr and 15 ton/yr, respectively) with either 4.5 or 3.0 percent sulfur coal. This is summarized in Table 4-1.

In order to control fugitive particulate emissions from vehicle resuspension the following procedures will be implemented:

1. The total approximate 3.2 mile roadway shown on Drawing No. 9-6992-6290 will be cleaned by water flushing at an applied rate of 5,000 gallons per mile on a once per week basis. Based on a control efficiency presented in the Ohio EPA document entitled, Reasonably Available Control Measures for Fugitive Dust Sources (September 1980), this activity will yield an efficiency of 80 percent emissions reduction.

2. A high pressure water flushing truck such as that manufactured by Klein Equipment, Inc., TX, Model No: D600 will be used to wash the roadway surface.

3. The roadway will not be flushed under the following conditions.

   a. A minimum of 0.1 inch of rainfall occurred during the preceding 24-hour period. The amount of rainfall will be determined by measurements representative of onsite conditions.

   b. It is raining at the time of the scheduled water flushing.

BAILLY GENERATING STATION/AFGD
SYSTEM NPDES PERMIT
MODIFICATION FOR WASTEWATER DISCHARGES
(DATE ISSUED MARCH 2, 1990)

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

105 South Meridian Street
P.O. Box 6015
Indianapolis 46206-6015
Telephone 317/232-8603

March 5, 1990

VIA CERTIFIED MAIL P 741 219 991

Mr. William R. Elliott, V. P.
and General Manager, Electric Supply
Northern Indiana Public Service Company
Corporate Headquarters
5265 Hohman Avenue
Hammond, Indiana 46320

Re: NPDES Permit No. IN 0000132
NIPSCO Bailly Station
Chesterton, Indiana

Dear Mr. Elliott

Your application for modification of the above-referenced discharge permit has been processed in accordance with Section 402 and 405 of the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251, et seq.), and the Indiana Environmental Management Act, as amended (IC 13-7).

The enclosed Pages 1 through 21 of 21 are intended to replace Pages 1 through 20 of 20 of the existing permit. An accompanying Briefing Memo itemizes and explains the rationale for the revisions.

The enclosed NPDES Permit Amendment covers your existing NPDES Permit No. IN 0000132. All discharges from the referenced facility shall be consistent with the terms and conditions of this permit, as amended.

Please see the Post Public Notice Addendum at the end of the Briefing Memo accompanying the final permit for responses to the comment letter of November 27, 1989, signed by Mr. Mark Maassel and explanation of changes made to the final permit.

Pursuant to IC 4-21.5-3-2(e) and IC 4-21.5-3-5(f), the determination of modification in this letter becomes effective eighteen (18) days after it is served by U.S. mail. A party affected or aggrieved by this decision may appeal the modification and must do so within eighteen (18) days after the date of mailing of this letter by filing a request for an adjudicatory hearing with the Commissioner of the Indiana Department of Environmental Management. Please send a copy of any such appeal to me at the above address. Any appeal request must be filed in accordance with IC 4-21.5-3-7 and IC 13-7-10-5 and must include facts demonstrating that the party requesting appeal is the applicant, a person aggrieved or adversely affected by this modification or otherwise entitled to review by law. Pursuant to IC 13-7-10-5(b), the permit shall remain in force pending a decision on any appeal that has been timely requested under the provisions of IC 4-21.5 and IC 13-7-10.5.

If you have questions concerning this modification, please contact Mr. Mark Stanifer at 317/232-8704. Questions concerning appeal procedures should be directed to Mr. Ihor Boyko, Office of Legal Counsel at 317/232-8515.

Sincerely,

T.P. Chang for

Charles B. Bardonner
Assistant Commissioner
Office of Water Management

MWS/ssh

Enclosure

cc: Chief, Permit Section, U.S. EPA
Porter County Health Department

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

AMENDED AUTHORIZATION TO DISCHARGE UNDER THE

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Federal Water Pollution Control Act, as amended by P.L. 92-500, P.L. 95-217, and P.L. 97-117, (33 U.S.C. 1251 et seq.; and "ACT"), and the "The Environmental Management Act", as amended (IC 13-7),

NORTHERN INDIANA PUBLIC SERVICE COMPANY
BAILLY GENERATING STATION

is authorized to discharge from a coal-fired power plant located at 246 Bailly Station Road to receiving waters named Lake Michigan and to the groundwater in accordance with effluent limitations, monitoring requirements, and other conditions set forth in Parts I, II, and III.

The permit, as issued on September 29, 1988, and subsequently modified December 6, 1988, is hereby amended, as contained herein. The amended provisions shall become effective April 1, 1990. All terms and conditions of the permit not modified at this time remain in effect. Further, any existing condition or term affected by the amendments will remain in effect until the amended provisions become effective.

This permit and the authorization to discharge, as amended, shall expire at midnight August 31, 1993. In order to receive authorization to discharge beyond the date of expiration, the permittee shall submit such information and forms as are required by the Indiana Department of Environmental Management no later than 180 days prior to the date of expiration.

Signed this 2nd day of March, 1990, for the Indiana Department of Environmental Management.

t P Chang fr

Charles B. Bardonner
Assistant Commissioner
Office of Water Management

5003p 9/25/89

TREATMENT FACILITY CLASSIFICATION

The discharger has a Class C industrial wastewater treatment plant, classified in accordance with 327 IAC 8-12, Classification of Water and Wastewater Treatment Plants.

PART I

A. *EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS*

1. During the period beginning on the effective date of this permit and lasting until the expiration date, the permittee is authorized to discharge from Outfall 001 [1] - main outfall and 002 - intake deicing discharge. Such discharge shall be limited and monitored by the permittee as specified below:

	Quantity or Loading			Quality or Concentration			Monitoring Requirements	
Parameter	Monthly Average	Daily Maximum	Units	Monthly Average	Daily Maximum	Units	Measurement Frequency	Sample Type
Flow [2]	Report	Report	MGD	--	--		Daily	24-Hr. Total
Temperature [3]	Report	Report	°F	--	--		Daily	Continuous
Total Residual Chlorine+	--	--		--	0.2	mg/l	Daily [5]	Grab
Duration of Chlorination [4]	--	--		--	--		Monthly Report	
Chlorination Frequency [4]	--	--		--	--		Monthly Report	

[1] See also additional requirements for the discharge of chloride, total dissolved solids, sulfate and fluoride from this outfall under the requirements of Outfall 401, Page 9 of 21 of this permit.

[2] Flow may be estimated by engineering calculations.

[3] See Other Requirements, Part III of Permit.

[4] Total Residual Chlorine (TRC) may not be discharged from any single generating unit (condenser) for more than two hours per day. Frequency and Duration of chlorination need only be reported for Outfall 001.

[5] During discharge of chlorine bearing wastewater.

a. The discharge shall not cause excessive foam in the receiving waters. The discharge shall be essentially free of floating and settleable solids.

b. The discharge shall not contain oil or other substances in amounts sufficient to create a visible film or sheen on the receiving waters.

c. Samples taken in compliance with the monitoring requirements above shall be taken at a point representative of the discharge but prior to entry into Lake Michigan.

2. During the period beginning on the effective date of this permit and lasting until the expiration date, the permittee is authorized to discharge from Outfall 100 - Miscellaneous Low Volume Bypass. Such discharge shall be limited and monitored by the permittee as specified below:

	Quantity or Loading			Quality or Concentration			Monitoring Requirements	
Parameter	Monthly Average	Daily Maximum	Units	Monthly Average	Daily Maximum	Units	Measurement Frequency	Sample Type
Flow	Report	Report	MGD	--	--		Daily*	24-Hr. Tot
TSS	--	--		30	100	mg/l	Daily*	Grab
Oil & Grease	--	--		15	20	mg/	Daily*	Grab

*During discharge

a. The pH shall not be less than 6.0 nor greater than 9.0. The pH shall be monitored as follows: by a daily grab sample, during discharge.

b. The discharge shall not cause excessive foam in the receiving waters. The discharge shall be essentially free of floating and settleable solids.

c. The discharge shall not contain oil or other substances in amounts sufficient to create a visible film or sheen on the receiving waters.

d. Samples taken in compliance with the monitoring requirements above shall be taken at a point representative of the discharge but prior to mixing with other wastewaters.

3. During the period beginning on the effective date of this permit and lasting until the expiration date, the permittee is authorized to discharge from Outfall 101 - Ash Pond Discharge. Such discharge shall be limited and monitored by the permittee as specified below:

	Quantity or Loading			Quality or Concentration			Monitoring Requirements	
	Monthly	Daily		Monthly	Daily		Measurement	Sample
Parameter	Average	Maximum	Units	Average	Maximum	Units	Frequency	Type
Flow	Report	Report	MGD	--	--		Weekly	24-Hr. Total
TSS	--	--		20	30	mg/l	Weekly	24-Hr. Comp.
Oil & Grease	--	--		15	20	mg/l	Weekly	Grab

a. The pH shall not be less than 6.0 nor greater than 9.0. The pH shall be monitored as follows: by a weekly grab sample, except during discharge of metal cleaning wastes from Outfall 111 sampling is to be conducted daily.

b. The discharge shall not cause excessive foam in the receiving waters. The discharge shall be essentially free of floating and settleable solids.

c. The discharge shall not contain oil or other substances in amounts sufficient to create a visible film or sheen on the receiving waters.

d. Samples taken in compliance with the monitoring requirements above shall be taken at a point representative of the discharge but prior to mixing with other wastewaters.

4. During the period beginning on the effective date of this permit and lasting until the expiration date, the permittee is authorized to discharge from Outfall 111 - metal cleaning waste discharge from the wastewater treatment facility. Such discharge shall be limited and monitored by the permittee as specified below:

	Quantity or Loading			Quality or Concentration			Monitoring Requirements	
Parameter	Monthly Average	Daily Maximum	Units	Monthly Average	Daily Maximum	Units	Measurement Frequency	Sample Type
Flow	Report	Report	MGD	--	--		Daily*	24-Hr. Tota
T. Iron	--	--		--	1.0	mg/l	Daily*	24-Hr. Comp
T. Copper	--	--		--	1.0	mg/l	Daily*	24-Hr. Comp

*These limitations and monitoring requirements apply only during discharge of metal cleaning wastes. The term "metal cleaning wastes" means any wastewater (including chemical cleaning liquor, incinerated metal cleaning wastes (ash), rinse water and passivation solution) resulting from cleaning (with or without chemical compounds) any metal process equipment, including, but not limited to boiler tube cleaning, boiler fireside cleaning and air preheater cleaning. The volume of boiler cleaning waste to which these limitations apply is two boiler volumes, including the initial cleaning solution and the first rinse. For the purpose of this permit, air preheater wash, although defined under 40 CFR 423.12(b)(5) as a metal cleaning waste, is to be considered as a low volume wastestream.

a. Samples taken in compliance with the monitoring requirements above shall be taken at a point representative of the discharge but prior to mixing with other wastestreams.

5. During the period beginning on the effective date of this permit and lasting until the expiration date, the permittee is authorized to discharge from Outfall 201 - sewage Treatment plant. Such discharge shall be limited and monitored by the permittee as specified below:

	Quantity or Loading			Quality or Concentration			Monitoring Requirements	
Parameter	Monthly Average	Daily Maximum	Units	Monthly Average	Daily Maximum	Units	Measurement Frequency	Sample Type
Flow (MGD)	Report	Report		--	--		Weekly	24-Hr. Total
BOD_5	--	--		30	45	mg/l	Weekly	8-Hr. Comp.
Fecal Coliform*	--	--		--	400	100 ml	Weekly	Grab
T. R. Chlorine*	--	--		--	2.0	mg/l	2 X Weekly	Grab

*Fecal coliform and chlorine limitations apply only from April 1 through October 31 annually. Disinfection is not required, and chlorination should not be practiced November 1 through March 31. However, if the permittee determines that it is necessary to disinfect between November 1 and March 31, the daily maximum limitation for total residual chlorine will apply at such time.

a. Samples taken in compliance with the monitoring requirements above shall be taken at a point representative of the discharge but prior to mixing other wastewaters.

6. During the period beginning on the effective date of this permit and lasting until the expiration date, the permittee is authorized to discharge from Outfall 301 - boiler blowdown. Such discharge shall be limited and monitored by the permittee as specified below:

	Quantity or Loading			Quality or Concentration			Monitoring Requirements	
Parameter	Monthly Average	Daily Maximum	Units	Monthly Average	Daily Maximum	Units	Measurement Frequency	Sample Type
Flow	Report	Report	MGD	--	--		2 X Monthly	24-Hr. Total
TSS	--	--		30	100	mg/l	2 X Monthly	24-Hr. Comp.
Oil & Grease	--	--		15	20	mg/l	2 X Monthly	Grab

a. The pH shall not be less than 6.0 nor greater than 9.0. The pH shall be monitored as follows: by a grab sample twice monthly.

b. The discharge shall not cause excessive foam in the receiving waters. The discharge shall be essentially free of floating and settleable solids.

c. The discharge shall not contain oil or other substances in amounts sufficient to create a visible film or sheen on the receiving waters.

d. Samples taken in compliance with the monitoring requirements above shall be taken at a point representative of the discharge but prior to mixing with other wastewaters, except for pH, which may be sampled after mixing with the main discharge. For TSS and oil & grease, the representative location may be from the boiler drum rather than at end-of-pipe.

7. During the period beginning on the effective date of this permit and lasting until the expiration date, the permittee is authorized to discharge from Outfall 003 - coal pile runoff. Such discharge shall be limited and monitored by the permittee as specified below:

	Quantity or Loading			Quality or Concentration			Monitoring Requirements	
Parameter	Monthly Average	Daily Maximum	Units	Monthly Average	Daily Maximum	Units	Measurement Frequency	Sample Type
Flow	Report	Report	MGD	--	--		Weekly*	24-Hr. Tota

*Flow is to be estimated based on precipitation. All parameters are to be monitored weekly during periods of discharge of coal pile runoff to the ground absorption area.

a. The pH shall not be less than 6.0 nor greater than 9.0. The pH shall be monitored as follows: by a weekly grab sample, during periods of discharge.

b. The discharge shall not contain oil or other substances in amounts sufficient to create a visible film or sheen on the receiving waters.

c. Samples taken in compliance with the monitoring requirements above shall be taken at a point representative of the discharge but prior to entry into the ground absorption area.

8. During the period beginning on the effective date of this modification and lasting until the expiration date, the permittee is authorized to discharge from Outfall(s) 401-AFGD system discharge. Such discharge shall be limited and monitored by the permittee as specified below:

	Quantity or Loading			Quality or Concentration			Monitoring Requirements	
Parameter	Monthly Average	Daily Maximum	Units	Monthly Average	Daily Maximum	Units	Measurement Frequency	Sample Type
Flow	Report	Report	MGD	--	--	--	2 X Weekly	24-Hr. Tota
TSS	--	--	--	30	100	mg/l	2 X Weekly	24-Hr. Comp
Oil & Grease	--	--	--	15	20	mg/l	Monthly	Grab
Chloride								
[1]	--	--	--	Report	Report	mg/l	2 X Weekly	24-Hr. Comp
[2]	--	--	--	30	40	mg/l	2 X Weekly	24-Hr. Comp
Total Dissolved Solids								
[1]	--	--	--	Report	Report	mg/l	2 X Weekly	24-Hr. Comp
[2]	--	--	--	344	400	mg/l	2 X Weekly	24-Hr. Comp
Sulfate								
[1]	--	--	--	Report	Report	mg/l	2 X Weekly	24-Hr. Comp
[2]	--	--	--	52	100	mg/l	2 X Weekly	24-Hr. Comp
Fluoride								
[1]	--	--	--	Report	Report	mg/l	2 X Weekly	24-Hr. Comp
[2]	--	--	--	1.4	2.0	mg/l	2 X Weekly	24-Hr. Comp

Sampling required for this outfall only needs to be conducted during discharge of AFGD process wastewater to outfall 001.

[1] The permittee is required to report the actual measured concentration of these pollutants from Outfall 401.

[2] The permittee is required to report the final effluent concentration of these pollutants, after mixing of the effluent of Outfalls 401 and 001. This should be determined by actually measuring these concentrations at Outfall 001, after mixing of all wastestreams. No credit for net discharge will be considered for these pollutants.

a. The pH shall not be less than 6.0 nor greater than 9.0. The pH shall be monitored as follows: by a grab sample twice weekly.

b. Samples taken in compliance with the monitoring requirements above shall be taken at a point representative of the discharge but prior to mixing with other wastestreams.

c. The permittee is strongly encouraged to exercise the option of evaporation of the AFGD process wastewater by injecting it into the Unit 8 flue gas ahead of the electrostatic precipitator to the maximum extent possible.

B. MONITORING AND REPORTING

1. Representative Sampling

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge.

2. Reporting

The permittee shall submit discharge monitoring reports (DMR-1 Form) to the Indiana Department of Environmental Management containing results obtained during the previous month and shall be postmarked no later than the 28th day of the month following each completed monitoring period. The first report shall be submitted by the 28th day of the month following the month in which the permit becomes effective.

If there is to occur a substantial period of time during which there will be no discharge from an authorized outfall, then the permittee may submit a written request to the Indiana Department of Environmental Management for relief from reporting requirements. The Commissioner may then suspend reporting requirements without public notice or opportunity for public hearing.

The Regional Administrator may request the permittee to submit monitoring reports to the Environmental Protection Agency if it is deemed necessary to assure compliance of the permit.

3. Definitions

a. Monthly Average

(1) Weight Basis - The "monthly average" discharge means the total discharge by weight during a calendar month divided by the number of days in the month that the production or commercial facility was discharging. Where less than daily sampling is required by this permit, the monthly average discharge shall be determined by the summation of the measured daily discharges by weight divided by the number of days during the calendar month when the measurements were made.

(2) Concentration Basis - The "monthly average" concentration means the arithmetic average (proportional to flow) of all daily determinations of concentration made during a calendar month. Daily determinations of concentration made using a composite sample shall be the concentration of the composite sample. When grab samples are used, the daily determination of concentration shall be the arithmetic average (weighted by flow value) of all the samples collected during the calendar day.

b. "Daily Maximum" Discharge

(1) Weight Basis - The "daily maximum" discharge means the total discharge by weight during any calendar day.

(2) Concentration Basis - The "daily maximum" concentration means the daily determination of concentration for any calendar day.

c. 24-Hour Composite Sample--Consists of at least 3 individual flow-proportioned samples of wastewater which are taken at approximately equally spaced time intervals during a 24-hour period and which are combined prior to analysis.

d. Concentration--The weight of any given material present in a unit volume of liquid. Unless otherwise indicated in this permit, concentration values shall be expressed in milligrams per liter (mg/l).

e. The "Regional Administrator" is defined as the Region V Administrator, U.S. EPA, located at 230 South Dearborn Street, Chicago, Illinois 60604.

f. The "Commissioner" is defined as the Commissioner of the Indiana Department of Environmental Management, which is located at the following address: 105 South Meridian Street, Indianapolis, Indiana 46225.

4. Test Procedures

The analytical and sampling methods used shall conform to the current version of 40 CFR, Part 136. The approved methods may be included in the texts listed below. However, different but equivalent methods are allowable if they receive the prior written approval of the State agency and the U.S. Environmental Protection Agency.

(1) Standard Methods for the Examination of Water and Wastewater 16th Edition, 1985, American Public Health Association, Washington, D.C. 20005.

(2) A.S.T.M. Standards, Part 23, Water; Atmospheric Analysis 1972 American Society for Testing and Materials, Philadelphia, PA 19103.

(3) Methods for Chemical Analysis of Water and Wastes June 1974, Revised, March 1983, Environmental Protection Agency, Water Quality Office, Analytical Quality Control Laboratory, 1014 Broadway, Cincinnati, OH 45202.

5. Recording of Results

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:

a. The exact place, date, and time of sampling;

b. The dates the analyses were performed;

c. The person(s) who performed the analyses;

d. The analytical techniques or methods used; and

e. The results of all required analyses.

6. Additional Monitoring by Permittee

If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified above, the results of such monitoring shall be included in the calculation and reporting of the values required in the Monthly Discharge Monitoring Report. Such increased frequency shall also be indicated.

7. Records Retention

All records and information resulting from the monitoring activities required by this permit, including all records of analyses performed and calibration and maintenance of instrumentation and recording from continuous monitoring instrumentation, shall be retained for a minimum of three (3) years, or longer, if requested by the Regional Administrator or the Indiana Department of Environmental Management.

C. REOPENING CLAUSE

1. When the U.S. EPA and the State of Indiana finalize a policy regarding the implementation of 40 CFR 122.26, which addresses stormwater discharges, this permit may be modified, after public notice and opportunity for hearing, to incorporate revised limitations for the control of such discharges.

2. This permit may be modified, or, alternatively revoked and reissued, after public notice and opportunity for hearing, to incorporate revised effluent limitations, with appropriate schedule(s) of compliance, if necessary, after final promulgation and effectiveness of revised Indiana Water Quality Standards.

PART II
STANDARD CONDITIONS FOR NPDES PERMITS
FOR INDUSTRIAL FACILITIES

SECTION A. GENERAL CONDITIONS

1. Duty to Comply

The permittee shall comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act and the Indiana Environmental Management Act and is grounds for enforcement action, for permit termination, revocation and reissuance, or modification, or for denial of a permit renewal application.

2. Penalties for Violations of Permit Conditions

Pursuant to the Indiana Environmental Management Act, any person who violates a permit condition implementing sections 301, 302, 306, 307, 318, or 405 of the Clean Water Act is subject to a civil penalty not to exceed $25,000 per day of such violation. Any person who willfully or negligently violates permit conditions implementing sections 301, 302, 306, 307, or 308 of the Clean Water Act is subject to a fine of not less than $2,500 nor more than $25,000 per day of violation, or by imprisonment for not more than 1 year or both. If the conviction is for a violation committed after a first conviction of such person under this provision, punishment shall be a fine of not more than fifty thousand dollars ($50,000) per day of violation, or by imprisonment for not more than two (2) years, or both.

Except as provided in permit conditions on "Bypassing," Section B, Paragraph 2 and "Upsets," Section B, Paragraph 3, nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance.

3. Duty to Mitigate

The permittee shall take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with the permit.

4. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause, including, but not limited to, the following:

a. Violation of any terms or conditions of this permit;

b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts; or

c. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

The filing of (i) a request by the permittee for a permit modification, revocation and reissuance, or termination, or (ii) a notification of planned changes or anticipated noncompliance does not stay any permit condition.

5. Duty to Provide Information

The permittee shall furnish to the Commissioner, within a reasonable time, any information which the Commissioner may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The permittee shall also furnish to the Commissioner, upon request, copies of records required to be kept by this permit.

6. Duty to Reapply

If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. The application should be submitted at least 180 days before the expiration date of this permit. The Commissioner may grant permission to submit an application less than 180 days in advance but no later than the permit expiration date.

7. Transfers

This permit is nontransferable to any person except after notice to the Commissioner pursuant to Regulation 327 IAC 5-2-6(c). The Commissioner may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the Clean Water Act.

8. Toxic Pollutants

Notwithstanding Paragraph A-4, above, if a toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under Section 307(a) of the Clean Water Act for a toxic pollutant which is present in the discharge and such standard or prohibition is more stringent than any limitation for such pollutant in this permit, this permit shall be modified or revoked and reissued to conform to the toxic effluent standard or prohibition.

The permittee shall comply with effluent standards or prohibitions established under section 307(a) of the Clean Water Act for toxic pollutants injurious to human health within the time provided in the regulations that establish those standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

9. Containment Facilities

When cyanide or cyanogen compounds are used in any of the processes at this facility, the permittee shall provide approved facilities for the containment of any losses of these compounds in accordance with the requirements of Water Pollution Control Board Regulation 327 IAC 2-2-1.

10. Operator Certification

The permittee shall have the waste treatment facilities under the direct supervision of an operator certified by the Commissioner as required by IC 13-1-6.

11. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Clean Water Act.

12. Property Rights

The issuance of this permit does not convey any property rights of any sort or any exclusive privileges, nor does it authorize any injury to private property or an invasion of personal rights, nor any infringement of Federal, State, or local laws or regulations.

13. Severability

The provisions of this permit are severable and, if any provision of this permit or the application of any provision of this permit to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this permit shall not be affected thereby.

14. Inspection and Entry

The permittee shall allow the Commissioner, or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to:

a. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

d. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act, any substances or parameters at any location.

15. Construction Permit

The permittee shall not construct, install, or modify any water pollution control facility without a valid construction permit issued by the Indiana Department of Environmental Management pursuant to 327 IAC 3-2.

SECTION B. MANAGEMENT REQUIREMENTS

1. Proper Operation and Maintenance

The permittee shall at all times maintain in good working order and efficiently operate all facilities and systems for wastewater collection and treatment which are installed or used by the permittee and which are necessary for achieving compliance with the terms and conditions of this permit.

2. Bypass of Treatment Facilities

a. Definitions:

(1) "Bypass" means the intentional diversion of a waste stream from any portion of a treatment facility normally utilized for treatment of the waste stream.

(2) "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which would cause them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production at the permittee's facility.

b. (Prohibition of Bypass) Bypass which causes or is likely to cause applicable effluent limitations to be exceeded is prohibited unless the following three conditions are met:

(1) Bypass is unavoidable to prevent loss of life, personal injury or severe property damage;

(2) There are no feasible alternatives to bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal period of equipment down-time; and

(3) The permittee submits notice of an unanticipated bypass to the Commissioner within 24 hours of becoming aware of the bypass (if this information is provided orally, a written submission must be provided within five days). Where the permittee knows or should have known in advance of the need for a bypass, this prior notification shall be submitted for approval to the Commissioner, if possible, at least ten days before the date of the bypass.

c. An anticipated bypass which meets the three criteria of Paragraph b of this subsection may be allowed under conditions determined to be necessary by the Commissioner to minimize any adverse effects.

3. Upset Conditions

a. Definition: "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

b. (Effect of an upset) An upset shall constitute an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of Paragraph c of this subsection are met.

c. (Conditions necessary for a demonstration of upset) A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs or other relevant evidence, that:

(1) An upset occurred and the permittee has identified the specific cause(s) of the upset, if possible;

(2) The permitted facility was at the time being operated in compliance with proper operation and maintenance procedures; and

(3) The permittee complied with any remedial measures required under Paragraph A.3 of this Part.

4. Removed Substances

Solids, sludges, filter backwash, or other pollutants removed from or resulting from treatment or control of wastewaters shall be disposed of in a manner such as to prevent any pollutant from such materials from entering waters of the State and to be in compliance with all Indiana statutes and regulations relative to liquid and/or solid waste disposal.

SECTION C. REPORTING REQUIREMENTS

1. Planned Changes in Facility or Discharge

Any anticipated facility expansions, production increases, or process modifications which will result in new, different, or increased discharges of pollutants must be reported by submission of a new NPDES application or, if such changes will not violate the effluent limitations specified in this permit, by advance notice to the permit issuing authority of such changes. Following such notice, the permit may be modified to revise existing pollutant limitations and/or to specify and limit any pollutants not previously limited.

2. Monitoring Reports

Monitoring results shall be reported at the intervals and in the form specified in Part I.B.2.

3. Compliance Schedules

Reports of compliance or noncompliance with interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date. Any reports of noncompliance shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirement.

4. Twenty-Four Hour Reporting

The permittee shall report information on the following types of noncompliance within 24 hours from the time permittee becomes aware of such noncompliance:

a. Any unanticipated bypass which exceeds any effluent limitation in the permit;

b. Violation of a maximum daily discharge limitation for any of the pollutants listed by the Commissioner in the permit to be reported within 24 hours; and

c. Any noncompliance which may pose a significant danger to human health or the environment.

A written submission shall also be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected the anticipated time it is expected to continue; and steps taken or planned to reduce and eliminate the noncompliance and prevent its recurrence. The Commissioner may waive the written report on a case-by-case basis if the oral report has been received within 24 hours.

5. Other Noncompliance

The permittee shall report any instance of noncompliance not reported under Paragraph 3 or 4 of this Section at the time the pertinent Discharge Monitoring Report is submitted. The report shall contain the information specified in Paragraph 4 of this Section.

6. Other Information

Where the permittee becomes aware that he failed to submit any relevant facts or submitted incorrect information in a permit application or in any report to the Commissioner, the permittee shall promptly submit such facts or corrected information.

7. Changes in Discharge of Toxic Substances

The permittee shall notify the Commissioner as soon as it knows or has reason to believe:

a. That any activity has occurred or will occur which would result in the discharge of any pollutant identified as toxic, pursuant to Section 307(a) of the Clean Water Act which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels:"

(1) One hundred micrograms per liter (100 ug/l);

(2) Two hundred micrograms per liter (200 ug/l) for acrolein and acrylonitrile; five hundred micrograms per liter (500 ug/l) for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter (1 mg/l) for antimony;

(3) Five (5) times the maximum concentration value reported for that pollutant in the permit application; or

(4) The level established in Part III of the permit by the Commissioner.

b. That it has begun or expects to begin to use or manufacture as an intermediate or final product or byproduct any toxic pollutant which was not reported in the permit application.

8. Signatory Requirements

a. All reports required by the permit and other information requested by the Commissioner shall be signed and certified by a person described below or by a duly authorized representative of that person:

(1) For a corporation: by a principal executive officer of at least the level of vice-president (including a person who is not a vice-president but performs similar policy-making functions for the corporation);

(2) For a partnership or sole proprietorship: by a general partner or the proprietor, respectively; or

(3) For a Federal, State, or local governmental body or an agency or political subdivision thereof: by either a principal executive officer or ranking elected official.

b. A person is a duly authorized representative only if:

(1) The authorization is made in writing by a person described above.

(2) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, or position of equivalent responsibility. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.); and

(3) The authorization is submitted to the Commissioner.

c. Certification. Any person signing a document under this section shall make the following certification:

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

9. Availability of Reports

Except for data determined to be confidential under Water Pollution Control Board Regulation 327 IAC 12, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Indiana Department of Environmental Management and the Regional Administrator. As required by the Clean Water Act, permit applications, permits, and effluent data shall not be considered confidential.

10. Penalties for Falsification of Reports

The Indiana Environmental Management Act provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance, shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.

Part III
Other Requirements

A. Thermal Effluent Requirements

As a result of approval of the 316(a) demonstration study submitted in September 1976, no thermal effluent limitations are included in this permit. Indiana Water Quality Standards (IWQS) for temperature are waived unless the generating capacity is expanded, or the mode of operation of the existing condensers is changed to allow for additional thermal discharge.

B. Intake Structures

The 316(b) demonstration submitted for this plant has been approved. Although it appears that significant numbers of fish are impinged due to the nature of the intake pipe, the Indiana Department of Environmental Management does not believe that a significant reduction of impingement could be attained by any reasonably practical measures such as the addition of mesh screen over the intake pipe, since NIPSCO has demonstrated by their letter of September 6, 1983, that this is impractical due to the presence of "dune grass" in the intake which would soon obstruct any small diameter screens.

No further submission of information on this subject is required at the time of reissuance of this permit.

C. Chlorine Concentration

The total exposure time of TRC resulting from chlorination of the condenser cooling water shall not exceed two hours per day per generating unit.

D. Intake Screen Wash

There shall be no discharge of debris from intake screen washing operations which will settle to form objectionable deposits, which is in amounts sufficient to be unsightly or deleterious, or which will produce colors or odors constituting a nuisance.

E. Polychlorinated Biphenyl

There shall be no discharge of polychlorinated biphenyl (PCB) compounds such as those commonly used for transformer fluid, in accordance with 40 CFR 423.12(b) and 423.13(a).

Briefing Memo
September 22, 1989

NIPSCO - Bailly Generating Station
246 Bailly Road
Chesterton, Indiana 46304
NPDES Permit No. IN 0000132

Background

The NPDES permit for this facility was renewed September 29, 1988, and modified December 6, 1988. Since that time, the permittee has made plans to construct and operate an Advanced Flue Gas Desulfurization (AFGD) system to reduce air pollutant emissions from this coal fired power plant. NIPSCO is doing this in joint venture with Pure Air, which itself is a joint venture company between Air Products and Chemicals, Inc., and Mitsubishi Heavy Industries America, Inc. This project is being funded by Pure Air and the U.S. Department of Energy. The AFGD system is designed to operate for 3 years in a demonstration phase and seventeen years in commercial operation.

Two wastestreams will be generated by this operation: sanitary wastewater and process wastewater from the scrubber itself. The sanitary wastewater will be discharged to the existing NIPSCO sanitary wastewater treatment plant (STP) which is already permitted as Outfall 201. Because the additional volume of sanitary wastewater will be well within the existing design capacity of the STP, there will be no effect on the existing permit limitations for Outfall 201.

The new process wastestream (0.2 MGD ave., 0.4 MGD max.) will be characteristically high in TSS and TDS. Plans are to discharge this wastestream to the cooling wastestream (Outfall 001) for mixing prior to ultimate discharge to Lake Michigan. Treatment will be provided for removal of TSS. No treatment for TDS is planned, as such is not practical. The facility will have the ability to inject this wastewater into the flue gas effluent between the Unit 8 air preheater and the electrostatic precipitator (ESP), where the water would be evaporated and the resultant solids collected by the ESP. This option only exists when unit 8 is operating and is considered somewhat experimental at this time. For this reason the permit limitations, as described below, do allow the direct discharge of this wastestream, but strongly encourage the use of the evaporation option whenever possible.

Proposed Modification/Effluent Limitations Rationale

For the reasons described above, no modification is proposed for the discharge of treated sanitary wastewater from Outfall 201.

The permit is being modified to include a new Outfall 401 for the discharge of the treated AFGD process wastewater to the cooling water wastestream prior to its ultimate discharge to Lake Michigan. Effluent limitations are proposed for TSS, oil and grease, chloride, TDS, sulfate, fluoride and pH. A new page 1 is included to reflect this modification. A new page 9 is included to include the requirements for new Outfall 401. Other pages are renumbered accordingly.

TSS and oil and grease limitations are based on 40 CFR 423.12(b)(3), which applies to "low volume" wastestreams. Because oil and grease is not really expected to be present, sampling is required only on a monthly basis.

pH limitations are established within the range of 6.0 and 9.0 s.u., and are based on both 40 CFR 423.12(b)(1) and Indiana Water Quality Standards (IWQS).

Chloride, TDS, sulfate and fluoride limitations are based on that provision of the IWQS (327 IAC 2-7-4(b)(8)) which defines water quality for Lake Michigan. Current policy is to allow a 1:1 mixing zone for discharges to Lake Michigan under this rule, which yields effluent limitations for the four pollutants of concern as follows:

Pollutants	Mo. Ave.	Daily Max.
Chloride	30 mg/l	40 mg/l
TDS	344 mg/l	400 mg/l
Fluoride	1.3 mg/l	2.0 mg/l
Sulfate	52 mg/l	100.00 mg/l

These values are different (and more stringent) than those preliminarily given to the permittee, but are within the expected actual effluent concentrations as predicted by the permittee. This change has come about due to the ongoing activity surrounding the revisions to the Indiana Water Quality Standards. IDEM staff initially believed that since the Lake Michigan Rule (327 IAC 2-7) was proposed for repeal, that the standards listed thereunder would also be repealed, and therefore the standards applicable to "All State Waters" (327 IAC 2-1) would apply. The current proposal for revision of 327 IAC 2-1 contains a table applicable to Lake Michigan (using the same values contained currently in 327 IAC 2-7-4(b)(8), Table II. With the knowledge that the Lake Michigan standards will be retained, they must be used in this permit.

The one exception to the above is the monthly average value for fluoride, which is the same value as previously reported to the permittee as expected permit limitations. This value is based on the U.S. EPA chronic water quality criteria for fluoride.

The actual limitations for these four pollutants apply at Outfall 001, which is the point of discharge to waters of the state from this facility. Neither technology based (40 CFR 423) or water quality based (327 IAC 2-1) limitations can really be applied at Outfall 401 for these pollutants. The draft permit modification requires monitoring for these four pollutants at both 401 and 001, with the results from both locations being reported at 401. Page 2 of the permit (Outfall 001) has been revised to refer to new page 9.

Due to the significant presence of all of the pollutants controlled by the permit, all parameters with the exception of oil and grease as described above are to be monitored twice weekly.

Expiration Date

This modification will expire August 31, 1993, as with the current permit.

Drafted by M. W. Stanifer

0813B 10/16/89

Post Public Notice Addendum 12-4-89 M.W.Stanifer Revised 3-1-90 MWS

During the public notice period, comment letters were received from the Permittee and Save the Dunes Council. A response letter has been prepared to Save the Dunes Council, which will be sent when the final permit is sent. The following is IDEM's response to the Permittee's comments:

1. pH monitoring at outfalls 301 and 401 (Pages 7 and 9); The permittee's request is reasonable. Redundant pH sampling is not necessary for outfall 301, although reporting requirements have not been changed.

2. Sampling frequency for dissolved solids at 401 (Page 9); the permittee's request for reduced monitoring frequencies is not granted, on the basis that this system is experimental, the permittee's reported effluent concentrations are only estimates, and the IDEM desires more information on this system. The permittee may request reduction in monitoring frequency after a period of operation, if such results demonstrate adequate compliance. Such modification would require public notice.

3. Application of effluent limitations vs. monitoring requirements at outfall 401 (page 9). IDEM believes that the permit is clear that the limitations for the various dissolved solids and pH are only applicable after mixing with other wastestreams and are not applicable at the point of discharge to the other wastestreams. The second part of the permittee's comment was answered in the previous response.

4. As with comment 2, IDEM will entertain a request to review (and reduce) monitoring frequencies after a period of substantial compliance has been demonstrated. Also, as with the other previous responses, no change has been made in the permit.

5. The permit (page 9) has been revised to clarify that sampling for the parameters prescribed at outfall 401 is required only during periods of discharge from outfall 401 to 001.

6. IDEM accepts NIPSCO's comments regarding the experimental nature of the evaporation of the AFGD process wastewater in lieu of discharge. As stated in the response letter to Save the Dunes Council, consideration was given to denying the permit application on the basis that a reasonable alternative to discharge is available. However, IDEM decided to propose the permit, and is

now issuing the permit on the basis that it is not known if a valid alternative to direct discharge is in fact available. IDEM will review the results of the initial test operational period regarding this matter prior to renewal of this permit (upon its expiration).

7. The monthly average fluoride value reported in the draft Briefing Memo (1.3 mg/l) was incorrect. The permit limitation of 1.4 mg/l is the correct value. In accordance with agency policy to maintain continuity of the records, the Briefing Memo as drafted has not been altered.

U.S.EPA Region 5 submitted a comment letter dated Jan. 23, 1990 which contained three comments on the draft permit. The Region 5 comments and IDEM responses are summarized as follows:

1. The Briefing memo "did not provide written confirmation that this proposal has been reviewed for consistency with the nondegradation provisions" of the IWQS. Region 5 requests that information be included in this Briefing Memo regarding "estimates of the social and/or economic benefits from the proposal, alternatives to the proposed wastewater discharge and the impact of the discharge on Lake Michigan."

While this subject was touched upon in the original Briefing Memo, it was not detailed to the extent requested by Region 5. IDEM does believe that the proposed discharge will have no significant adverse impact on the water quality of Lake Michigan, so long as the effleunt limitations are consistently met. IDEM has requested this information from NIPSCO, which has subsequently been received via correspondence of March 1, 1990. NIPSCO's justification is attached and incorporated here as Attachment A. IDEM accepts NIPSCO's justification.

2. Region 5 commented that the original Briefing Memo "did not discuss the consideration made for concentrations of TDS, Fluoride, Sulfate, and Chloride in Lake Michigan" (intake concentrations). Their request was that the limits be recalculated accordingly. IDEM contends that since the permit intentionally does not provide for net limitations, or credit for quantities of these same pollutants which are present in the intake or from other sources from within the plant, this matter has already been considered and adequately addressed.

3. Region 5 noted that the monthly average concentration limit for TDS should be 344 mg/l as stated in the Briefing Memo rather than 394 mg/l. This error has been corrected.