Conf-9109162--1

PERMITTING AND SOLID WASTE MANAGEMENT ISSUES FOR THE BAILLY STATION WET LIMESTONE (AFGD) SYSTEM

CONF-9109162--1

DE92 000287

Frank T. Bolinsky
Pure Air
Two Windsor Plaza
7540 Windsor Drive
Allentown, PA 18195

D. Steve Dennis
United Engineers
& Constructors, Inc.
Stearns-Roger Division
P.O. Box 5888
Denver, CO 80217

John Ross
Northern Indiana Public
Service Company
5265 Hohman Avenue
Hammond, IN 46320

J. Spenser Huston
Environmental Alternatives, Inc.
P. O. Box 4373
Warren, NJ 07059

INTRODUCTION

Pure Air (a general partnership between Air Products and Chemicals, Inc., and Mitsubishi Heavy Industries America, Inc.) is constructing a wet limestone co-current advanced flue gas desulfurization (AFGD) system that has technological and commercial advantages over conventional FGD systems in the United States. The AFGD system is being installed at the Northern Indiana Public Service Company's (Northern Indiana) Bailly Generating Station approximately 12 miles northeast of Gary Indiana, on the southern shore of Lake Michigan (Figure 1). The project is funded by Pure Air, Northern Indiana and the U.S. Department of Energy (DOE) as part of DOE's Clean Coal Technology Program. Pure Air provided the fundamental process engineering as well as the overall project and construction management. United Engineers & Constructors, Inc. Stearns Roger Division, was hired by Pure Air to provide detailed design engineering services and to obtain all permits. The AFGD system is scheduled to be operational by the Summer, 1992.

The AFGD system will remove at least 90 percent of the sulfur dioxide (SO_2) in the flue gas from Boilers 7 and 8 at the Station while burning 3.2 percent sulfur coal. Also as part of testing the AFGD system, 95 percent removal of SO_2 will be demonstrated on coals containing up to 4.5 percent sulfur. At the same time that SO_2 is removed from the flue gas, a gypsum by-product will be produced which will be used for wallboard manufacturing.

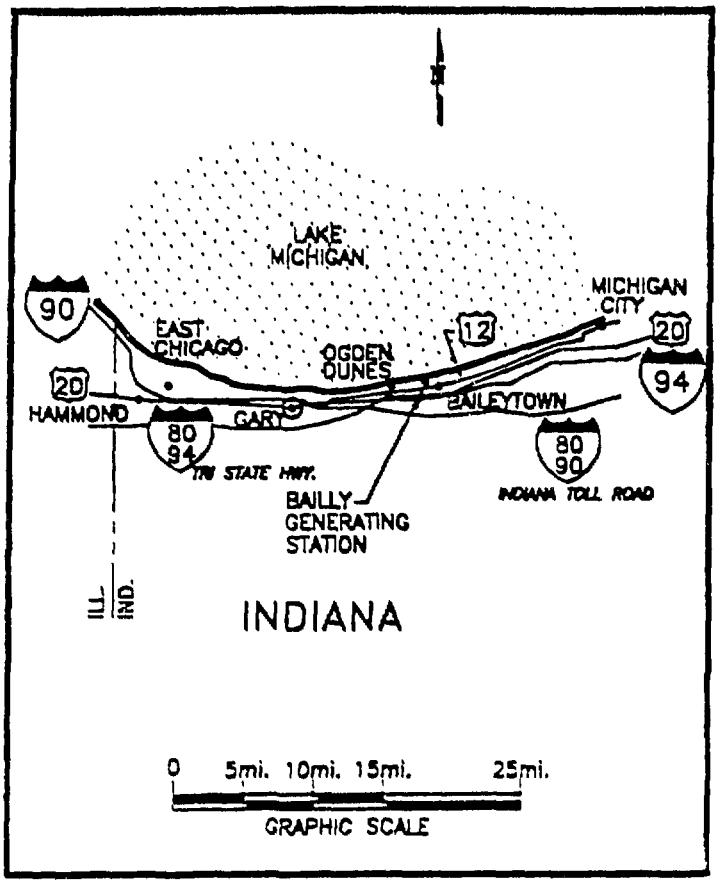

Figure 1. Site Location Map of the AFGD System at Bailly Generating Station.

Since the AFGD system is a pollution control device, one would expect its installation to be received favorably by the public and regulatory agencies. Although the project was well received by regulatory agencies, one public group (Save the Dunes Council) was initially concerned since the project is located adjacent to the Indiana Dunes National Lakeshore. The purpose of this paper is to describe the project team's experiences in obtaining permits/approvals from regulatory agencies and in dealing with the public.

AFGD SYSTEM FEATURES

As indicated above, the AFGD system will demonstrate high efficiency (95 percent) SO_2 removal with high sulfur coals. Other technological features include the following:

1. The applicability and reliability of FGD using a single module to control all of the SO_2 emissions from multiple boilers;

2. The functionality of a single loop in situ oxidation absorber producing wallboard quality gypsum while treating flue gas from the burning of high sulfur and high chloride coals; and

3. The demonstration of a wastewater evaporation system (WES) to minimize wastewater disposal problems inherent with many gypsum producing FGD systems.

The major innovative commercial feature of the project is that Pure Air and Northern Indiana have an agreement whereby Pure Air will own and operate the AFGD system for the system's 20-year life cycle. This arrangement relieves Northern Indiana of the operating risks for the facility and provides them with financial benefits.

ENVIRONMENTAL PERMITS/APPROVALS

The project was faced with obtaining typical environmental permits/approvals for construction and operation These included those for air emissions, wastewater discharges and waste disposal. Also, because the project involved DOE funds, an environmental assessment (EA) was required in fulfillment of the National Environmental Policy Act and its implementing regulations.

PERMITS FOR AIR EMISSIONS

Air quality impact issues were addressed with the Indiana Department of Environmental Management (IDEM), Office of Air Management (OAM) during several meetings. Pure Air presented information about the AFGD system, and answered questions regarding its construction and operation. The information presented relative to air emissions is discussed below.

During the AFGD system operation, both emissions from a new stack 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 can be directed through the existing stack, and will be within existing Bailly Station emission permit requirements. When the existing stack is used, no additional impact other than that currently observed will occur, and the area's current classification as an attainment area with respect to SO_2 will not be jeopardized. 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 from the AFGD system. Particulate emissions from the stack also will remain unchanged. However, fugitive particulate emissions may increase slightly primarily during transfers of pulverized limestone at the site.

The existing and new emission rates and emission standards for the

Station's regulated compounds (SO_2, NO_x, particulate matter) are shown below:

Parameter	Emissions Without AFGD (lbs/MMBtu)	Predicted AFGD Emissions (lbs/MMBtu)	Existing Permit Conditions Without AFGD (lbs/MMBtu)
SO_2	5.2	0.52	6.0
NO_x	1.70	1.70	N/A
Particulate Matter	0.10	0.10	0.22

As can be seen from this comparison, the AFGD system will reduce the SO_2 emission rate by 90 percent from 5.2 lbs/MMBtu to 0.52 lbs/MMBtu. The process does not significantly reduce the present NO_x emission rate of 1.70 lbs/MMBtu. Finally, the particulate matter emission rate is expected to remain unchanged as a result of the AFGD system. In practice, all AFGD systems receive some amount of particulate (nominally 0.1 lb/MMBtu for the Bailly Station) from the electrostatic precipitators. Approximately 50 percent of this particulate received from the precipitators can be removed by the AFGD system. The AFGD system can in turn emit a minor amount (0.05 lb/MMBtu) of scrubber generated particulate matter. Thus, there is no expected increase in particulate matter emissions as measured before and after installation of the AFGD system.

Based on the meetings with IDEM, OAM, it was agreed that:

1. The AFGD system would <u>not</u> be subject to new source review under the regulations for Prevention of Significant Deterioration of air quality (PSD). A Permit to Construct (Construction Permit) application would be required per 326 IAC 2-1-1 which requires a permit for "Any person proposing to construct or operate ... any emission control equipment ..." The Construction Permit also was required because the AFGD system involved an unknown technology, and IDEM, OAM wanted to be able to set emissions limits on various parameters to protect air quality and determine compliance.

2. Once the AFGD system is in operation, a Permit to Operate will be issued. This will be a separate operating permit from the Bailly Station's permit in order to allow emissions through the existing Station's stack when the AFGD system is not in operation. During normal AFGD system operation, emissions will be directed through a new stack.

3. No contravention of National Ambient Air Quality

Standards (NAAQS) would result from operation of the AFGD system. This premise, however, had to be verified in accordance with state and federal law and with air quality dispersion modeling.

4. Stack height calculations were to be developed in order to support AFGD system design of a new stack and to demonstrate "Good Engineering Practice" (GEP) to IDEM, OAM and the U.S. Environmental Protection Agency (EPA).

5. A fugitive dust control plan was to be developed based on fugitive emissions calculations.

Air Emissions Modeling

The project's dispersion modeling involved, (1) developing a modeling protocol for review and approval by IDEM, OAM, and (2) preparation of a Technical Support Document describing the air quality dispersion modeling studies conducted. The modeling results were then reviewed for consistency with the existing State Implementation Plan (SIP), and to assess the impact that operation of the AFGD system would have on the prevailing air quality in the area of the Bailly Station. This evaluation was then used to support the Permit to Construct application and information presented in DOE's EA.

The protocol or work plan, outlining the procedures for air quality modeling was negotiated with IDEM, OAM. The agreed upon protocol specified the general approach to be utilized, the simulation model, the data (both emissions and meteorological) that would be employed in the dispersion modeling, and the points at which predictions of concentration would be made (i.e., the receptor locations).

Although the proposed AFGD system will substantially reduce the SO_2 emissions, the system may reduce the stack gas temperature from 350°F to approximately 130°F. This temperature change will probably result in reduced plume rise depending on weather conditions. Therefore, it was necessary that the dispersion modeling demonstrate that the predicted air emissions concentrations from the AFGD system would not significantly increase concentrations overall. It was agreed with IDEM, OAM that modeling would be conducted for SO_2 emissions, both from the existing stack serving Boilers 7 and 8, and the new stack serving the AFGD system. Modeling was conducted on a receptor grid used in recent modeling studies for Porter County, Indiana for development of the SO_2 SIP. Additionally, modeling of SO_2 emissions was conducted for selected receptors and time periods identified by IDEM, OAM.

The air quality dispersion modeling was conducted using the U.S.

Environmental Protection Agency's Industrial Source Complex Model (Short-Term), operating in a non-urban (rural) mode. This was the same model that had been previously employed by IDEM, OAM for evaluating the SO_2 SIP for Porter County. The objective was to evaluate the net change of the predicted concentrations resulting from the AFGD system's new stack compared with the existing Bailly Station's stack. Selected critical days were modeled at specific receptor locations and the meteorological data were specified by IDEM, OAM.

For the comprehensive modeling of the new and existing stacks, each stack was first modeled using a receptor grid of polar coordinates and 5 years of meteorological data. For each stack, Pure Air identified the overall highest predicted annual concentration and the overall highest second-highest predicted short-term concentration for each year of dispersion modeling. The results were then compared to evaluate whether the addition of the AFGD system would result in a significant increase of predicted SO_2 concentrations.

For the critical day/receptor pairs identified by IDEM, OAM from the SO_2 SIP studies, modeling of all SO_2 sources in the Porter County inventory was conducted. For each case, the existing Boiler 7 and 8 stack predicted impacts were compared to the predicted impacts of the new stack emissions after the addition of the AFGD system. The results were reviewed to evaluate whether the new stack would affect SIP maintenance and compliance with the NAAQS for SO_2.

Modeling was conducted for each year from 1983 through 1987 for annual, 24-hour and 3-hour averaging periods. The results showed the following with respect to the NAAQS for SO_2:

Averaging Period	NAAQS for SO_2 (ug/m^3)	Range of Highest SO_2 Concentrations Due to New Stack (ug/m^3)
Annual	80	4.4 to 5.8
24-Hour	365	68.9 to 97.6
3-Hour	1,300	279.6 to 461.8

The modeling results indicated the following:

1. The predicted concentrations for the AFGD system stack would be in compliance with the NAAQS for SO_2.

2. Based on dispersion modeling for critical days and critical receptors identified by IDEM, OAM from development of the Porter County SO_2 SIP, the contribution from the AFGD stack would have no effect on the conclusions of the SIP.

Therefore, operation of the proposed AFGD system at the Bailly Generating Station would assure the continued attainment and maintenance of the NAAQS. Subsequently, these results were confirmed by IDEM, OAM and the Oak Ridge National Laboratory, who provided technical support to DOE in development of the EA (U.S. Department of Energy, April, 1990).

The EA also presented a comparison of NAAQS with predicted concentrations of particulate matter (PM_{10}) and NO_x from the AFGD system stack added to existing background levels. The background levels include emissions from the existing Bailly Station stack, so that the total emissions are an overestimate of predicted concentrations. The predicted ambient concentrations shown below are well within NAAQS for SO_2, NO_x and PM_{10}.

Parameter/ Averaging Period	AFGD System Plus Background Emissions (ug/m^3)	NAAQS (ug/m^3)
SO_2		
Annual	31	80
24-Hour	310	365
3-Hour	896	1,300
NO_x		
Annual	53	100
PM_{10}		
24-Hour	32	50
	84	150

GEP Stack Height

In order to determine an acceptable stack height for the AFGD system, GEP calculations were made following EPA's Stack Height Regulations (Federal Register. July 8, 1985. 50(130):27892-27907). The GEP stack height formula used was for stacks constructed after January 12, 1979 per the regulations. The purpose of this determination was to ascertain a stack height at which the phenomenon of aerodynamic downwash would not be observed. Avoiding downwash assures that high concentrations at ground level are not observed during turbulent wind flow.

The GEP calculations were based on the tallest building near the AFGD system's new stack. This building was the Unit 8 Boilerhouse. Based on this analysis, the GEP stack height was determined to be 482.5 feet. Therefore, a stack height of 480 feet was acceptable to IDEM, OAM and was permitted with the Federal Aviation Administration (FAA).

Fugitive Dust Control Plan

The final IDEM, OAM preconstruction air quality issue involved developing a fugitive dust control plan as a part of the Permit to Construct application. Based on this requirement, fugitive emissions estimates were calculated for limestone, lime, and gypsum storage and handling, as well as for emissions related to vehicle resuspension. Fugitive estimates for limestone and gypsum were based on maximum throughput; however, calculations involving hydrated lime were based on average throughput since this material will be used only during the demonstration of the wastewater evaporation system (WES).

The fugitive emissions analyses indicated that the largest contribution to the annual fugitive emissions rate results from vehicle resuspension. In order to control these emissions, a road washing program was proposed and accepted by IDEM, OAM. Using road washing, the annual fugitive emissions rate is 12.2 tons/yr (TPY) of which 95 percent is due to vehicular traffic and the remaining 5 percent is due to limestone, lime and gypsum handling.

The fugitive emissions rate of 12.2 TPY represents 49 percent of the PSD de minimis value for total suspended particulates, which is 25 TPY. The annual fugitive release rate also is below the PSD de minimis value for PM-10 (particulate less than 10 u), which is 15 TPY. Since the AFGD system will not cause any additional particulate matter to be emitted through the new stack, as was discussed previously, the net emissions increase at the Bailly Station for particulate matter will remain below levels warranting PSD review.

Overall, net emissions calculated from vehicular traffic associated with the proposed AFGD system plus reduced current fugitive roadway emissions, once controls are implemented, will probably demonstrate a plantwide net reduction in fugitive emissions.

Following the completion of the air emissions modeling, the GEP stack height calculations and development of the fugitive dust control plan, IDEM, OAM issued the Permit to Construct. The permit conditions had been discussed with the project team prior to permit issuance. They focused on the following for the AFGD system:

- SO_2 emissions limit of 1.2 lb/MMbtu;
- Particulate matter emissions limit of 0.22 lb/MMBTU;
- Visible emissions limit of 40 percent opacity;
- Continuous emission monitoring (CEM) of SO_2 before and after the absorber vessel;
- CEM for percent oxygen or carbon dioxide;

- CEMs for recording of opacity before absorber in individual ducts from Units 7 and 8;

- Sulfur content of coal used at the Station shall not exceed 4.5 percent;

- Bunkered coal will be sampled on a daily basis for heat content and percent sulfur; and,

- Stack tests for SO_2 and particulate matter shall be required per a schedule specified in the permit.

PERMIT FOR WASTEWATER DISCHARGES

The impact of the AFGD system on the project site's water quality was discussed in several meetings with the IDEM, Office of Water Management (OWM). Because, as discussed below, the AFGD system's wastewater will be combined with the existing Bailly Station's wastewater, IDEM, OWM concluded that the Station's National Pollutant Discharge Elimination System (NPDES) permit should be modified.

Operation of the AFGD system will produce two wastewater discharge streams:

1. Domestic sanitary sewer wastes will be directed to the Bailly Station's existing onsite sewage treatment system at an estimated flow of 1,100 gallons/day (gpd); and,

2. Wastewater from a centrifuge operation, which is part of a system to purge water from the absorber vessel, will be directed to a wastewater treatment facility prior to being combined with the Station's recirculating water system for discharge to Lake Michigan. This will result in approximately a maximum flow from the AFGD system of 0.4 MM gpd combining with a maximum of 443.2 MMgpd from the Station.

The domestic sanitary sewer wastes will consist of routine wastes from showers, sinks and toilets. The existing sewage treatment system has adequate capacity and treatment for this wastewater.

The wastewater from the absorber vessel will contain a variety of dissolved and suspended solids. Suspended solids include fly ash, fine gypsum particles that were not trapped within the AFGD process, and inert solids that entered with the limestone. The dissolved substances include high concentrations of chlorides, calcium and sulfates resulting in a supersaturated solution of these materials. This wastewater will be treated using two separate systems as described below. The described wastewater treatment system was permitted by IDEM, OWM.

A portion of this wastewater will be neutralized with hydrated lime and delivered to a demonstration wastewater evaporation system (WES). The WES includes dual-fluid nozzles in the ductwork of one of the two boilers between the air heater and electrostatic precipitator. The wastewater will be sprayed by nozzles into the ductwork where it will be evaporated by the flue gas. The small amount of solids produced by the evaporation process will be captured by the electrostatic precipitator and removed with the fly ash. The WES will be operated during a specified period of time to demonstrate its capabilities. However, if the WES is successful and is operated on a full-time basis, it can significantly reduce the amount of wastewater discharged from the AFGD system.

Process wastewater which is not treated by the WES will be delivered to a treatment system designed to meet the specific needs of the gypsum-supersaturated, high-chloride wastewater. The first step in treatment will be pH adjustment to raise the pH of the slightly acidic wastewater to pH 7. This adjustment of pH will result in the precipitation of iron and aluminum salts, further contributing to the suspended solids in the waste stream. The next step in treatment will be desaturation. The wastewater will be brought into contact with a recycled slurry of gypsum to provide seed crystals to initiate the precipitation of supersaturated calcium and sulfates.

Following precipitation of dissolved species, the wastewater will be treated for suspended solids removal. The first step in suspended solids removal will be the addition of a metallic coagulant such as ferric chloride or alum to destabilize the colloidal solids. Following a rapid mix with added polymer, the wastewater will be gently mixed to promote the agglomeration of solids. After this flocculation step, the agglomerated solids will pass to a solids-liquid separator for sedimentation and thickening. A portion of the thickened slurry will be recycled to the desaturation tank to promote gypsum precipitation. The overflow from the solids-liquid separator flows to a treated-water sump where the pH will be adjusted to between 6 to 9 before discharge into the Station's recirculating water system.

Based on Pure Air's description of the AFGD system's wastewater discharge, IDEM, OWM developed water quality based effluent limitations. This approach was believed appropriate since IDEM, OWM initially thought that the Indiana Water Quality Standards for Lake Michigan were proposed for repeal and water quality standards applicable to "all state waters" would apply. However, IDEM, OWM subsequently determined that the Lake Michigan standards would be retained. This resulted in stricter effluent limitations being placed on the project as can be seen from Table I.

Following additional discussions with IDEM, OWM, the NPDES permit modification was issued with the stricter effluent limitations. Other permit requirements included the following:

TABLE I

PURE AIR, NORTHERN INDIANA PUBLIC SERVICE COMPANY
BAILLY 600 MW AFGD PROJECT
BAILLY GENERATING STATION

NPDES PERMIT MODIFICATION CONDITIONS
FOR AFGD SYSTEM

	CALCULATED BAILLY STATION DISCHARGE WITH TREATED AFGD SYSTEM WASTEWATER		PRELIMINARY WATER QUALITY BASED PERMIT LIMITS		FINAL PERMIT LIMITS	
PARAMETER	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
Chloride, mg/l	29.0	29.0	162.4	377.8	30	40
Dissolved Solids mg/l	241.8	241.8	529.5	1,232.0	344	400
Fluoride, mg/l	0.1	0.4	1.4	3.3	1.4	2.0
Oil and Grease, mg/l	0	0	15	20	15	20
pH, units	6.5-9.0		6.5-9.0		6.0-9.0	
Suspended Solids, mg/l	<30	<100	30	100	30	100
Sulfate, mg/l	24.6	24.6	176.5	410.7	52	100

- Existing sewage treatment plant effluent limitations will be applicable. The limitations will be as follows:

Parameter	Monthly Average	Daily Maximum
BOD_5	30 mg/l	45 mg/l
Fecal Coliform	N/A	400/100 ml
Total Residual Chlorine	N/A	2.0 mg/l

- The AFGD system centrifuge operation wastewater discharge shall be monitored prior to mixing with the Station's recirculating water for the parameters shown in Table I plus flow;

- At the Station's main outfall in Lake Michigan monitoring shall continue for flow, temperature, total residual chlorine, and the duration and frequency of chlorination. In addition the parameters in Table I shall be monitored; and

- IDEM, OWM encouraged the project to operate the WES "... to the maximum extent possible" to minimize the AFGD system's wastewater discharge to the Station's recirculating water system.

SOLID WASTE PERMIT ISSUES

Discussions with the IDEM, Office of Solid and Hazardous Waste Management (OSHWM) concerning AFGD system wastes were initiated early in the project. AFGD system operating wastes or by-products will consist primarily of coal ash and gypsum. The ash generated during operations will continue to be removed by a contract hauler for disposal or sale for other uses. The AFGD project may be required to obtain approval for disposing of ash in Indiana, if the ash is not used for beneficial purposes. Because of the changing waste disposal regulatory climate in Indiana, this approval, if necessary, will be obtained as the project approaches start-up (Summer to Fall, 1992).

Gypsum produced by the AFGD system is considered a by-product and generally will be sold to U.S. Gypsum, a major wallboard manufacturer. However, small quantities of off-specification gypsum, or gypsum not sold for wallboard manufacturing, will be disposed of in an appropriately permitted landfill. Because IDEM, OSHWM was not familiar with the characteristics of this material from the AFGD system, a sampling and analysis plan was developed. The plan was based on analyzing gypsum produced from pilot plant tests conducted at the Hiroshima Research and Development Center in Hiroshima, Japan. The samples were then analyzed for the parameters shown in Table II.

TABLE II

PURE AIR, NORTHERN INDIANA PUBLIC SERVICE COMPANY
BAILLY 600 MW AFGD PROJECT
BAILLY GENERATING STATION

LIST OF GYPSUM ANALYSES

General

Corrosivity
Ignitability
Reactivity

Toxicity Characteristic Leaching Procedure (TCLP) Test

Arsenic	Lead
Barium	Mercury
Cadmium	Selenium
Chromium	Silver

Indiana Neutral Leaching Method Test

Barium	Nickel
Boron	Phenols
Chlorides	Sodium
Copper	Sulfate
Cyanide	Sulfide
Fluoride	TDS
Iron	Zinc
Manganese	pH

The project team is currently analyzing the results of the gypsum analyses. Once the analyses are complete the data will be forwarded to IDEM, OSHWM and a request will be made for disposal in an appropriate landfill. IDEM, OSHWM has indicated that if the data are acceptable they will approve temporary landfill disposal. However, once the AFGD system is in operation the actual gypsum produced by the system will have to be analyzed for the same parameters shown in Table II. IDEM, OSHWM will then issue full approval for gypsum disposal in an appropriate landfill.

ENVIRONMENTAL ASSESSMENT

The DOE Clean Coal Technology Program required full compliance with the National Environmental Policy Act (NEPA) and the development of an Environmental Monitoring Plan (EMP). Compliance with NEPA was satisfied by the project team developing an Environmental Information Volume (EIV) which contained the information on the following major topics:

- The proposed action and its alternatives;
- Existing environment;
- Consequences (impacts of the project); and,
- Regulatory compliance.

Based on the EIV, DOE published an EA which was followed by a Finding of No Significant Impact (FONSI). The fundamental purpose of the EA was to provide sufficient evidence and analysis to determine whether the project could have significant impact on the environment. Based on the analysis in the EA, the DOE determined that construction and operation of the project would not cause significant environmental impact, and published a FONSI.

The DOE Clean Coal Technology Program requires that an EMP be developed in consultation with DOE. Therefore, the AFGD project team developed an EMP to, (1) provide a description of the environmental monitoring tasks to be performed prior to and during a DOE specified AFGD system demonstration period, and (2) provide the rationale for the scope and types of monitoring that will be conducted. The demonstration period was determined to be the first 3 years of AFGD system operation. The monitoring for the project will focus on collecting on-site technical, environmental and operating data associated with the following:

- Coal;
- Raw limestone;
- Raw hydrated lime;

- Gypsum;
- Ash;
- Makeup water;
- Wastewater;
- Air emissions; and,
- Sound levels.

BUILDING PERMITS

An area which is often not thought of when designing pollution control equipment and associated facilities, is the need for building permits. Throughout the United States it is typical for industrial projects to work with state or local building departments who issue these permits. These departments follow accepted codes (e.g., Uniform Building Code) and design of a facility must be per the codes or variances must be obtained. Applying for and issuance of building permits often takes as long or longer than obtaining environmental permits.

The AFGD project team obtained design releases from the Indiana Department of Fire and Building Services (DFBS) and Improvement Location Permits (building permits) from the Porter County Plan Commission (PC). The DFBS design releases required submittal of design specifications and drawings on,

- Foundations;
- Structural steel;
- Ductwork;
- Buildings (structural, architectural, electrical, heating and ventilation);
- Stack or chimney;
- Tanks and silos; and,
- Electrical (e.g., grounding).

Once the DFBS issued a design release, the Improvement Location Permit was obtained from the PC. This involved submitting site plan information on the proposed structures to be built and a presentation before the PC's Technical Advisory Committee. As the structures associated with each Improvement Location Permit are completed, the PC's building inspector will make final inspections followed by issuance of a Certificate of Occupancy.

PUBLIC PERCEPTION OF PROJECT

The majority of the public who were familiar with the AFGD project, were proponents of the project. However, the Save the Dunes Council (a local environmental group) challenged the IDEM Permit to Construct and the NPDES permit modification. The Council raised the following issues concerning the Permit to Construct:

1. Whether the PSD regulations are applicable to the project;

2. Whether the IDEM, OAM Assistant Commissioner properly approved the Permit to Construct when, as alleged by the Council, Northern Indiana was contemplating a redesign of the AFGD facility;

3. Whether the Assistant Commissioner acted within his authority by issuing the air construction permit without coordinating his permitting efforts with the IDEM, OWM;

4. Whether the Assistant Commissioner must require modeling for all regulated pollutants; and,

5. Whether the Assistant Commissioner adequately considered possible alternatives to the AFGD facility.

The Save the Dunes Council raised 16 issues concerning the NPDES permit modification. The major issues focused on the following:

1. The design of the wastewater treatment system;

2. The water quality parameters to be monitored;

3. The determination of applicable effluent limitations;

4. The use of the WES;

5. The use of estimated concentrations of parameters discharged versus actual concentrations; and,

6. The definition of the waters of the United States.

The Save the Dunes Council's initial challenges or appeals were considered at separate hearings for the Permit to Construct and NPDES permit modification. The presiding IDEM Administrative Law Judge denied the Council's appeals. The Council then appealed to the Indiana Air and Water Pollution Control Boards. These Boards also denied the Council's appeals. However, the Council's appeal of the Permit to Construct required approximately 1 year to resolve; whereas, the NPDES permit modification appeal required approximately 8 months.

CONCLUSIONS

The permitting process for the AFGD system was initiated during December, 1988. Permitting continued until approximately June, 1991. Although the AFGD project at the Bailly Generating Station is viewed as a beneficial project, permitting has been a lengthy and expensive process. The most time consuming permit issues involved,

1. Activities associated with development of DOE's EA and issuance of the FONSI;

2. Activities associated with the Permit to Construct and NPDES permit modification; and,

3. Obtaining building permits since design of the AFGD system proceeded concurrent with construction.

The project team met three times with the Save the Dunes Council starting in May, 1989. Despite these meetings and letters responding to the Council's questions about the project, the Council appealed two major environmental permits: the Permit to Construct and NPDES permit modification. The Council subsequently verbally indicated that they are in favor of the project, however they believed that certain issues should be raised in a public forum.

Project experience points out the need for public relations programs, even for projects that are perceived as being beneficial. The public should be involved early in a project and adequate information should be provided about the project. However, the information provided may be misinterpreted and the lack of technical expertise may result in project delays.

Despite the delays and problems encountered by the Pure Air AFGD project, the facility is scheduled to be in operation by the Summer, 1992. At that time the Bailly Station's SO_2 emissions will be reduced by at least 90 percent and a by-product gypsum will be sold for wallboard manufacturing. Also, during operation of the AFGD system a WES will be demonstrated which has the potential to reduce wastewater discharged from the facility.

REFERENCE

U.S. Department of Energy. April, 1990. Environmental assessment: Innovative clean coal technology program advanced flue gas desulfurization demonstration project. DOE/EA-0420.

LEGAL NOTICE/DISCLAIMER

This paper was prepared by Pure Air pursuant to a cooperative agreement partially funded by the U.S. Department of Energy and neither Pure Air nor any of its subcontractors nor the U.S. Department of Energy, nor any person acting on behalf of either:

(a) Makes any warranty or representation, express or implied, with respect to the accuracy, completeness, or usefulness of the information contained in this report, or that the use of any information, apparatus, method, or process disclosed in this report may not infringe privately-owned rights; or

(b) Assumes any liabilities with respect to the use of, or for damages resulting from the use of, any information, apparatus, method or process disclosed in this report.

Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the U.S. Department of Energy. The views and opinions of authors expressed herein do not necessarily state or reflect those of the U.S. Department of Energy.