DOE/ EA-0471

Environmental Assessment

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**Bethlehem Steel
Blast Furnace Granulated Coal Injection
Demonstration Project**

Clean Coal Technology Program

**A Project Proposed by
Bethlehem Steel Corporation**

at the

**Burns Harbor Plant
Burns Harbor, Indiana**

May 1993

**U.S. Department of Energy
Assistant Secretary for Fossil Energy
Washington D.C. 20585**

U.S. DEPARTMENT OF ENERGY

ENVIRONMENTAL ASSESSMENT

BETHLEHEM STEEL CORPORATION
BLAST FURNACE GRANULATED COAL INJECTION
DEMONSTRATION PROJECT

CLEAN COAL TECHNOLOGY PROGRAM

A PROJECT PROPOSED BY
BETHLEHEM STEEL CORPORATION

AT THE
BURNS HARBOR PLANT
BURNS HARBOR, INDIANA

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WASHINGTON D.C. 20585

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ACRONYMS AND ABBREVIATIONS

Al ₂ O ₃	- Aluminum Oxide
AQCR	- Air Quality Control Region
BFG	- Blast Furnace Gas
BFGCI	- Blast Furnace Granulated Coal Injection
BSC	- Bethlehem Steel Corporation
Btu	- British thermal unit
C	- Carbon
CaO	- Calcium Oxide
CCT	- Clean Coal Technology
CEQ	- Council on Environmental Quality
CFR	- Code of Federal Regulations
CO	- Carbon monoxide
CO ₂	- Carbon dioxide
d	- Day
DOE	- U.S. Department of Energy
EA	- Environmental Assessment
EIS	- Environmental Impact Statement
EPA	- U.S. Environmental Protection Agency
FONSI	- Finding of No Significant Impact
ft	- Foot (feet)
gal	- Gallon
H	- Hydrogen
IAC	- Indiana Administrative Code
IDEM	- Indiana Department of Environmental Management
lb(s)	- Pound(s)
METC	- Morgantown Energy Technology Center
MgO	- Magnesium Oxide
MM	- Million
MMBtu	- Million British Thermal Units
MMgal	- Million Gallons
MMCF	- Million Cubic Feet
MnO	- Manganese Oxide
NAAQS	- National Ambient Air Quality Standards
NEPA	- National Environmental Policy Act
NO _x	- Nitrogen Oxides
NG ^x	- Natural Gas
NPDES	- National Pollutant Discharge Elimination System
NTHM	- Net Ton of Hot Metal
O	- Oxygen
O ₃	- Ozone
OAM	- Office of Air Management (Indiana)
OWM	- Office of Water Management (Indiana)
PEIS	- Programmatic Environmental Impact Statement
PM ₁₀	- Particulate Matter <10 microns in size
PON	- Program Opportunity Notice
PSD	- Prevention of Significant Deterioration
S	- Sulfur
scf	- Standard Cubic Foot
SiO ₂	- Silica
SIP ²	- State Implementation Plan
SO ₂	- Sulfur Dioxide

ACRONYMS AND ABBREVIATIONS
(continued)

TSP	- Total Suspended Particulates
USEFWS	- U.S. Fish and Wildlife Service
veh	- Vehicles
VOC	- Volatile Organic Compounds
yr	- Year

ENVIRONMENTAL ASSESSMENT
FOR THE PROPOSED
BETHLEHEM STEEL BLAST FURNACE GRANULATED COAL
INJECTION DEMONSTRATION PROJECT
(DOE/EA-0471)

1.0 INTRODUCTION

Public Law 100-446, "An Act Making Appropriations for the Department of the Interior and Related Agencies for the Fiscal Year Ending September 30, 1989, and Other Purposes," was signed into law on September 27, 1988. Among other things, the Act provided funding to the U.S. Department of Energy (DOE) to cost-share the design, construction, and operation of Clean Coal Technology (CCT) projects that demonstrate the feasibility of technologies to reduce or eliminate economic and environmental impediments that limit the full consideration of coal as a viable future energy resource.

On May 1, 1989, DOE issued Program Opportunity Notice (PON) Number DE-PS01-89FE612825 for Round III of the CCT program, soliciting proposals to conduct cost-shared CCT projects to demonstrate innovative, energy-efficient clean coal technologies that are capable of being commercialized in the 1990s. The Bethlehem Steel Corporation (BSC) Blast Furnace Granulated Coal Injection (BFGCI) Demonstration Project was selected for negotiations from among 48 proposals received by DOE in response to the PON.

The CCT program has developed a three-level strategy for complying with the National Environmental Policy Act of 1969 (NEPA). The strategy includes the consideration of programmatic and project-specific environmental impacts during and subsequent to the project selection process. This strategy is consistent with the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 CFR Parts 1500-1508) and the DOE regulations for compliance with NEPA (57 FR 15122, April 24, 1992, to be codified at 10 CFR 1021).

At the first level, DOE published and publicly distributed a Programmatic Environmental Impact Statement (PEIS) for the CCT Demonstration Program (DOE/EIS-0146) in November 1989. The PEIS assessed the impacts of the technologies that could be proposed and demonstrated under the Clean Coal Program. As the second level, prior to project selection, DOE prepared a confidential "Pre-selection Project-Specific Environmental Review" for internal DOE use in the decision-making process. This Environmental Assessment (EA), which represents the third level of NEPA review, provides a site-specific environmental analysis of the proposed BSC project at the Burns Harbor, Indiana, plant.

As required by Section 1508.9(b) of the CEQ regulations, the sections contained in this EA include the following:

- 1.0 Purpose and Need for the Proposed Action;
- 2.0 Alternatives;
- 3.0 Environmental Impacts of the Proposed Action and the No Action Alternative; and
- 4.0 List of Agencies and Persons Consulted.

The purpose of this EA is to provide a sufficient basis for determining whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI) for the proposed project.

2.0 PURPOSE AND NEED FOR THE PROPOSED ACTION

The DOE proposes to provide cost-shared Federal funding for the design, construction, and operation of a blast furnace granulated coal injection system to feed two existing ironmaking blast furnaces. The objective of the proposed project is to demonstrate the commercial performance characteristics of granulated coal as a fuel and reducing agent for steel industry blast furnaces by replacing the natural gas and coke with direct coal injection. The coal to be fed into the iron-making blast

furnaces would replace a portion of the coke feed (coal serving as a reducing agent or carbon source) and the current natural gas feed (coal serving as a fuel source). Each of the ironmaking blast furnaces to be retrofitted with BFGCI technology has a production capacity of 7,000 tons of hot metal per day. The proposed project would be demonstrated at BSC's Burns Harbor Plant located on the shore of Lake Michigan in Porter County, approximately 10 miles northeast of Gary, Indiana (Figure 1).

Successful demonstration of the proposed project could encourage more widespread use of coal injection in blast furnaces, with the associated environmental benefits to the U.S. ironmaking industry. Major benefits would result from the replacement of a significant amount of the coke presently used in blast furnaces with coal. For example, at the target injection rate of 400 pounds (lbs) of coal per net ton of hot metal (NTHM), coke use at the Burns Harbor Plant blast furnaces would be reduced by 700,000 tons (approximately 31 percent). This reduction represents a combination of imported coke (400,000 tons) and coke produced on-site (300,000 tons). The Burns Harbor Plant is currently an importer of coke, but it could become a net exporter of coke if the target injection rate is achieved or the plant could alternately decrease its production of coke. Therefore, due primarily to the decrease in the amount of coke which would be imported to the Burns Harbor Plant, the reductions in coke oven emissions would not occur at the Burns Harbor Plant, but at coke production facilities elsewhere that export coke to Burns Harbor for use in the ironmaking blast furnaces.

Expanding the implementation of coal injection to a national scale would result in major reductions in coke production and its associated emissions. These emissions include particulate matter, sulfur dioxide (SO_2), volatile organic compounds (VOCs), nitrogen oxides (NO_x), and other coke production by-products, such as ammonia liquor and tar decanter sludge. In addition, the BFGCI process would create new markets for nonmetallurgical coals

FIGURE 1
Location of the Bethlehem Steel Burns Harbor Plant

that were previously unacceptable for coking purposes. The flexibility of the BFGCI system for retrofitting almost all domestic blast furnace installations and the system's potential environmental and economic benefits would support commercialization of the BFGCI technology to other steelmakers.

This site-specific EA has been prepared by the DOE to comply with the requirements of NEPA and assesses the potential for environmental impacts at BSC's Burns Harbor Plant where the BFGCI is proposed to be installed and operated. The scope of this EA is limited to the impacts related to switching from natural gas as a fuel for the blast furnaces to granulated coal. All other operations at the Burns Harbor facility (e.g., coke production, steel production, etc.) would remain unchanged.

In 1986, the Burns Harbor coke oven batteries were alleged to be operating in violation of federal regulations (42 U.S.C. 7413 (a) (1), 40 C.F.R. 52.776 (h)) by the U.S. Environmental Protection Agency (EPA), Region V. The doors on the coke ovens appeared to have visible fugitive particulate emissions exceeding the regulatory limits. A Consent Decree between BSC and the EPA was filed in May 1991. Provisions of this decree that BSC must meet involve a compliance program, self-monitoring program, and reporting program to the EPA. This decree does not affect the operation of the blast furnaces, which is the subject of this EA.

Sources of information for this EA include the following: BSC's technical proposal for the project submitted to DOE in response to the CCT, Round III, PON; discussion with the BSC staff; the Environmental Information Volume and supplemental updates for the project prepared by BSC (1990-1992) for use in preparing the NEPA documents; an EA prepared by DOE (1990a) that contains a description of the affected environment for the same area in which the proposed project would be located; a biological assessment prepared by DOE for the U.S. Fish and Wildlife Service (USFWS) for the proposed project; BSC's application for an air

permit to construct submitted to the State of Indiana in October 1992 (currently undergoing state review); and visits to the proposed project site and surrounding area.

3.0 ALTERNATIVES

This section describes the proposed action and alternatives to the proposed action.

3.1 THE PROPOSED ACTION

This section is divided into three parts. The first deals with the existing facilities and ironmaking process at the Burns Harbor Plant and provides the context for the second part, which describes the proposed BFGCI system process and the changes to the existing facility and processes necessary for BFGCI operation. The final section summarizes the changes in feedstocks, emissions, and other activities at the Burns Harbor facility that would result due to the construction and operation of the BFGCI system.

3.1.1 Current Burns Harbor Plant Operations

The 3,300-acre Burns Harbor site, which is owned by BSC, was originally developed in the 1960s as a modern steelmaking site. Figure 2 shows a schematic of the ironmaking process at the Burns Harbor Plant. Current operation of the blast furnaces involves alternately feeding coke from the coke plant, limestone/dolomite fluxes, iron ore pellets, and sinter pellets into the top of the blast furnace. The sinter pellets are made in the sinter plant from fine materials containing ore particles and other materials (such as flue dust). Coke provides carbon (C) for the reduction of the iron from the ore as well as the physical support for the materials in the blast furnace. Limestone and dolomite serve to remove sulfur and other impurities found in the iron ore and coke.

Granulated Coal Injection for Iron Making

FIGURE 2

SCHEMATIC OF THE BLAST FURNACE COAL INJECTION SYSTEM

The blast furnace, which operates in a reducing (oxygen deficient) environment, receives coke, iron ore pellets, and limestone at the top of the furnace. Burners at the bottom of the blast furnace, currently fueled by natural gas, provide heat. The hot combustion product gases rise in the furnace counter-currently, transferring heat to the feedstock to convert it to a molten form. Normal operation results in the feedstocks smoothly melting, converting to iron, and moving to the bottom of the furnace where the hot molten iron and slag (by-product material) are removed.

Occasionally "slips" occur which result in uncontrolled releases of pollutants. Slips are products of process upset conditions, i.e., when the feedstocks hang up near the top of the furnace and then suddenly release due to lack of physical support (Strassburger, 1969). This happens when gas passage is restricted by excess fines or when premature melting of the iron oxides causes other feedstocks to solidify, thus forming a "bridge" that adheres to the side of the furnace. A cavity forms under this "bridge" of material as the coke beneath is consumed. When the "bridge" can no longer support its weight, the burden suddenly falls or "slips" to the bottom, causing the release of particulate matter and blast furnace gas (BFG) to the atmosphere through bleeder valves. These bleeder valves, which are normally closed, open in response to the sudden increased internal pressure that results from slips. The frequency of occurrence of slips has been greatly reduced due to the advancement of burden control technology. The Burns Harbor Plant of BSC has not experienced a slip in the last decade. With the implementation of the proposed coal injection system, no change in the frequency of occurrence of slips is expected at the Burns Harbor Plant. However, on those rare occasions when slips are experienced, the associated emissions are typically of such short duration and intensity that there is no threat to human health and the environment.

The gases generated in the blast furnace are collected at the top of the furnace and enter a clean-up system in which the particulate matter is removed from the BFG and recycled. Under normal operating conditions no release of particulate emissions to the outside air would occur. Particulate control for both blast furnaces is achieved in a clean-up system consisting of a dust catcher and a wet scrubber. The clean-up system dust catcher (cyclones) captures about 36,000 tons per year of flue dust while the wet scrubber subsequently removes 60,600 tons per year of finer particles. The flue dust from the dust catcher and the filter cake from the wet scrubber are recycled through the sinter plant. These fine particulate materials constitute less than 1 percent of the total feed material in the sinter plant. The water is circulated and reused in the clean-up systems of the wet scrubber.

Approximately 279 million cubic feet (MMCF) of low-grade blast furnace gas is produced annually at the Burns Harbor plant. The composition of this gas varies somewhat with different furnaces and with raw materials and fuels, but typically will be approximately 54 percent nitrogen (N_2), 22 percent carbon monoxide (CO), 21 percent carbon dioxide (CO_2), and 3 percent hydrogen (H_2) on a dry basis. It will also contain some water vapor. Under the reducing atmosphere that exists in the blast furnace, oxygen is not available to form NO_x and SO_2 ; therefore, SO_2 and NO_x are not expected in any appreciable quantities in the BFG collected at the top of the blast furnace and are not measured. Almost all of the sulfur and sulfur compounds in the feed stock are captured in the slag with a small portion going to the hot metal, with negligible sulfur being evolved as reduced gases (e.g., hydrogen sulfide). Carbon monoxide (CO) and CO_2 are produced and leave as BFG which then undergoes cleanup through the aforementioned dust catcher and wet scrubber system. The cleaned BFG serves as a low-heating value fuel (80-90 Btu/ft³) for the plant's coke ovens, blast furnace stoves, soaking pits,

and power station. Table 1 displays the 1990 distribution of clean BFG to the various units on the Burns Harbor plant site.

Table 1
USES FOR BLAST FURNACE GAS AT THE BURNS HARBOR PLANT
FOR 1990

Operation	Quantity (in MMCF/yr)
Coke Oven Battery #1	5,204
Blast Furnace C stoves	42,512
Blast Furnace D Stoves	35,395
Blast Furnace Flare	7,277
Soaking Pits	7,726
Power Station Boilers 7-12	181,078
TOTAL	279,192

The blast furnace produces a slag resulting from the union of the fluxes with silica (SiO_2), alumina (Al_2O_3) and some of the manganese oxide (MnO) that are available from the coke ash and gangue (e.g., stony materials occurring with the metallic ore) of the iron-ores. A nominal composition of the slag is 38 percent calcium oxide (CaO), 12 percent magnesium oxide (MgO), 37 percent SiO_2 , 10 percent Al_2O_3 , a few percent MnO , and 1 to 2 percent sulfur. The slag, which is skimmed from the molten iron contains the bulk of the impurities associated with the ironmaking process. The slag is used for rock wool applications or as a construction aggregate material. Thus, whereas the sulfur present in the coal burned in a power plant or charged into a coke oven battery has the potential to create environmental problems as gaseous sulfur species, the sulfur in the feed products to a blast furnace remains in a solid form and becomes a constituent of a useful by-product.

3.1.2 BFGCI System Process

The BFGCI technology to be demonstrated at the BSC Burns Harbor Plant involves injecting coal directly into an ironmaking blast furnace to replace a portion of the coke feed and the natural gas as the fuel (see Figure 2). The objective of the proposed project is to demonstrate the commercial performance characteristics of granulated coal as a fuel for steel industry blast furnaces by replacing the natural gas and coke with direct coal injection at the rate of 400 lbs per NTHM. Since coal would also be a reducing agent to the iron ore, the need for coke, which is the primary blast furnace reducing agent, would be decreased by about 30 percent (DOE, 1990b). Approximately 1.8 million tons of the 2.2 million tons of coke required by the blast furnaces at the Burns Harbor Plant are produced on-site with the remainder imported from other facilities. With the BFGCI, the need to import coke would be eliminated, but on-site coke production would continue at the same rate. Hence, the benefits of reduced emissions from reduced coke consumption would be experienced off-site at the location of the suppliers' coke production facilities and potentially at new consumers' sites. All other operations of the facility would remain unchanged. The quantity of low-Btu BFG produced in the blast furnaces is not expected to increase as a result of installing the BFGCI system.

The reducing environment of the blast furnace and the current quantity of flux (limestone or dolomite) material in the blast furnace feed materials would effectively capture the sulfur released from burning coal. The majority of the captured sulfur would report to the slag, with a small percentage reporting to the hot metal. Thus, sulfur emissions from the BFGCI system should be the same as those emissions generated when coke and natural gas are used as feedstocks to the blast furnace. In addition, slag would continue to be sold as construction aggregate. As is current practice, the gases exiting the blast furnace would be cleaned by cyclones and wet scrubbers to remove

particles, then recycled as a fuel to plant process ovens, or flared if there is an excess.

New construction for the proposed project would consist of a coal preparation plant, which includes a coal storage pile, coal conveyor system to link the plant into the existing coal handling system, coal grinding and sizing equipment; and a coal injection plant, which includes coal injection equipment and injection lines to the blast furnaces. Figure 3 shows the plot plan for the BFGCI system. The proposed BFGCI technology would involve the following activities:

- Coal would be sized to under 4-mesh (approximately 5 millimeters in size or smaller) particle size in the gas-swept roller mill in the coal preparation plant.
- Correctly sized granulated coal would then be transferred to the injection plant, where it would be placed in storage silos until needed in the blast furnace. Nitrogen from the existing air separation plant would be used to stabilize the stored coal and prevent auto-ignition (e.g. spontaneous combustion).
- In the injection plant, coal would move by gravity from the storage silos through a weigh hopper to the distribution hopper and, finally, to the individual injectors; nitrogen gas would be used to fluidize the coal in the storage vessels to ensure smooth flow and reduce fire hazards.
- Each injector would have a single pneumatic pipeline to its respective blast furnace nozzle where the granulated coal enters the furnace; the injector output rate would be controlled by a motor-driven metering feeder and air would be used to transport coal to the blast furnaces.

The Burns Harbor Plant site is zoned for heavy industry. The BFGCI project would be constructed entirely within the existing plant boundaries on an 8.5-acre tract adjacent to Blast Furnaces C and D, which are proposed for retrofit with the BFGCI technology. Within the 8.5-acre tract, the coal storage pile would be located on 2.5 acres that are currently used for storage of iron-bearing materials. The coal storage pile would hold a 10-day (28,000 tons) supply of raw coal. Limiting the pile to a

10-day supply reduces the potential for leaching and erosion from exposure to rain and the wind. Coal would be reclaimed from hoppers under the pile and conveyed via the new Coal Reclamation Conveyor System to the coal preparation plant.

The Burns Harbor Plant site is well served by rail, waterways, and highways. No additional transportation links for this project would be needed to transport the coal required to the site. An estimated maximum of 1,051,000 tons per year of coal, delivered to the site by rail, would be transported to the coal storage area by the existing conveyor system, comprised of existing material handling facilities with some new connecting conveyors.

During the 32-month operational phase (Phase III) of the proposed project, the effects of four variables--coal type, coal granule size, coal injection rate, and blast furnace conversion method--would be evaluated both separately and in combination to determine the optimum operating conditions for achieving both economic and environmental benefits from the BFGCI process. Following the demonstration of the proposed BFGCI technology, the project would continue as a commercial operation at the Burns Harbor Plant. The data developed would be provided to DOE for use in future commercialization of the BFGCI technology at other steelmaking facilities.

Four types of coal would serve as feedstocks and would be evaluated during the demonstration period of the proposed project. Included would be eastern bituminous coals with low ash and low sulfur contents, such as from the Elkhorn seam; eastern bituminous coals with moderate ash and higher sulfur such as Ellsworth; midwestern coals with higher inherent moisture content but low ash and moderate-to-high sulfur such as Illinois #6; and western sub-bituminous coals with low ash and low sulfur contents but high inherent moisture, such as Decker Powder River. Table 2 describes the characteristics of these feedstocks.

Table 2

CHARACTERISTICS OF THE COALS TO BE USED IN THE BFGCI SYSTEM

Coal Type	Btu/lb	Volatile Matter, %	Ultimate Analysis, %					
			C	H	O	S	Ash	Water
Lower Elkhorn Pike, # 26, KY	14,000	36.0	79.5	5.5	6.7	0.7	6.0	1.6
Ellsworth, #60, PA	14,125	37.0	78.3	5.4	6.6	1.3	6.5	1.9
Illinois #6, Consol, IL	13,499	35.0	74.3	4.9	12.0	1.0	5.7	2.1
Decker Powder River, MT	9,595	31.5	55.0	3.9	12.6	0.4	4.2	23.9

The amount of coal used in the BFGCI system correlates directly with the rate of injection. At the target injection rate of 400 lbs of coal for each NTHM from each blast furnace, as much as 1,051,000 additional tons of coal per year would be delivered through the existing transportation networks. Coal is currently delivered to the site for the production of coke at a rate of approximately 520 unit trains a year. The BFGCI system would cause an additional 30 unit trains per year to be delivered. In addition to the coal, approximately 1,065 standard cubic feet (scf) per minute of nitrogen gas would be added to the granulated coal at the discharge cones of silos, hoppers, and bins in order to fluidize it, guarantee consistent flow, and maintain inert conditions. After particulate removal in the baghouse, the nitrogen would be vented directly to the atmosphere at the same rate. Oxygen is required to maintain temperatures high enough to keep iron and slag in the molten state. Coal injection would require more than twice as much oxygen feed than the current natural gas injection due to thermodynamic and kinetic considerations. There would be no change to the current arrangement under which oxygen is delivered to the site directly from the nearby oxygen plant via pipeline. Material consumption in the BFGCI system is summarized in Table 3.

Table 3
MATERIAL CONSUMPTION AT THE BETHLEHEM STEEL BLAST FURNACE SYSTEM

Material	Current	With BFGCI System (400 lb/NTHM)	Change due to BFGCI
Coke (ton/yr)	2,200,000	1,500,000	-700,000
Coal (ton/yr)	0	1,051,000	+1,051,000
Natural Gas (ton/yr)	250,200	9,600 ^a	-240,600
Nitrogen (ton/yr)	0 ^b	21,900	+21,900
Oxygen (ton/yr)	206,600	443,600	+237,000
Water (MM gal/d) (non-contact cooling water)			
Blast Furnace only	58.0	59.3	
Total Plant	300.0	301.3	+1.3 ^c

^a Applies if natural gas is used for drying coal; if BFG is used in the drying process, the quantity may decrease to zero, depending on the extent that natural gas is replaced by BFG.

^b Nitrogen is not consumed in the blast furnace system, but is used for fluidization, coal transportation, and stabilization and then vented unaltered to the atmosphere.

^c Non-contact cooling water used at the Burns Harbor Plant of BSC is withdrawn and returned to Lake Michigan. As such, it is not actually consumed. Therefore, the additional 1.3 million gallons per day, which would be required for this purpose if the BFGCI system were built, is not a consumptive change as is the case for the other materials listed in this table.

Currently, 2,200,000 tons per year of coke are used on site with about 400,000 tons per year of the coke being produced at other locations and the remaining 1,800,000 tons per year being produced on-site. These quantities correspond to achieving a coal injection rate of 300 lbs per NTHM. If the target injection rate of 400 lbs per NTHM is achieved, the BFGCI system would be expected to require about 83.3 percent of the coke produced

on-site. Based on market conditions, then, the BFGCI system could make the Burns Harbor plant a net exporter of about 300,000 tons of coke, or lead to a decrease in production of coke, as shown below.

COKE DISTRIBUTION ANALYSIS (Tons/Yr) AT 400 lb/NTHM

COKE CURRENTLY USED	2,200,000
COKE FOR BFGCI	<u>1,500,000</u>
TOTAL REDUCED CONSUMPTION	700,000
LESS IMPORTED	<u>400,000</u>
REMAINING ON SITE PRODUCTION	300,000

BSC would work with the appropriate offices of the Indiana Department of Environmental Management (IDEM) to obtain the required construction and operation permits. An application for the air permit to construct was submitted in October 1992 and is currently undergoing state review. The IDEM Office of Air Management (OAM) will review the project and issue the appropriate finding under its current regulations. It is expected that the maximum allowable atmospheric emission limits previously set by OAM for steelmaking operations would apply to the BFGCI system. Approval of the permit is expected in mid-1993. Air monitoring stations are operated in the region by the State of Indiana, National Park Service, Porter County (assigned to the state on January 1, 1993), and Northern Indiana Public Service Company. The IDEM Office of Water Management (OWM) regulates surface water discharges through the National Pollutant Discharge Elimination System (NPDES) program. The existing NPDES Permit for the Burns Harbor Plant, which is to be renewed in August 1993, requires that any anticipated facility process modifications be reported. The additional 1.3 million gallons per day of non-contact cooling water discharged by the BFGCI system would not exceed the existing IDEM-OWM permit limits. No modification of the existing NPDES permit is anticipated, but the changes must be submitted to IDEM-OWM.

Because there would be no new solid or hazardous wastes to be disposed, no new permits would be required for the BFGCI system, and no modifications to existing permits are anticipated. Table 4 summarizes the environmental permitting requirements anticipated for the project.

Table 4
PERMITTING REQUIREMENTS FOR THE BFGCI SYSTEM

Permit	Agency	Status
Air Permit to Construct	Indiana Office of Air Quality (IDEM-OAM)	Application submitted October 1992. Currently undergoing State review.
Air Permit to Operate	Indiana Office of Air Quality (IDEM-OAM)	Initial permit to operate is part of construction permit application.
Water Permit (NPDES)	Indiana Office of Water Management (IDEM-OWM)	Expires August 31, 1993; renewal submitted March 1993.

3.1.3 Environmental Changes due to the BFGCI System

Implementation of the new BFGCI system would result in some changes from the existing conditions at the Burns Harbor Plant site. These changes include air quality, water quality, resource consumption, socioeconomics, and others. Changes from the current conditions are presented in Table 5; impacts associated with these changes are addressed in Section 4.0.

3.2 ALTERNATIVES TO THE PROPOSED ACTION

The alternatives discussed in the following sections were considered through all three elements of the NEPA strategy presented in Section 1.0. The "no-action" alternative, alternative sites, and alternative technologies were considered

Table 5

ENVIRONMENTAL CHANGES SPECIFIC TO THE PROPOSED BFGCI SYSTEM

Item	Unit	Current	With BFGCI	Change
Resource Consumption				
Coke	Ton/yr	2,200,000	1,500,000	-700,000
Coal	Ton/yr	0	1,051,000	+1,051,000
Natural Gas	Ton/yr	250,200	9,600	-240,660
Nitrogen	Ton/yr	0 ^a	21,900	+21,900
Oxygen	Ton/yr	206,600	443,600	+237,000
Air Emissions				
(See Table 6)				
Water Emissions				
Non-contact Cooling Water	MMgal/d	58.0	59.3	+1.3
Waste Production^b				
Slag	Ton/yr	1,077,216	1,087,218	+10,002
Traffic				
Construction				
Highway	veh ^c /d	3,000	3,025	+25
Operation				
Highway	veh/d	3,000	3,003	+3
Rail	car/yr	52,000	55,000	+3,000
^a Nitrogen is not consumed in the blast furnace, but is used for fluidization, coal transportation and stabilization, and then released to the atmosphere. ^b slag is a fully recycled by-product material. ^c vehicle.				

during the project selection process and the project-specific pre-selection review. Brief summaries of the alternatives are discussed below.

3.2.1 No Action

Under the No Action Alternative, DOE would not provide cost-shared federal funding to support the 69-month project to demonstrate the proposed technology. The BFGCI technology might be completed without DOE participation or the project might be canceled. If the project proceeds without DOE funding, impacts would be the same as for the proposed action.

If the project were canceled, the BSC BFGCI system would not be installed at the Burns Harbor Plant and the operation of the facility would be expected to continue under the current method. Therefore, this new technology would not be demonstrated for potential future commercialization, and the potential for national benefits to be derived from the commercialization of this technology would not be realized. These benefits include reduced consumption of natural gas; the creation of new markets for coals having marginal or unacceptable metallurgical properties; reduced capital and operating costs for steelmakers; improved energy independence and reliability for the domestic steel industry; improved productivity of domestic blast furnaces; reduced discharge of environmental pollutants associated with basic steel operations; and reduced domestic production and consumption of coke and its associated emissions.

3.2.2 Alternative Technologies and Sites

Under Round III of the CCT Program, DOE solicited proposals to conduct cost-shared CCT projects to demonstrate innovative, energy efficient technologies that offered the prospect for commercialization in the 1990s. The selection guidelines included the capability of reducing emissions from existing facilities and/or providing for future energy needs in an environmentally acceptable manner. Other than compliance with these basic objectives of the CCT Program, location of the project in the United States, and the use of coal from U.S.

mines, the prospective offerors were not constrained with regard to technology or site. For those proposals submitted that were determined to be suitable for comprehensive evaluation, each received a confidential pre-selection environmental review. This review summarized for the Source Selection Official the strengths and weaknesses of the specific project relative to the environmental evaluation criteria including, to the maximum extent possible based upon the information provided in the proposal, a discussion of alternative technologies and sites reasonably available to the proposer, a brief discussion of the potential environmental impacts of each proposal, necessary mitigative measures and, to the extent known, a list of permits and licenses which must be obtained in implementing the proposal.

Based upon the overall technical and environmental merit of the respective proposals, including the Program Policy Factors, the Source Selection Official selected a series of projects for possible cost-shared financial assistance, within the budgetary constraints of Round III of the CCT Program. The BFGCI project was included among the thirteen selected under Round III of the CCT Program for its potential to demonstrate the use of granulated coal as a fuel and reducing agent for steel industry blast furnaces by replacing natural gas and coke with direct coal injection, thereby reducing coke oven emissions. Given the nature of the CCT selection process, DOE is limited to either accepting or rejecting the overall demonstration project as proposed by the participant, including both the technology and site designated by the offeror. Therefore, the only technology and site addressed in this EA are those proposed by the participant.

4.0 ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION AND THE NO ACTION ALTERNATIVE

This section presents the impacts of the proposed action and the no action alternative.

4.1 THE PROPOSED ACTION

The following subsections describe the proposed action's impacts on the affected environment.

4.1.1 Air Quality

The following subsections describe the proposed action's potential impacts on air quality.

4.1.1.1. Construction

Emissions from construction, primarily due to vehicle exhaust, would be short-term (19 months or less) and localized. Changes in ambient levels would be temporary for dust, smoke, particulate matter, SO₂, NO_x, CO, and VOC. During the proposed construction period required for installation of the BFGCI system and support facilities (see Figure 3), there would be emissions of small quantities of dust or occasional smoke, particulate matter and other chemicals in the construction area. Some of these emissions would be generated by about 25 vehicles per day transporting construction personnel to and from the site. The traffic increase would be small in comparison with current employee traffic (3000 vehicles per day) at the facility. Additional quantities of aforementioned emissions would be generated by the engines powering the construction equipment. The potential for fugitive dust raised during construction would be directly affected by weather conditions. BSC would spray water on roads and laydown areas as a dust control program during the construction. Thus, these emissions are expected to be small in quantity, limited in duration, and confined to the site.

4.1.1.2. Operation

Operation of the BFGCI system would result in small increases in air emissions; these are summarized in Table 6.

Table 6
SUMMARY OF CALCULATED AIR EMISSIONS SPECIFIC TO
THE BFGCI SYSTEM
(TONS PER YEAR)

Item	Current	With BFGCI	Change
Particulate Matter	14.65	28.25	+13.60 ^a
Nitrogen Oxides ^g			
NG ^b	nd ^d	30.04	+30.04
BFG ^c	nd ^d	17.44	+17.44
Carbon Dioxide	6,481,580	6,701,708	+220,128
Sulfur Dioxide ^e			
NG ^b	nd ^d	0.13	+0.13
BFG ^c	nd ^d	12.9	+12.9
Volatile Organic Compounds			
NG ^b	nd ^d	0.60	+0.60
BFG ^c	nd ^d	0.00	+0.00
Carbon Monoxide			
NG ^b	nd ^d	7.5	+7.5
BFG ^c	nd ^d	35.3	+35.3

^a PM₁₀ component is 13.19 ton/yr.

^b Using natural gas as a fuel for coal dryers. Natural gas emissions were calculated using emission factors from EPA AIRS (1990) for NG fired boilers with heat input capacities between 10 and 100 MMBtu/hr. Maximum heat input of coal dryers would be 25 MMBtu.

^c Using Blast Furnace Gas (BFG) as fuel for coal dryers. The BFG burned in the coal dryers would be diverted from other current uses within the Burns Harbor Plant, e.g. from the blast furnace flare.

^d Not detectable.

^e This emission rate for SO₂ was calculated using an emission factor for BFG that is currently being used in the Lake County SO₂ State Implementation Plan Revision based on U.S. Steel Gary Works (BSC, 1992). BSC heat and material balance shows negligible SO₂ in the BFG.

^f VOC and CO emission rates were calculated using emission factors for BFG combustion published in EPA AIRS (1990).

^g NOx emission rate was calculated using an emission factor for BFG derived from stack testing on blast furnace stoves conducted in May, 1987 at ARMCO's Ashland Plant and July and August, 1988 at steam generation boilers at BSC's Sparrows Point Plant.

The values reflected in Table 6 were calculated on the basis of the incremental changes associated exclusively with the blast furnace operations, without giving credit for the reduction in emissions which would be attributable to the production of 700,000 tons of coke which would be displaced by the coal used in the BFGCI system. As noted earlier, this displaced coke is comprised of 400,000 tons currently imported to the Burns Harbor facility and 300,000 tons produced on-site. Under the assumption that coke production at the Burns Harbor facility would continue at its current level, the environmental benefits associated with this reduction in coke requirements would not accrue to that site, but instead be reflected in improved air quality elsewhere.

The BSC is located in the Chicago Air Quality Control Region (AQCR), which is currently in attainment for all criteria pollutants, except O_3 . Particulate matter increases result primarily from coal handling and storage. The other air emissions result from the addition of coal dryers to the blast furnace. Two cases were analyzed: the coal dryers fueled by natural gas, or the coal dryers fueled by BFG.

Operation of the BFGCI system would result in an increase in emissions of particulate matter due to the operation of new equipment associated with the transportation and processing of coal. Also, the periodic use by the BFGCI system of existing equipment primarily used for other operations, (e.g., the rotary car dumper currently used to supply coal to the coke oven batteries) would produce incremental increases in emissions for some existing equipment. These are dominantly in the form of fugitive emissions with the principal contribution coming from the coal storage pile. These fugitive emissions were estimated using the appropriate emissions factors in the EPA's *Compilation of Air Pollutant Emission Factors (AP-42)*, September, 1988 and Supplement C, September 1990, as appropriate.

Additional emissions of particulate matter would result from point source emissions (Car Dumper Baghouse, Lockhopper Filter Vent, etc). Proper design and operations (covered conveyors, enclosed transfer points) of these point sources would minimize TSP emissions from these sources. Total Suspended Particulates resulting from operation of the BFGCI are estimated at 13.6 tons/year. The Burns Harbor Plant is in an unclassified area treated as an attainment area by EPA. These emissions are below the Net Significant Emission Level (equivalent to the *de minimis* level of PSD review as set forth in 40 C.F.R. 52.24(23)(i)) of 25 tons/year for PSD review, and therefore would not subject the project to PSD review requirements.

Operation of the BFGCI system would require that the granulated coal be dried prior to injection into the blast furnace. This is accomplished using two burners fired with natural gas and/or BFG. If natural gas is used to fire the burners, an increase in NO_x emissions would occur due to the formation of thermal NO_x . In any combustion process, elevated temperatures and oxygen in the form of excess air are conducive to the formation of oxides of nitrogen (NO_x). Although ironmaking requires the introduction of air (hot blast), the process takes place in a reducing atmosphere. There is no excess oxygen present; therefore NO_x in the blast furnace is formed in very small quantities or not at all. Nitrogen gas (as N_2) is introduced into the furnace as an inert component of the hot blast, and does not react but passes through as a component of the BFG. Analysis of the low-grade gas produced by blast furnaces, and used as a fuel, indicated that 54 percent of the BFG is elemental nitrogen (N_2).

In order to establish a reasonable upper limit on NO_x emissions, it was assumed that only natural gas would be used to fire the burners. Under such a scenario, the natural gas consumption rate would be approximately 48,700 scf/hour, thereby generating an estimated 30 tons per year of NO_x emissions from

the dryers. This, again, is below the Net Significant Emission Level (equivalent to the *de minimis* level of PSD review as set forth in 40 C.F.R. 52.24(23)(i)) of 40 tons/year, that would require a PSD review. If BFG is used to fire the burners for the dryers, the expected NO_x emissions would be reduced since NO_x is not formed in the reducing atmosphere of the blast furnace and is not, therefore, a component of BFG. The calculated emissions of 17.44 tons/year NO_x result from the actual combustion of the BFG at lower combustion temperatures than under the natural gas scenario, thereby generating less thermal NO_x .

Sulfur in coal that is consumed in a conventional combustion process such as a power generating station undergoes oxidation and is released to the atmosphere as SO_2 . The sulfur carried into the blast furnace by the coke, ores and fluxes as well as by the injected coal reports principally to the slag and to the hot metal. Once the slag cools, the sulfur content is bound in the slag in solid solution as metallic sulfides and sulfates. Of the sulfur entering the blast furnace, 4 percent typically reports with the hot iron; 5 percent with the flue dust, filter cake, and BFG; and 91 percent with the slag. The reactions are complex, but the net effect is that the sulfur introduced into the blast furnace is mostly carried out by the slag and some by the hot metal. The content of sulfur in the hot metal is controlled by the thermodynamic conditions in the blast furnace. Heat and material balance modeling for the BFGCI system shows negligible levels of sulfur in the BFG. However, Lake County SIP Revisions present an emission factor of 0.059 percent sulfur for calculating estimated emissions in BFG. Using this guideline to establish a reasonable upper limit, the BFGCI system would emit 12.9 tons per year of SO_2 using BFG or 0.13 tons using natural gas as the dryer fuel.

Calculations of the effects of CO and CO_2 generation resulting from the operation of the BFGCI system are based on granulated coal replacing both natural gas and coke. Under the

BFGCI system, an increase of 3 to 4 percent in the amount of CO and CO₂ in the BFG is expected at the target coal injection rate of 400 lbs/NTHM. Assuming that all the carbon in the BFG is converted to CO₂ (100 percent combustion efficiency), a net increase of approximately 220,000 tons/year of CO₂ is expected. This is approximately a 3 percent increase in CO₂ emissions. Additionally, burners in the coal dryers would increase CO emissions slightly, depending on the burner efficiency and fuel used. The calculated incremental CO emissions would not exceed the Net Significant Emissions Levels (equivalent to the *de minimis* level of PSD review as set forth in 40 C.F.R. 52.24(23)(i)), and hence, would not require a PSD review.

According to the EPA emissions factors, none of the coal handling operations in the proposed BFGCI system are sources of VOCs (EPA, 1990). The use of natural gas to fire burners used in coal drying could result in a slight increase in VOCs. However, assuming that only natural gas is used to fire the burners, the calculated potential emission of 0.6 ton/year of VOCs would be well below the Net Significant Emission Level (equivalent to the *de minimis* level of PSD review as set forth in 40 C.F.R. 52.24(23)(i)) of 40 tons/year. In addition, the substitution of BFG, in part or in whole, for natural gas for the dryer burners would reduce VOCs proportionally since VOCs do not result from the combustion of BFG. Ozone (O₃) also is not expected to increase as a result of operation of the BFGCI due to the limited increase in the emission of VOCs, which is a measured indicator of O₃. Since the calculated VOC emissions (< 1 ton/yr) would be less than 100 tons/yr, offsets for non-attainment would not be required.

Overall, potential detrimental impacts to air quality resulting from the operation of the BFGCI system consist of marginal increases in the emission of TSP, NO_x, CO₂, and SO₂. A slight increase in the release of VOCs could result under the assumption that no BFG is used to fire burners in the coal

dryers. All expected incremental increases are below *de minimis* values and would not require a PSD review. The Burns Harbor plant is in general compliance with all air regulations and expects to remain so even after the installation of the new process at the facility. The operation of the proposed BFGCI system should therefore have minimal effect on air quality.

4.1.2 Groundwater

The following subsections describe the proposed action's potential impacts on groundwater.

4.1.2.1 Construction

Construction of the BFGCI system is not expected to affect groundwater quality in the area. During construction, no material would be used that would be expected to cause any adverse impact on groundwater.

4.1.2.2 Operation

During operation, coal storage procedures would be consistent with current practices at the plant used for coal storage for coking operations. Coal and other raw materials used in the coking operations are presently stored in graded areas that promote evaporation or infiltration of storm water rather than runoff storm water (see discussion under Section 4.1.3.2). Aquifers used for public water supply are located within Devonian-Silurian bedrock approximately 185 feet (ft) below the surface and are separated from the surface aquifer by several impervious deposits (BSC, 1990). Because of this separation, no potential impacts to groundwater used for public or private water supply is anticipated.

Current coke production at the Burns Harbor Plant is not expected to change as a result of the proposed action. However,

if the target rate of 400 lbs of coal/NTHM is achieved as a result of the proposed project, the blast furnaces would use about 83 percent of the coke produced on-site. If BSC chose to reduce coke production by 17 percent at the Burns Harbor Plant rather than to export the excess coke, the quantities of all waste materials and emissions resulting from coke production would likewise be reduced approximately 17 percent.

4.1.3 Surface Water

The following subsections describe the proposed action's potential impacts on surface water.

4.1.3.1 Construction

Construction of the BFGCI system is not expected to have any adverse impacts on surface water. Water required for construction would be obtained directly from the Burns Harbor Plant's existing water system, which is supplied by Lake Michigan. It is not anticipated that construction would have any adverse effect on the lake or recreational activities associated with the lake. No outfalls or docking facilities would be constructed for the BFGCI system.

4.1.3.2 Operation

The proposed BFGCI system would require approximately 1.3 million gal/d of non-contact cooling water in addition to current total plant usage, which is approximately 300 million gal/d. Cooling water currently is obtained from Lake Michigan and discharged back into the lake; the additional cooling water would also be obtained from Lake Michigan and would be directed to existing permitted outfalls within the plant prior to discharge. This additional discharge represents approximately 0.4 percent of the existing permitted discharge. Blast furnace blowdown, 314,000 gal/d, would remain unchanged for the BFGCI system. This

water is currently directed to the plant's secondary wastewater treatment facility, treated and discharged into the Little Calumet River, which in turn flows into Lake Michigan.

The proposed coal storage site, which is currently used for storage of iron-bearing materials, is about 2.5 acres in size. The current design, unlined but graded to collect surface water in such a manner that the water either evaporates or infiltrates into the soil, would remain unchanged. The coal pile would average about 28,000 tons of coal, which represents a 10-day supply at an injection rate of 400 lbs of coal per NTHM. Current storage of iron-bearing materials on this area averages about 500,000 tons. Both current and proposed storage piles are dynamic -- that is, size and quantity change frequently. The short storage time would reduce potential contamination from leaching of coal constituents. Drainage from the 2.5-acre storage area, located about 4,000 ft from Lake Michigan, would infiltrate the ground and, over time, be expected to flow into Lake Michigan via the groundwater. Groundwater flow at the Burns Harbor site is northward toward the lake at approximately 0.5 ft/d. The blast furnaces are located approximately 0.5 miles south of Lake Michigan. Storm runoff from the existing iron-ore pile associated with current operations is not monitored, and Indiana does not now require nor have any proposed regulations that such runoff, either from the existing iron ore or the proposed coal pile, be monitored or controlled. Based on the size of the current iron-ore pile in comparison to the smaller proposed coal pile and the coal pile's high turnover rate, minimal impacts to the area's groundwater, or subsequently to surface water, are anticipated.

Storm water runoff would be handled by the current storm water management system at the Burns Harbor Plant and no changes in volume or quality of runoff are anticipated. Emergency water for fire protection would remain available from Lake Michigan, if needed, at the rate of 172.8 million gal/d.

4.1.4 Land Use

The following subsections describe the proposed action's potential impacts on land use.

4.1.4.1 Construction

All construction activity would occur within the Burns Harbor Plant site, which is already an industrialized setting. The BFGCI system would require 8.5 acres, approximately 0.26 percent of the 3,300 acres currently dedicated to the plant. No wetlands on the Burns Harbor Plant site or on any nearby properties would be disturbed by construction activities or by alteration of drainage patterns. The closest wetlands to the proposed project site are located approximately one mile away. No prime farmland is present in the area subject to disturbance. Initial construction impacts would result from installation of utilities and site preparation activities. Laydown areas of about 2 acres would be returned to their initial industrial states following completion of construction activities. Recreation activities near the Burns Harbor Plant consist of lakeshore swimming beaches. Construction is not anticipated to have any adverse impacts on these activities near the Burns Harbor Plant because the proposed site is not discernible from other industrial activities in the area. The Bailly Generating Station of the Northern Indiana Public Service Company northeast of the site would also be unaffected.

4.1.4.2 Operation

Operation of the BFGCI system is not expected to impact land use in the area because the Burns Harbor Plant is already a heavily industrialized site. No landfill disposal of solid wastes would occur either on-site or off-site as a result of the BFGCI system. No impact is expected on area recreational activities (lakeshore beaches) or historic resources. The site

activities would not be distinguishable from the currently operating surrounding industrial activities.

4.1.5 Waste Management

The following subsections describe the proposed action's potential impacts on waste management.

4.1.5.1 Construction

All construction wastes, such as cement, debris, and solvents, from the BFGCI system would be disposed of in accordance with applicable state and Federal regulations. BSC would obtain the necessary permits for disposal of hazardous and non-hazardous construction wastes as appropriate for the project.

4.1.5.2. Operation

Operation of the BFGCI system would generate neither hazardous nor solid waste; filter cake would continue to be recycled through the facility's sinter plant. Slag produced on-site would continue to be recycled by an on-site subcontractor. The quantity of slag is expected to increase from about 1.08 million tons/yr to about 1.09 million tons/yr (1 percent). The slag currently contains about 1.3 to 1.8 percent sulfur; the national average is 1.4 percent for slag used for construction. Slag from the BFGCI system would contain about 2 percent sulfur, which is within the normal range of variability for sulfur content of slag. This is not expected to affect the salability of the BFGCI slag. Currently, the BSC sells all slag produced to the Levy Company, an on-site slag reclamation firm. The slag is crushed, sized, and stored prior to off-site sales as a raw material for mineral wool and construction aggregate material. Current demand for slag is high due to accelerated infrastructure repairs; therefore, it is expected that all of the BFGCI slag would be recycled. If in the unlikely event that the demand for

slag becomes minimal in the near future, the slag (which is typically classified as a non-hazardous waste) would be disposed of according to standard landfill practices for non-hazardous wastes.

4.1.6 Ecology

The following subsections describe the proposed action's potential impacts on the ecology.

4.1.6.1 Construction

Construction of the BFGCI system is not expected to have any adverse impacts on the aquatic or terrestrial ecosystems present on or near the site. The construction site is currently in an industrial setting located within the Burns Harbor Plant property. No ecological impacts beyond those associated with the current industrialized environment are anticipated. No Federal- or state-listed threatened, endangered, or rare plant or animal or critical habitat is present on the proposed BFGCI system construction site or the Burns Harbor Plant property.

4.1.6.2 Operation

The Indiana Department of Natural Resources and the USFWS, by letters dated April 11 and September 13, 1990, respectively, to the DOE, indicated that some protected species do occur in the nearby Indiana Dunes National Lakeshore, which is located approximately 6,000 ft east of the BFGCI system and 1,600 ft east of the plant boundary. Due to the projected increase in NO_x emissions and the close proximity to another Clean Coal Project located at the Bailly Generating Station, the USFWS expressed concern for these species. At the request of USFWS, the DOE conducted a biological assessment with regard to the dune thistle (Cirsium pitcheri), a threatened plant species, and eight candidate species. The assessment indicated that no impacts on

the protected species would be expected as a result of the BFGCI system (DOE, 1991). After consultation with the National Park Service and review of the Biological Assessment (DOE, 1991), the USFWS has concurred that no adverse impacts to threatened, endangered, or candidate species would occur as a result of this project (letter dated March 27, 1991 to the DOE, see Appendix A).

Operation of the proposed BFGCI system is not expected to cause any adverse impacts on aquatic or terrestrial ecosystems on the site, including both Federally- and state-protected species, relative to operation of the current facility, for the same reasons stated in Section 4.1.6.1.

4.1.7 Floodplains and Wetlands

The following subsections describe the proposed action's potential impacts on the floodplains and wetlands.

4.1.7.1 Construction

The BFGCI system would be constructed about 46 ft above the 100-yr floodplain and 46.6 ft above the 500-yr floodplain. Its site elevation is 630 feet. Wetland habitats occur on the Burns Harbor Plant property and on adjoining property, but these habitats are not in close proximity (at least one mile distant) to the BFGCI system site and would not be disturbed by on-site activities or surface water and groundwater flows from the site.

4.1.7.2 Operation

Operation of the proposed BFGCI system is not expected to have any impacts on floodplains or wetlands compared to operation of the current facility, for the same reasons stated in Section 4.1.7.1.

4.1.8 Socioeconomics

The following subsections describe the proposed action's potential impacts on the socioeconomics.

4.1.8.1 Construction

The construction phase of the BFGCI system would last approximately 19 months and would result in creation of a maximum of 50 to 80 jobs during the peak period of construction. The new jobs would yield a small short-term benefit to the area, but no significant changes in area economic, housing, or infrastructure conditions are expected, since the area experiences construction activity on a regular basis. Traffic volume to the Burns Harbor Plant is expected to increase by about 25 cars per day because of construction of the BFGCI system. This volume could be easily accommodated by the existing transportation network, particularly Highway 12 and the nearby interstate system. The closest community to the proposed site is 2.5 miles east. Due to the industrial area surrounding the proposed site, few commercial businesses would be affected by the increased traffic volume.

4.1.8.2 Operation

Operation of the BFGCI system would result in the creation of five or six permanent jobs and increase traffic volume by about three cars per day. The Burns Harbor Plant currently employs approximately 6,000 persons and the BFGCI system would not have a significant impact on the local housing or economy or on local transportation conditions. No hazardous, toxic, or radioactive materials would be transported to or from the BFGCI system.

4.1.9 Cultural Resources

The following subsections describe the proposed action's potential impacts on the cultural resources.

4.1.9.1 Construction

The Indiana State Historic Preservation Officer confirmed by letter to the DOE dated April 9, 1990 (see Appendix A), that no known historic or archeological resources would be affected by construction of the proposed BFGCI system project.

4.1.9.2 Operation

Operation of the proposed BFGCI system is not expected to have any impacts on known historic or archaeological resources, based on the letter to the DOE from the Indiana State Historic Preservation Officer referred to in Section 4.1.9.1.

4.1.10 Noise

The following subsections describe the proposed action's potential impact on noise levels.

4.1.10.1 Construction

Increased sound levels would be generated from BFGCI system construction activities and from deliveries of materials by truck. The closest residence is approximately two miles from the BFGCI system site. Because of the industrial nature of the area and the distance to the nearest plant boundary (approximately 1,500 ft), the net increase in noise outside the plant attributable to the BFGCI system would not be perceptible above background.

4.1.10.2 Operation

Increased noise levels from operation of the BFGCI system would not be distinguishable from background noise in the already heavily industrialized environment. Rail traffic would increase by about 6 percent, from about 52,000 cars per year to about 55,000 cars per year, due to increased coal consumption. This is equivalent to one additional 100-car unit train every 12 days. Because of the industrial nature of the Burns Harbor Plant area and the distance to sensitive noise receptors, the net increase in area noise would be imperceptible beyond the plant boundary.

Work place noise exposure from the BFGCI system would be in compliance with the Occupational Safety and Health Administration's noise regulations, and appropriate engineering controls and hearing protection would be employed.

4.1.11 Occupational Health and Safety

The following subsections describe the proposed action's potential impact on occupational health and safety.

4.1.11.1 Construction

No negative impacts to occupational health and safety are expected as a result of the proposed action. Any potential exposure of workers to hazards would be minimized by a combination of engineering controls, work practices and procedures, and personal protective equipment. The current procedures for health and safety at the Burns Harbor Plant would be continued during construction of the BFGCI system. Training programs would be continued to ensure that workers are aware of potential hazards and effectively able to use control measures. Any additional training that might be needed for the safe operation of the BFGCI system would be completed prior to operation of the facility. Surveillance of work place health and

safety would be maintained through a monitoring program, medical surveillance, and record keeping.

4.1.11.2 Operation

Operation of the proposed BFGCI system is not expected to have any increased impacts on occupational health and safety compared to operation of the current facility, for the same reasons stated in the above discussion of construction impacts.

4.1.12 Pollution Prevention

The following subsections describe the proposed action's potential impact on pollution prevention.

4.1.12.1 Construction

During the planning and construction stages, designs would be developed and construction methods used to avoid and/or minimize the pollution potential to the environment from the construction activities. For example, a dust control program consisting of spraying the lay down area and roads would limit the potential of pollution from fugitive dust emissions and diking around construction areas and coal piles would control storm water runoff.

4.1.12.2 Operation

Operation of the BFGCI would substitute the raw material coal for the processed material coke, which would reduce pollution by decreasing the demand for processed coke. Although this reduction would not be realized within the immediate vicinity of the Burns Harbor facility, the decrease in demand for coke by the facility would prevent further pollution at other sites. The proposed process could use recycled BFG to generate power for other parts of the process. This recycling of BFG

would minimize gaseous waste production from the process. Also, the slag generated from burning coal would be totally recycled for use in construction and other industrial uses. Finally, the project proposes to keep only a 10-day supply of coal on site to minimize stormwater runoff quantities and limit the leachability of the runoff to the soil.

4.1.13 Biodiversity

The following subsections describe the proposed action's potential impact on biodiversity.

4.1.13.1 Construction

Construction of the BFGCI system is not expected to have an adverse impact on the biodiversity of the area. The site is currently an industrial setting located within the Burns Harbor Plant property. The construction activities would be similar in nature to previous construction projects conducted on the site and would not present any changes to the ecological system of the area.

4.1.13.2 Operation

Operation of the BFGCI system is not expected to have any discernible changes to the biodiversity of the area. An ecological assessment was conducted (as discussed in 4.1.6.2) and it indicated that no impacts on the protected species would be expected as a result of the BFGCI system. Floodplains, wetlands, surface water, groundwater, aquatic or terrestrial ecosystems would not be affected by the proposed project's operation.

4.1.14 Cumulative Impacts

No cumulative impacts are expected beyond those already discussed. Recently, IDEM, in conjunction with BSC and other

industries in the area, conducted a study to develop an updated control strategy for SO₂. The results of this study, which included existing and future sources, indicated that the NAAQS for SO₂ are being met. BSC will continue to work with IDEM to monitor the air quality impacts of their facility as it contributes to the region. All known sources with the potential to contribute appreciably to concentrations near the BFGCI site were included in the air quality analyses for this EA.

The BSC is currently preparing to shut down one of the coke oven batteries for rebuilding. In late summer 1993, coke oven battery #2 will be taken off-line, demolished, and rebuilt using state-of-the-art equipment and technology to allow for cleaner production of coke. These operations are being monitored by the IDEM and the EPA.

Significant cumulative impacts to surface water, ground water, land, ecological, socioeconomic, or cultural resources or to ambient noise levels are not expected.

4.2 SUMMARY

This section presents a summary of impacts for the proposed action.

4.2.1 Construction

Construction of the proposed BFGCI system is not expected to have significant impacts on air quality, noise, and land use at the Burns Harbor Plant area. There would be emissions of small quantities of particulate matter, dust, and occasional smoke in the construction area. These emissions would be generated by vehicles transporting construction personnel, by construction equipment engines, and by earth moving. The proposed project would be constructed on a currently industrialized site that has preexisting roads and utilities, such that land use impacts on

the local ecosystem or on the biodiversity of the area would be minimal. No protected species, floodplains, wetlands, archeological, historical, or cultural resources would be affected. A maximum of 50 to 80 jobs would be created during the peak construction period. The new jobs would bring a small short-term economic benefit to the area without stressing the existing infrastructure.

4.2.2 Operation

Operation of the proposed BFGCI system is not expected to have significant impacts on the environment at the Burns Harbor Plant area. An increase of approximately 30 tons/yr for NO_x and approximately 13 tons/yr for particulate matter (from the coal storage area) is expected. These emissions are within the currently permitted levels. A negligible increase in SO₂ emissions is expected due to either the use of natural gas in the coal dryers or the diversion of BFG from other plant uses to the coal dryers. Carbon dioxide emissions, which are unregulated, would increase by about 220,000 tons/yr at the Burns Harbor Plant. Water withdrawn and returned to Lake Michigan would increase by 1.3 million gal/d (0.4 percent of existing permitted discharge) for non-contact cooling water. The system would be located on a currently industrialized site and no discharges to land would occur either on-site or off-site, so no land use impacts on area recreational or historic resources would be expected. No protected species, floodplains, wetlands, or cultural resources would be affected by operation of the proposed facility. Small economic benefits would occur from the creation of 5 or 6 permanent new jobs during the operation of the proposed demonstration project and subsequent commercial operation.

4.3 NO ACTION ALTERNATIVE

Under the No Action Alternative, the proposed project would not receive cost-shared funding support from DOE. The project

could proceed without DOE funding or it could be canceled. If the project were canceled, the existing environment of the Burns Harbor Plant would remain unchanged, and the impacts described herein would not occur. If the project were undertaken without DOE funding support, the potential impacts would be the same as for the proposed Federal action.

5.0 LIST OF AGENCIES AND PERSONS CONSULTED

1. Patrick R. Ralston, Indiana Department of Natural Resources, Division of Historic Preservation and Archaeology, 251 East Ohio Street, Suite 880, Indianapolis, Indiana 46204.
2. Michelle L. Martin, Indiana Department of Natural Resources, Division of Nature Preserves (Indiana Natural Heritage Program), 605B State Office Building, Indianapolis, Indiana 46204.
3. David C. Hudak, U.S. Fish and Wildlife Service, 718 North Walnut, Bloomington, Indiana 47401.
4. James P. Bennett, Ph.D., Great Lakes Cooperative Park Studies Unit, University of Wisconsin-Madison, 1040 WARF Building, 610 Walnut St., Madison, Wisconsin 53705.
5. Richard L. Whitman, Ph.D., Indiana Dunes National Lakeshore, National Park Service, 1100 N. Mineral Springs Road, Porter, Indiana 46304.

6.0 REFERENCES

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2. Bethlehem Steel Corporation, October 1992, Construction Permit Application Blast Furnace Granulated Coal Injection System, Bethlehem Steel Corporation, Bethlehem, Pennsylvania (Submitted to Indiana Department of Environmental Management in October 1992.)

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11. U.S. Environmental Protection Agency, Airs Facility Subsystem Source Classification Codes and Emission Factor Listing for Criteria Air Pollutants. March 1990. (EPA/450/4-90/003) Research Triangle Park, North Carolina.
12. U.S. Fish and Wildlife Service. March 1978. Impacts of Coal-Fired Power Plants on Fish, Wildlife, and Their Habitats. FWS/OBS-78/29. National Power Plant Team, Fish and Wildlife Service, U.S. Department of the Interior, Ann Arbor, Michigan. 260 pp.

APPENDIX A

United States Department of the Interior

FISH AND WILDLIFE SERVICE
BLOOMINGTON FIELD OFFICE (ES)
718 North Walnut Street
Bloomington, Indiana 47404
(812) 334-4261 FAX 334-4273

REPLY REFER TO:

March 27, 1991

Ms. Wennona A. Brown
U. S. Department of Energy
Morgantown Energy Technology Center
P.O. Box 880
Morgantown, West Virginia 26507-0880

Dear Ms. Brown:

This responds to your March 20, 1991 letter and Biological Assessment for the Blast Furnace Granulated Coal Injection Demonstration project at Bethlehem Steel in Porter County, Indiana. This was in response to our request that a Biological Assessment be completed for this project in a letter October 23, 1990.

Based on the information provided in the Biological Assessment, the Fish and Wildlife Service concurs with your findings that the aforementioned project will not affect the dune thistle (Cirsium pitcheri). This precludes the need for further consultation as required by Section 7 of the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.).

Thank you for your cooperation and assistance for the protection of threatened and endangered species. If you have any questions, or require further technical assistance, please contact Dan Sparks of my staff at (FTS) 332-4265.

Sincerely Yours,

David C. Hudak
Supervisor

cc: Regional Director, FWS, Twin Cities, MN (FWE-SE)
Indiana Dunes National Lakeshore, Porter, IN
IDNR, Natural Heritage Program, Indianapolis, IN
DOE, Pittsburgh Energy Technology Center, Pittsburgh, PA - Sarkus
NPS-CPSU, Madison, WI - Bennett

INDIANA DEPARTMENT OF NATURAL RESOURCES

PATRICK R. RALSTON, DIRECTOR

Division of Historic Preservation
and Archaeology
251 East Ohio Street, Suite 880
Indianapolis, Indiana 46204
317-232-1646

April 9, 1990

Laura Kowalsky
Marketing Services Manager
Enviroplan
59 Main Street
West Orange, New Jersey 07052

Dear Ms. Kowalsky:

We have reviewed the proposed construction of a blast furnace granulated coal injection system (BFGCI) at the Burns Harbor Plant in Porter County, Indiana.

No known historical, architectural, or archaeological sites listed on or eligible for inclusion in the National Register of Historic Places will be affected by this project. If any archaeological artifacts are uncovered during construction, work will stop and the discovery will be reported to our Division of Historic Preservation and Archaeology.

We appreciate the opportunity to be of service.

Very truly yours,

A handwritten signature in dark ink, appearing to read "Patrick R. Ralston", is written over a horizontal line.

Patrick R. Ralston
State Historic Preservation Officer

PRR:SBG:vk

FINDING OF NO SIGNIFICANT IMPACT

Bethlehem Steel Blast Furnace Granulated Coal Injection Demonstration Project

AGENCY: U.S. Department of Energy (DOE)

ACTION: Finding of No Significant Impact (FONSI)

SUMMARY: DOE has prepared an Environmental Assessment (EA) (DOE/EA-0471) for a project that has been proposed by the Bethlehem Steel Corporation (BSC) for the cost-shared design, construction, and demonstration of a Blast Furnace Granulated Coal Injection (BFGCI) demonstration project. The project would be located at BSC's Burns Harbor Plant, in Porter County, about 10 miles northeast of Gary, Indiana. The proposed federal action is to provide cost-shared financial assistance to the project. Based on the analysis in the EA, DOE has determined that the proposed action is not a major federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act (NEPA) of 1969. Therefore, the preparation of an Environmental Impact Statement is not required, and the Department is issuing this FONSI.

COPIES OF THIS EA ARE AVAILABLE FROM:

Mr. John R. Ganz
NEPA Compliance Officer
Morgantown Energy Technology Center
P.O. Box 880
Morgantown, WV 26507-0880
Telephone: (304) 291-4346

FOR FURTHER INFORMATION CONTACT:

Ms. Carol M. Borgstrom, Director
Office of NEPA Oversight (EH-25)
U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, DC 20585
Telephone: (202) 586-4600 or (800) 472-2756

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produced on site, with the remainder imported from other facilities. With the BFGCI system, the need to import coke would be eliminated, but on-site coke production could continue at the same rate. All other operations of the Burns Harbor facility would remain unchanged.

New construction would consist of a coal preparation plant, which includes a coal storage pile, a coal conveyer system to link the plant into the existing coal handling system, and coal grinding and sizing equipment; and a coal injection plant, which includes coal injection equipment and injection lines to the blast furnaces. Coal, delivered to the site by rail, would be transported to the storage site by a combination of new and existing conveyers and existing material handling facilities. The storage pile would be located on the 2.5-acre site currently used for storage of iron-bearing materials, adjacent to the coal preparation plant.

During operation of the BFGCI system, the effects of four variables - coal type, coal granule size, coal injection rate, and blast furnace conversion method - would be evaluated, both singly and in combination, to determine the optimal operating conditions to achieve both economic and environmental benefits from this process. Four types of coal currently produced in the U.S., representative of geographic and geologic diversity, would be used as feedstocks and be evaluated during the demonstration project.

The amount of coal used in the BFGCI system would vary depending on the rate of injection. At the target rate of 400 pounds of coal per net ton of hot metal (NTHM), as much as 1,051,000 tons of coal per year would be delivered through existing transportation networks. In addition to the coal feedstocks, approximately 21,900 tons per year of nitrogen gas would be used for fluidization of the coal at the discharge cones of silos, hoppers, and bins in the plant, and approximately 443,600 tons per year of oxygen would be required to maintain temperatures high enough to keep the iron and slag in the molten state. With installation of the BFGCI system, natural gas use would be reduced from 11,200 million cubic feet per year (250,200 tons per year) to 430 million cubic feet per year (9600 tons per year).

ENVIRONMENTAL IMPACTS: Potential environmental impacts of the proposed action were analyzed for both construction and operating activities. Air emissions, water effluent, and solid waste discharges associated with the operation of the demonstration project were compared with those from the current blast furnace operation with natural gas to establish the net change in potential environmental impacts.

Construction Impacts

No previously undisturbed land areas would be used for the BFGCI project. No sensitive ecological resources would be affected by construction of the BFGCI project, nor is any discernible impact on biodiversity expected. The Indiana State Historic Preservation Office has confirmed that no historic, archaeological, or cultural resources would be affected by the project. During the planning and construction stages, designs would be developed and construction methods used to avoid and/or minimize any potential pollution of the environment from the construction activities.

During construction, air emissions would be limited to fugitive dust, vehicular exhaust, and occasional smoke. These emissions would result from increased traffic (approximately 25 vehicles per day), construction equipment, and earth-moving activities. Due to the small area of construction (approximately 8.5 acres) and limited duration (19 months or less), these impacts are expected to be confined to the site and not significant. During construction, no material that could be expected to cause any adverse impact on groundwater would be used. Water required for construction would be obtained directly from the Burns Harbor Plant's existing water system, which is supplied by Lake Michigan. Storm water run-off and water for fire protection would be handled by current systems with no adverse effects. No new outfalls or docking facilities would be constructed for the BFGCI system. Therefore, no potential impacts on either groundwater or surface water is anticipated from construction of the BFGCI project.

Waste materials generated from construction of the BFGCI system are anticipated to be those normally associated with construction activities.

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These wastes (e.g., cement and debris) would be disposed of in accordance with applicable state and Federal regulations.

During peak construction, a maximum of 50 to 80 jobs would be created. These jobs would provide a small short-term benefit to the local area, but no significant changes in economic, housing or infrastructure conditions would result, since the area is accustomed to experiencing construction activity on a regular basis.

Operation Impacts

The BFGCI system would be a permanent operating addition to the Burns Harbor Plant. The addition of the BFGCI system is expected to have little discernible effect on air quality. Particulate matter emissions from the blast furnace presently are captured in a cleanup system involving a dust catcher and wet scrubber, with filtered material of both being recycled to the sinter plant. Quantities generated are not expected to change with operation of the BFGCI system. Operation of the BFGCI system would result in an increase in emissions of particulate matter due to the operation of new and existing equipment associated with the transportation, delivery, and processing of coal. These emissions would be dominantly in the form of fugitive emissions, with the principal contribution emanating from the coal storage pile.

Proper design and operations of point sources (covered conveyors and enclosed transfer points) would minimize total suspended particulate (TSP) emissions from these sources. TSP resulting from operation of the BFGCI are estimated at 13.6 tons/year.

Due to the reducing (i.e., oxygen deficient) environment of the blast furnace, only negligible amounts of sulfur dioxide (SO_2) or oxides of nitrogen (NO_x) emissions would be formed. For practical purposes, these emissions would not be detectable in the blast furnace gas (BFG). Essentially all of the sulfur compounds from the feedstocks report either to the slag or to the hot metal and are not released to the environment.

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Operation of the BFGCI system would require that the granulated coal be dried prior to injection into the blast furnace. Changes in gaseous emissions would result from fueling these two coal dryer burners, the only new source of emissions in the BFGCI system. Two scenarios for fueling these dryers were considered: burning natural gas, or burning BFG. The emissions from the coal dryers are calculated from published emission factors, rather than based on monitoring data. If natural gas is used, NO_x emissions would increase by approximately 30 tons per year, but if BFG is used an increase of about 17 tons per year would be attributable to blast furnace operations. Similarly, if natural gas is used, SO_2 emissions would be 0.13 ton/year, or approximately 13 tons/year if operated on BFG. Volatile organic compounds (VOC) would result only if natural gas were used to dry the coal (0.60 tons/year).

Calculations of the effects of carbon monoxide (CO) and carbon dioxide (CO_2) generation resulting from the operation of the BFGCI system are based on granulated coal replacing both natural gas and coke. Under the BFGCI system, an increase of three to four percent in the amount of CO and CO_2 in the BFG would be expected at the target coal injection rate of 400 lbs/NTHM. Assuming that all carbon in the BFG is converted to CO_2 , a net increase of about 220,000 tons/year of CO_2 would be expected. This is about a three percent increase in CO_2 emissions over current levels and would not make a major contribution to the greenhouse effect. Additionally, burners in the coal dryers would increase CO emissions slightly, depending on the burner efficiency and fuel used.

Overall, potential impacts to air quality resulting from the operation of the BFGCI system consist of marginal increases in the emissions of TSP, NO_x , and CO_2 . A slight increase in the release of VOCs could result under the assumption that no BFG is used to fire burners in the coal dryers. Heat and material balance modeling for the BFGCI system show negligible levels of sulfur in the BFG, thereby indicating that emissions of SO_2 would be expected to be negligible. Based upon emission factor calculations to establish a reasonable upper limit, the BFGCI system would emit 12.9 tons per year of SO_2 from burning BFG in the coal dryers or 0.13 tons annually using natural gas as

the dryer fuel. All expected incremental increases would be below de minimis values and would not require a Prevention of Significant Deterioration review.

Minimal effects on water quality would result from the operation of the BFGCI system. The Burns Harbor Plant currently uses approximately 300 million gallons of non-contact cooling water per day; an increase of 1.3 million gallons per day is anticipated for the BFGCI system. Non-contact cooling water is obtained from Lake Michigan and is returned to the lake through existing outfalls. This additional discharge represents approximately 0.4 percent of the existing permitted discharge. Blast furnace blowdown is currently directed to the plant's secondary wastewater treatment plant, treated, and discharged to the Little Calumet River; no change in quantity is anticipated. The storage pile areas are graded to contain runoff in-place for evaporation or infiltration into the ground. No adverse impacts to either groundwater or surface water are anticipated from the proposed project. No floodplains or wetland resources would be affected.

The BFGCI system would not generate solid waste. The amount of slag produced, which is non-hazardous, would increase by about one percent (from about 1.08 to 1.09 million tons per year). The slag produced would continue to be recycled by an on-site subcontractor, and filter cake would continue to be recycled through the facility's sinter plant.

Little or no effects on ecological or socioeconomic resources are anticipated. Operation of the BFGCI system is not expected to result in any discernible changes to the biodiversity of the area. An endangered plant species does occur within the general vicinity of the Burns Harbor Plant, outside of the plant boundaries. However, the U.S. Fish and Wildlife Service has determined that no adverse impacts to threatened or endangered species would occur as a result of this project. Small economic benefits would occur from the creation of about six new jobs for the operation of the BFGCI system. No hazardous, toxic, or radioactive materials would be transported to or from the BFGCI system. The Burns Harbor Plant is a heavy industrial site; no discernible increase in noise would result from operation of the BFGCI system. No

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negative impacts to occupational health and safety are expected as a result of the proposed action.

No significant cumulative impacts are expected from the construction and operation of the BFGCI Demonstration Project.

ALTERNATIVES CONSIDERED: In addition to the proposed action, alternative technologies and sites, and the "no action" alternative were also considered in the EA.

Alternative Technologies and Sites

Under Round III of the CCT Program, DOE solicited proposals to conduct cost-shared CCT projects to demonstrate innovative, energy efficient technologies that offered the prospect for commercialization in the 1990s. Based upon the overall technical and environmental merit of the respective proposals, the Source Selection Official selected a series of projects for possible cost-shared financial assistance. The BFGCI project was included among the thirteen selected under Round III of the CCT Program for its potential to demonstrate the use of granulated coal as a fuel and reducing agent for steel industry blast furnaces by replacing natural gas and coke with direct coal injection, thereby reducing coke oven emissions. Given the nature of the CCT selection process, DOE is limited to either accepting or rejecting the overall demonstration project as proposed by the participant, including both the technology and site designated by the offeror. Therefore, the only technology and site addressed in this EA are those proposed by the participant.

No Action Alternative

Under the no action alternative, DOE would not provide cost-shared federal funding support to demonstrate the proposed technology. The BFGCI technology might be completed without DOE participation, or the project might be canceled. If the project were canceled, the BSC BFGCI system would not be installed at the Burns Harbor Plant, and the operation of domestic blast furnaces would be expected to continue under the current methods. Therefore, this new technology would not be demonstrated for potential future commercialization, and the potential for national benefits to be derived from

the commercialization of this technology would not be realized. If the project were undertaken without DOE funding, the potential impacts would be the same as for the proposed federal action.

PUBLIC AVAILABILITY: Copies of the final EA and FONSI will be distributed to all persons and agencies known to be interested in or affected by the proposed action or alternatives including appropriate agencies within the State of Indiana. Additional copies of the final EA and FONSI are available on request from the Morgantown Energy Technology Center at the address given above.

DETERMINATION: Based upon the information and analyses provided in the EA, DOE has determined that the proposed federal action, to provide cost-shared financial assistance to the Blast Furnace Granulated Coal Injection Demonstration Project, is not a major federal action significantly affecting the quality of the human environment within the meaning of NEPA. Therefore, an environmental impact statement is not required and DOE is issuing this FONSI.

ISSUED IN WASHINGTON, D.C., this 8th day of June 1993.

Peter N. Brush
Acting Assistant Secretary
Environment, Safety and Health

END

**DATE
FILMED**
9 / 15 / 93