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DOE/EIS-0002

Final Environmental Impact Statement

ALLOCATION OF PETROLEUM FEEDSTOCK

Baltimore Gas and Electric Company
Sollers Point SNG Plant
Sollers Point, Baltimore County, Maryland

U.S. DEPARTMENT OF ENERGY

April 1978

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Sollers Point, Baltimore County, Maryland

Responsible Official:

James L. Liverman
Acting Assistant Secretary for Environment

U.S. DEPARTMENT OF ENERGY
Washington, D.C. 20461

April 1978

EIS SUMMARY

Statement Type: ( ) Draft (X) Final Environmental Statement

Prepared by: Office of Fuels Regulation
Economic Regulatory Administration
Department of Energy
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1. Type of Action ( ) Legislative (X) Administrative

2. Brief Description of the Proposed Action

The Economic Regulatory Administration (ERA) is considering an allocation of naphtha feedstock up to 2,186,000 barrels per year to the Baltimore Gas and Electric Company (BG&E) to operate its existing synthetic natural gas (SNG) facility, located on Sollers Point in Baltimore County, Maryland. The BG&E service area encompasses 590 square miles and includes the City of Baltimore as well as Baltimore, Cecil, Carroll, Harford, Howard and Anne Arundel Counties. The allocation would enable BG&E to produce 10,800,000 mcf of SNG during a 180 day period.

3. Summary of Environmental Impacts and Adverse Environmental Effects

Granting the allocation of feedstock would enable the operation of the Sollers Point SNG facility. The 101 acre site is zoned for industrial use. The operation of the plant at design capacity is expected to result in annual pollution emissions as follows: 626.4 tons of sulfur oxides, 168.5 tons of nitrogen oxides and 21.6 tons of particulate matter. Incremental emissions due to plant operations relative to existing emissions in Baltimore County are less than 1%. All Federal and State air quality standards should be met.

Treated effluent is to be discharged into the Patapasco River where the environmental impacts are not expected to be significant. The SNG facility has been designed to be in compliance with all applicable Federal, State and local effluent standards. Hazardous levels of aluminum in the plant discharge as reported in the DEIS were found to be erroneous as a result of subsequent laboratory tests (see Appendix E). BG&E has already received its State of Maryland and NPDES permits. Water consumption requirements of 335,000 gallons per day are not expected to significantly tax the area's water resources. Sound generated by the SNG facility will be inaudible or imperceptible primarily due to the high background noise levels which currently exist in the area. All other operational impacts on land use, population, visual quality, roadways, community facilities and services and ecological systems were judged to be minimal.

4. Summary of Major Alternatives Considered

Environmental impacts resulting from various alternatives ranging from full allocation through denial of an allocation are discussed. The analysis of the alternatives of no allocation or a partial allocation highlights loss of jobs and associated wages due to gas shortages which are projected to occur during a design winter. To the extent that some industrial and commercial users would use fuel oil as an alternate fuel, the end result would be an increase in air contaminant emissions. This effect may be of particular concern to the City of Baltimore since certain air quality standards have already been violated at locations within the city. Granting a full allocation would mitigate these impacts on jobs, wages and/or increased emissions attributable to fuel switching. Design alternatives and conservation were also evaluated.

5. Federal, State, Local Agencies and Others from which Comments Have Been Requested

Federal Agencies

Council on Environmental Quality
*Environmental Protection Agency
U.S. Department of Agriculture
U.S. Department of Health, Education and Welfare

*U.S. Department of the Interior
U.S. Department of the Treasury
U.S. Department of Transportation
U.S. Department of State
Nuclear Regulatory Commission
National Science Foundation
Department of Defense
Department of the Army Corps of Engineers
Department of Housing and Urban Development
Federal Energy Regulatory Commission
Interstate Commerce Commission
*Department of Commerce

<u>State Clearinghouses</u>

Maryland

<u>Other Parties</u>

Environmental Defense Fund
Friends of the Earth
Izaak Walton League of America
National Association of Counties
National League of Cities
Natural Resource Defense Council
National Wildlife Federation
Sierra Club
U.S. Conference of Mayors
American Petroleum Institute
American Gas Association
Institute of Gas Technology
Interstate Natural Gas Association of America
*Baltimore Gas and Electric Company
*Petrochemical Energy Group
General Motors Corporation
Emergency Syngas Group
Maryland Public Service Commission
Amerada Hess Corporation

6. Comments

The final environmental impact statement was made available to the public on or about May 5, 1978. Comments on the draft statement, which was made available on December 12, 1977, were received from those organizations in paragraph 5 identified by an asterisk. Comments were also received from the Greater Dundalk Community Council, the Baltimore Clearinghouse and the Logan Village Improvement Association.

On October 1, 1977, pursuant to the Department of Energy Organization Act, P.L. 95-91, and Executive Order 12009 (42 FR 46267, September 15, 1977) the Department of Energy was established. The Administrator of the Economic Regulatory Administration (ERA) was delegated by the Secretary of Energy in Delegation Order 0204-4 the authority to administer the regulations promulgated under §4(a) of the Emergency Petroleum Allocation Act of 1973, P.O. 93-159, as amended. References in this environmental impact statement to Federal Energy Administration (FEA) should read Department of Energy (DOE) or Economic Regulatory Administration (ERA), as appropriate, where they pertain to actions or events taking place after October 1, 1977.

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GLOSSARY OF TERMS

bbl	barrel - measure of volume of oil - a barrel contains 42 gallons of oil
cfm	cubic feet per minute - volume flow rate of a gas
cfs	cubic feet per second - volume flow rate of a liquid
CO_2	carbon dioxide
CRG	Catalytic Rich Gas Process
dBA	decibel - measure of sound level
DOE	U.S. Department of Energy
EPA	U. S. Environmental Protection Agency
ERA	Economic Regulatory Administration
FEA	U. S. Federal Energy Administration
FPC	U. S. Federal Power Commission
fps	foot per second - measure of speed
ft	foot - measure of distance
gal	gallon - measure of volume
gas	includes any or a combination of the following: natural gas, pipeline natural gas, LNG, and propane/air mixes
gpd	gallons per day - volume flow rate of a liquid
HC	hydrocarbons
km	kilometer - measure of distance - one kilometer equals about 0.62 miles
lb	pound - measure of weight
LG	Lurgi Gasynthan Process
LNG	liquidifed natural gas
mcf	thousand cubic feet - measure of a volume of a gas
mgd	million gallons per day - volume flow rate of a liquid
mg/l	milligrams per liter - measure of concentration
MRG	Methane Rich Gas Process

GLOSSARY OF TERMS (Continued)

NO_2	nitrogen dioxide
NO_x	nitrogen oxides - includes nitric oxide, nitrous oxide, nitrogen dioxide
OSHA	Occupational Safety and Health Act
ppm	parts per million - measure of concentration
SO_2	sulfur dioxide
SNG	synthetic natural gas
TSP	total suspended particulates (commonly referred to as particulates)
$\mu g/m^3$	micrograms per cubic meter - measure of concentration
10^6Btu	million British thermal units - quantity of heat

1. INTRODUCTION

The United States is heavily dependent upon natural gas as a source of energy. It is estimated that between 1950 and 1970, natural gas provided more than half the growth in total energy consumption. The increasing use of natural gas has been prompted by its low price, its clean burning and handling characteristics and its general convenience.

As a result of the disparity between production and consumption, natural gas has been in short supply in recent years. In many areas of the country, gas shortages have forced transmission and gas distribution companies to implement curtailment plans. There are several options available which could significantly increase the supply of natural gas in the long term, including the provision of sufficient price incentives; the importation of liquid natural gas; the importation of increased volumes of Canadian gas; the shipment of Alaskan gas; and the pursuit of coal gasification. However, these alternatives will not significantly augment gas supplies in the near term (∿ 1980).[2] Changes in technology and/or federal policies could alter the time frame within which these alternatives can significantly contribute to our nation's gas supplies.

The manufacturing of synthetic natural gas from hydrocarbon feedstocks has been selected by several gas companies as a feasible, short-term solution for supplementing their gas supplies. While SNG facilities could help to ensure a continued supply of gas, their development may also cause problems for other users of naphtha. Naphtha is the basic feedstock required for the production of gasoline and other petrochemical products. The argument has been given that diversion of significant portions of the available supply of naphtha to SNG production could have a direct and substantial impact upon gasoline production and petrochemical industries. Due to the potential conflicts between competing users of a particular feedstock within a given market area, the Federal Energy Administration, under its Mandatory Petroleum Allocation regulations (10 CFR 211.29), regulates the allocation of petroleum products to SNG plants. This regulation requires that SNG plants must petition the FEA for the assignment of or adjustment to a base period volume of feedstock.

On September 30, 1975, Baltimore Gas and Electric Company (BG&E) filed an Application for Assignment with the Federal Energy Administration. The action which the FEA must now take is the approval, denial or reduction of the quantity of naphtha requested.

The FEA determined that an Environmental Impact Statement (EIS) would have to be prepared in accordance with the National Environmental Policy Act of 1969 before any action can be taken. This decision was based on FEA's consideration that the allocation of naphtha feedstock to the Sollers Point SNG facility constituted a major federal action which could significantly affect the quality of the human environment. BG&E was informed of this decision on January 15, 1976.

This report is a Draft Environmental Impact Statement (Draft EIS) which evaluates the social, economic and environmental impacts which may occur within the service area of BG&E as a result of the FEA's action.

In general, impacts of naphtha assignment can result from (1) shifting an existing naphtha supply from one user to another and (2) constructing and operating a facility which will use the naphtha. The FEA considers that the naphtha requested by BG&E is a new supply and there are thus no impacts associated with shifting an existing supply. Consequently, this EIS focuses only on impacts associated with BG&E's SNG facility. Since this facility has already been constructed, the impacts considered are those which are related to operation. This report also addresses the effects of various alternatives to the FEA's action.

National policies and their environmental impacts such as use of SNG plants to compensate for shortages of natural gas, priority assignments of naphtha to different classes of users, energy policies as they relate to switching and importing of fuels, and policies for the advancement or development of natural gas resources represent programmatic considerations and, hence, are beyond the scope of this report. Such issues have been addressed in the Programmatic EIS on the Allocation of Petroleum Feedstocks to Synthetic Natural Gas Plants, FEA, August 1977.

The Final Environmental Impact Statement (Final EIS) has been written with the intent that it would be understandable to the general public. It will be submitted by the DOE's Office of Specialty Fuels and Products to the U. S. Council on Environmental Quality; the U. S. Environmental Protection Agency; other appropriate federal, state and local agencies and officials; organizations or individuals who submitted comments on the Draft EIS; and to interested individuals who request a copy. A public hearing was scheduled on January 12, 1978 to discuss the impacts of DOE's proposed action and to obtain comments from interested parties. Due to lack of interest, this hearing was cancelled. After written comments were received from various parties, the Final Environmental Impact Statement (Final EIS) was prepared incorporating all substantive comments received along with appropriate written responses to them.

2. EXECUTIVE SUMMARY

Description of the Proposed Action

An administrative action is to be taken by the Federal Energy Administration on the Application for Assignment by the Baltimore Gas and Electric Company of Baltimore, Maryland (BG&E). This application requests that the Amerada Hess Corporation of New York be approved as the supplier of naphtha and that BG&E be allocated 1,000,000 barrels of naphtha per year until the spring of 1978 when the allocation would be increased to 2,186,000 barrels per year. BG&E is seeking the allocation of naphtha so that it can produce a synthetic natural gas (SNG) which will be used to offset deficiencies in gas supplies to its firm customers.

BG&E has completed construction of the Sollers Point SNG facility (SNG facility) which will use the naphtha. This facility has been designed to produce 60,000 mcf (thousand cubic feet) of gas per day. It is expected to operate no more than 180 days per year and will produce up to 10,800,000 mcf. The plant will be used to provide enough gas so that the needs of residential, commercial and industrial customers in FPC categories 1, 2 and 3 who have firm gas contracts can be met when shortages occur in the supply of gas to BG&E. (See Appendix A for a definition of FPC categories.)

The SNG facility which is similar in appearance to an oil refinery is located on the Patapsco River on Sollers Point, southeast of Baltimore, Maryland. It occupies approximately 24 acres of the 101 acre site.

Description of the Environment Affected by the Action

The environment that will be influenced by the FEA action is primarily the site and surrounding area of the SNG facility. The site is in an industrial section of the Baltimore metropolitan area with such industries as Bethlehem Steel and the Riverside Steam Electric Generating Station located nearby; the site proper contains the newly constructed SNG facility. A residential area, East Turners, is along the eastern site boundary. Zoning and land use plans for the site indicate preference for industrial usage. The neighborhoods near the site can be generalized as stable neighborhoods of families with predominantly black populations. The site itself has no historic, archeologic, scenic or cultural significance.

The transportation network in the area is good with most roads operating under their capacity. New access roads to the recently completed Outer Harbor Crossing will increase traffic volumes and carry traffic parallel to Main Street which borders the SNG facility site. Air quality in the area reflects urban and industrial characteristics. Levels of particulates are high in the Sollers Point area and are probably due to construction and industrial activities. Contaminants associated with motor vehicle hydrocarbons and photochemical oxidants are also high and occasionally exceed air quality standards. The area has experienced air pollution alerts and air stagnation advisories which occur when meteorological conditions allow air contaminants to accumulate.

The water quality of the Patapsco River and Baltimore Harbor is severely degraded due to various factors associated with metropolitan Baltimore's urban environment. Water quality at Sollers Point which is part of the Outer Harbor is better than that for the Inner Harbor. Prime sources of water pollution have been identified as waste treatment plants, urban runoff, toxic chemicals from industries, overflow from sewers and septic tanks, and wastes from ships including oil spills.

Noise levels in the vicinity of the SNG facility are at or above the Maryland day-night noise standard.

The aquatic and terrestrial ecology of the area is limited since it has been exposed to stresses of an industrial and urban area. The site itself has been disturbed by construction activities and the quality of the offshore waters does not now support a significant aquatic ecosystem.

The site is underlain by alluvial deposits, and bedrock is deeper than 100 feet. Sand, fine gravel and traces of salt and clay are prevalent. The soils are not highly productive for growing vegetation and most areas of the site are seasonably wet.

Environmental Impacts of the Proposed Action

The FEA action of approval of the naphtha allocation would allow the SNG facility to operate commercially when it is needed. While the presence and operation of the SNG facility will create environmental impacts, these are not considered to be significant. It is also believed that if the SNG facility were not able to operate when it was needed significant problems may be created. The evaluation of environmental impacts has taken into account the fact that the SNG facility has been constructed, and that impacts associated with construction have already occurred.

The operation of the SNG facility should not affect land uses or development, since the plant is located in an industrial zone and is in accordance with area land use plans. No sites of historic, scenic, cultural or archeologic significances would be removed or obstructed due to operation of the facility. Recreational areas will also not be affected, since the site is separated from residential areas by a buffer zone and a major street. The project will create a few jobs, but no major new employment will occur. Additional taxes paid to Baltimore County will be a benefit. It is not expected that this project will cause a change in residential use of nearby neighborhoods.

The SNG made available from the facility will ensure that firm residential, commercial and industrial consumers in FPC Categories 1, 2 and 3 who are dependent on gas will have a reliable supply. Added cost to fuel bills, due to operation of the SNG facility, is expected to be about eight percent over current gas prices.

The SNG facility is not a traffic generator and will not affect the transportation network. The SNG facility will contribute concentrations of air contaminants to the ambient air quality. Concentrations of particulates, which are currently above air quality standards, will be further increased by a small amount by this project. It is expected that control of other industrial sources and end of construction on Sollers Point would help lower concentrations of particulates.

Wastewater effluents will be discharged into the Patapsco River. The effluent concentrations will be below levels which are considered hazardous. The SNG facility has been designed to be in compliance with all applicable state and federal effluent standards. The effluents will be released at low rates, although initial concentrations at discharge may be high.

Sound generated by the plant will be inaudible or imperceptible primarily due to high background noise levels.

The ecological conditions of the river and the site have been affected by construction, industrial and urban activities in the area. It is not believed that any unique ecosystems exist in the area which would be affected by the project. Although three rare and/or endangered species of birds have been identified within the Baltimore metropolitan area, none have been spotted in the area of the site.

It is not expected that the SNG facility will affect the water table or groundwater flow in the area because of the sandy soils. No impact is expected on geologic structures.

The SNG facility does create cumulative impacts by adding air and water contaminants into resources that are already affected by industrial and urban activities. The contribution of this project, however, is small. Other activities in the area such as major power plants switching from oil to coal may also affect the environment. The overall impacts of these activities are being addressed in environmental impact statements being prepared for the coal conversions. The Outer Harbor Crossings will change traffic patterns in the area, but there should be no interaction with the SNG facility.

Measures to Mitigate Environmental Impacts

Good engineering practices and compliance with codes and building permits have been used in the design of the SNG facility. Overall air pollution and water quality programs within the Baltimore metropolitan area are necessary to improve air and water quality to allow continued growth.

Adverse Impacts Which Can Not Be Avoided

The primary environmental impact is due to the discharge of air contaminants. The limited effect on the ambient air quality will cause negligible interference with the attainment or maintenance of air quality standards.

The Relationship of Short-Term Uses of the Environment Versus Long-Term Productivity

The project will allow continued productivity of BG&E's firm customers who use gas. It is not expected that the existence of the SNG facility and its operations will adversely affect long-term productivity, since the site and surrounding area would probably remain industrial if the SNG facility did not operate or were razed.

Irretrievable and Irreversible Commitments of Resources

The SNG facility will use up to 2,186,000 barrels of naphtha per year. It is believed that continuing the industrial trend of the site will keep the area industrial, even after the plant has ended its operating life. Other industries having similar if not greater impacts would probably use the site if it became available. Therefore, even though all impacts of the project other than naphtha and oil used are theoretically reversible, it is expected that the resources involved are actually irretrievably committed.

Alternatives to the Proposed Action

Alternatives to the project include administrative action such as denying the naphtha allocation, reducing it or finding other ways to reduce the gas shortages. Design alternatives include different plant systems which could affect environmental impacts.

The alternatives of denying or reducing the naphtha allocation could cause firm customers to face gas deficiencies. This would result in closing commercial and industrial firms and the potential loss of jobs, income and production.

Methods of increasing gas availability such as deregulation of gas prices may be effective. If gas availability could be increased, then the impacts created by this project would not occur. The use of pricing policies to modify gas consumption might not be effective with those customers who would be benefited by the SNG facility, since they do not have the capability for continuous use of an alternate fuel. If fuel switching does occur, it is expected that localized problems of air quality would occur as the larger consumers changed to other fuels.

BG&E has made sources of gas available other than natural gas. Some of these sources, including liquefied natural gas and SNG from its pipeline supplier, can help meet base load needs. A propane-air plant and liquefied natural gas storage can meet increased short-term demands. Expansion of these facilities would not be possible prior to the winter of 1977-78 when BG&E estimates that the SNG facility could be needed. Other methods of producing gas such as coal gasification are not commercially feasible in the time period for which a new gas supply is needed.

Various design alternatives to the SNG facility have been briefly considered. However, the increased costs for adding new systems does not seem to warrant their use for reducing impacts which are believed to be nonsignificant. These alternatives include methods of preventing all liquid wastewaters from leaving the site, such as reverse osmosis, evaporation and electrodialysis, and alternative means of reducing air contaminants such as electrostatic precipitatiors and SO_2 flue gas scrubbers.

In addition, the use of No. 2 fuel oil in boilers and process heaters instead of No. 6 oil has been considered. The No. 2 oil would reduce air contaminant emissions since it is a cleaner fuel than No. 6 oil. However, higher fuel costs, the need for additional fuel oil storage facilities and the diversion of No. 2 oil from home heating purposes reduce its attractiveness.

The conservation alternative was also evaluated. The analysis concluded that conservation can be considered as a partial solution to the gas shortage problem. In the near-term, the feasibility of conservation as a means to offset projected 1980 gas shortfalls is uncertain primarily due to the absence of sufficient information on (1) the amount of gas that can actually be saved in what time frame and (2) the direct and indirect cost of achieving these savings. The long-term benefits of conservation are undeniable although its economic implications have yet to be clearly defined. Conservation can be made a more attractive and reliable option when combined with other alternatives such as conversion from gas to coal or electricity. While conservation should be encouraged, it cannot be considered sufficiently reliable to be a complete and viable alternative in and of itself.

3. DESCRIPTION OF THE PROPOSED ACTION

3.1 Description of the Proposed Action

The proposed action before the Federal Energy Administration is the approval of Baltimore Gas and Electric Company's (BG&E's) Application for Assignment. This application was filed with the FEA on September 30, 1975. It requests approval of an allocation and supplier of naphtha for use as feedstock in a recently constructed manufacturing facility which produces SNG.

The application requests that the Amerada-Hess Corporation whose corporate headquarters are in New York be the naphtha supplier and that the naphtha assignment be as follows:

April 1, 1977 - March 31, 1978	1,000,000 barrels
April 1 to March 31 of each succeeding year	2,186,000 barrels

The SNG facility that would use the naphtha is described in Sections 3.2, 3.3 and 3.4 of this report.

BG&E is seeking the allocation of naphtha so that it can manufacture synthetic natural gas which will in turn will be used to offset shortages of natural gas.

BG&E is a public utility engaged in the production, purchase and sale of electricity and the purchase and sale of natural gas in central Maryland. Their gas service area covers approximately 590 square miles and includes Baltimore City and Baltimore, Cecil, Carroll, Harford, Howard and Anne Arundel Counties. Current firm customers number approximately 512,000 in FPC categories 1, 2, and 3. (FPC priority classifications are presented in Appendix A.) BG&E estimates that during a normal winter* its gas requirements for these firm customers is 46,026,000 mcf.

Based on historical and expected future curtailments of natural gas and on availability of other sources of gas, BG&E believes that the SNG from its Sollers Point SNG facility (SNG facility) will be required in order to prevent curtailments of gas supplies to its firm customers. It has estimated that in order to ensure continuous gas service to BG&E customers in FPC categories 1, 2, and 3 in the winter of 1978-79, SNG production from its SNG facility would be zero during a normal winter but 3,082,000 mcf during a design winter. Further curtailments in BG&E's sources of gas would increase the need for SNG production.

Baltimore Gas & Electric has indicated that it will use the SNG facility (and thus use the naphtha) only when deficiences of gas supplies occur. No SNG would be produced from the SNG facility when customers having an alternate fuel capability are receiving gas. BG&E expects that its SNG facility would not operate more than 180 days per year. During 180 days of full operation the SNG facility would produce 10,800,000 mcf of SNG. Under these conditions, the full naphtha allocation of 2,186,000 barrels would be required.

3.2 Description of the Sollers Point SNG Facility

Operation of the newly constructed Sollers Point SNG facility is dependent upon the allocation of naphtha requested by BG&E. Since the facility itself is the source of environmental impacts it is described in this section. The environmental conditions of its setting and the environmental impacts associated with its future operation are described in later sections of this report.

*A normal winter used by BG&E consists of a winter having 3,979 degree days. A design winter is based on the coldest winter that occurred since 1950 which had 4,449 degree days. BG&E recently established a new design of 4,894 degree days, based on conditions encountered during last winter. A degree day is the difference between the average daily temperature and 65°F and is an index of how cold a day is.

The SNG facility is located on Sollers Point in Baltimore County, Maryland. The location of this plant in relation to the Baltimore metropolitan area is shown in Figure 3.2-1.

The SNG facility has a capacity of producing 60,000 mcf of synthetic natural gas per day. Construction of the SNG facility is now complete, and start-up tests were conducted last winter prior to commissioning for commercial operation. The plant is currently ready for commercial operation.

BG&E began planning for this project in 1971. In July 1973, BG&E finalized a contractual arrangement with Stone & Webster Engineering Corporation for the design, engineering and construction of a facility which would employ naphtha as a feedstock for the production of SNG utilizing the Lurgi Gasynthan Process (LG). The project received all necessary permits for construction, and completion of the plant was originally scheduled for December 1, 1974. That date was twice deferred by BG&E due to economic and gas supply factors. The cost for constructing this plant is approximately $38 million.

The SNG facility occupies approximately 24 acres of a 101 acre site. The remaining acreage is available for future expansion, although BG&E has indicated that no plans for future development have been established.

3.3 Detailed Description of the SNG Facility

Site Layout

The site of the facility is subdivided into (1) the raw feedstock and propane storage area, (2) the process area, (3) the water treatment area, and (4) the administrative and service areas. A plot plan of the 101 acre site depicting these major plant components, is presented in Figure 3.3-1. The approximate acreage of each of these components of the facility are detailed below:

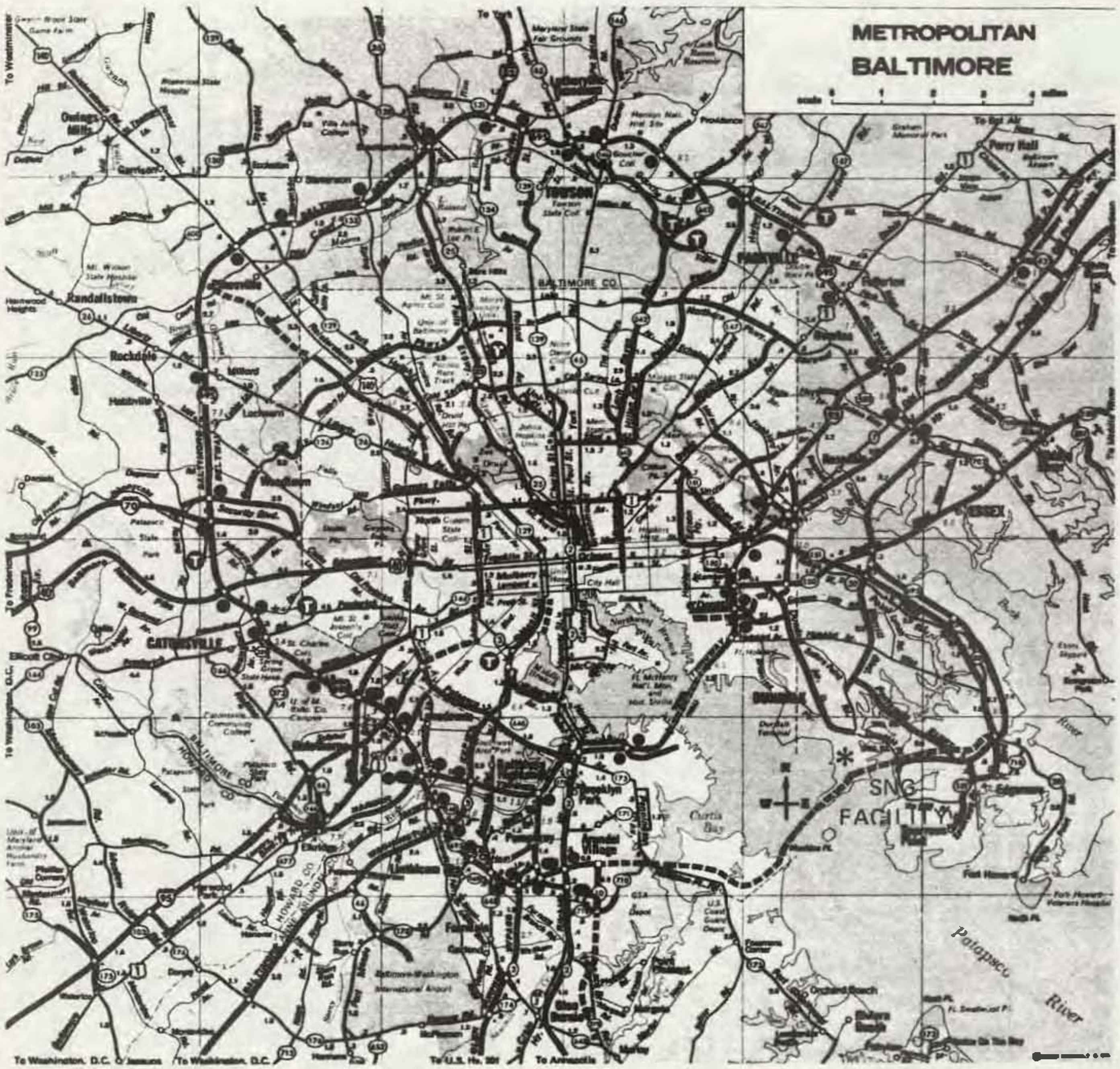


Figure 3.2-1   Location of the Sollers Point SNG Facility

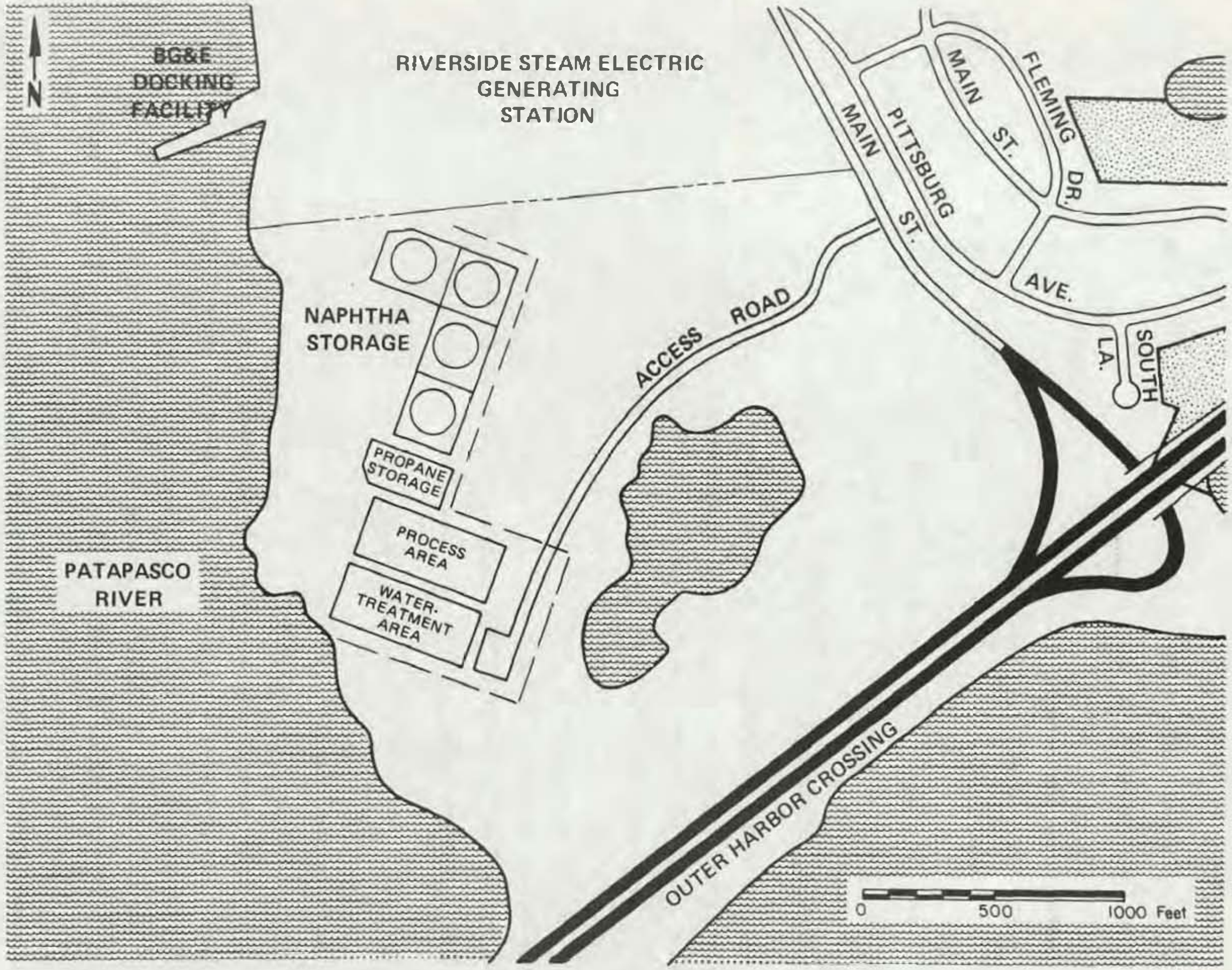


Figure 3.3-1
Site Plot Plan

Component	Acreage
Process area and boilers	4.0
Naphtha storage area	11.7
Propane storage area	1.5
Water treatment area	4.8
Waste water discharge and flares	1.0
Total	24.0

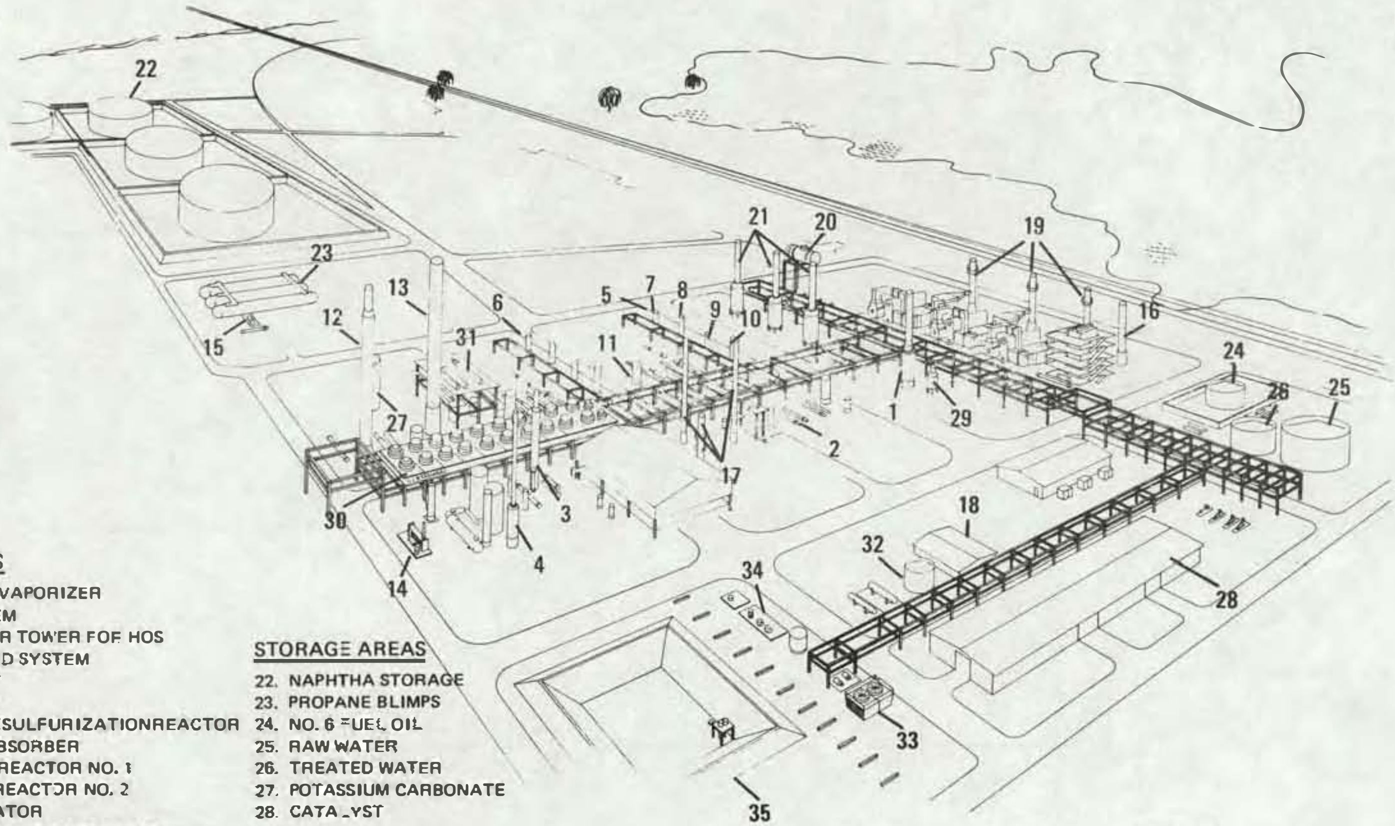
The various equipment requirements of the SNG facility are identified in the schematic drawing shown in Figure 3.3-2.

Description of the SNG Process

The method employed in the production of SNG in large quantities is catalytic gasification and hydrogenation to convert the feedstock into methane. The preferred feedstock is naphtha, although other light hydrocarbon petroleum fractions may be used. The four basic steps in the process are: (1) hydrodesulfurization, (2) gasification, (3) methanation, and (4) purification (carbon dioxide removal, drying, and spiking). A block diagram of the SNG process, to be employed by BG&E is presented in Figure 3.3-3. A detailed description of each of the process components is presented below with reference to the above diagram.

Hydrodesulfurization

Water washed naphtha is mixed with hydrogen, preheated to about 700°F and subsequently vaporized (1) and, passed through a catalytic reactor which converts sulfur compounds to hydrogen sulfide. The gases are condensed and separated from the noncondensible hydrogen stream which is recycled to the reactor feed (hydrodesulfurization system, HDS), (2). The naphtha is then passed through the HDS stabilization tower (3) where it is stripped of hydrogen sulfide. The off gases from the stabilization tower go to the Stretford system where elemental sulfur and a light hydrocarbon fuel are recovered. The fuel will normally be used to heat the naphtha vaporizer. Hydrodesulfurization is used to remove the bulk of the sulfur from the naphtha. This is necessary since sulfur is a permanent poison for reforming catalysts.



SNG PROCESS

1. NAPHTHA VAPORIZER
2. HOS SYSTEM
3. STABILIZER TOWER FOR HOS
4. STRETFORD SYSTEM
5. TRAIN "A"
6. TRAIN "B"
7. GUARD DESULFURIZATIONREACTOR
8. SULFUR ABSORBER
9. RICH GAS REACTOR NO. 1
10. RICH GAS REACTOR NO. 2
11. MENTHANATOR
12. CARBON DIOXIDE ABSORBER
13. REGENERATOR TOWER
14. GLYCOL UNIT
15. PROPANE METERING
    ANCILLARY PROCESSES
16. REFORMER FURNACE
17. HYDROGEN PLANT
18. DEMINERALIZER PLANT
19. BOILERS
20. DEAERATOR
21. SUPERHEATERS

STORAGE AREAS

22. NAPHTHA STORAGE
23. PROPANE BLIMPS
24. NO. 6 FUEL OIL
25. RAW WATER
26. TREATED WATER
27. POTASSIUM CARBONATE
28. CATALYST

MISC. EQUIPMENT

29. START-UP HEATER
30. FIN FAN COOLERS
31. CARBONATE REBOILER

WASTE WATER TREATMENT

32. NEUTRALIZATION TANK
33. COOLING WATER TOWER
34. WASTE WATER PUMPS
35. EQUALIZATION BASIN

Figure 3.3-2 Major Components of the SNG Facility

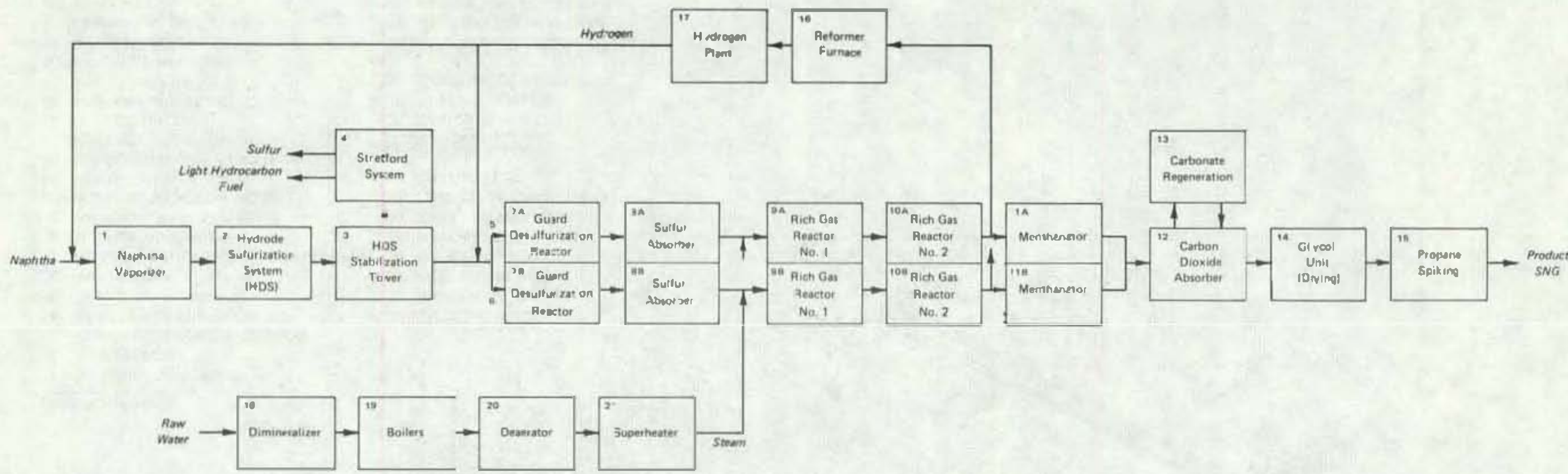


Figure 3.3-3 Block Diagram of the SNG Process

Gasification

After hydrodesulfurization, the naphtha is divided into two streams, Train "A" (4), and Train "B" (5), each of which receives identical treatment. The sulfur content at this point is approximately 5 parts per million (ppm) and it is necessary to reduce it to approximately 0.2 ppm. This is accomplished by vaporizing the naphtha over a cobalt catalyst in the guard desulfurization reactor (6) and absorbing hydrogen sulfide with zinc oxide (7). The gases are mixed with steam and passed through the first rich gas reactor (8), cooled and passed through the second rich gas reactor (9). At the outlet all hydrocarbons have been converted to methane, carbon dioxide, carbon monoxide, and hydrogen. This product is essentially town gas, a low heating value gas.

Methanation

A small portion of this low heating value gas is transferred to the hydrogen generation plant with the remaining going to methanation (10). In this process which employs an adiabatic catalyst bed and operates at about 600°F, the residual hydrogen and carbon monoxide are converted to methane. The effluent of the methanator reactor consist of methane, a small amount of residual hydrogen and carbon monoxide and a substantial portion of carbon dioxide and residual water.

Purification

The effluent from the methanator is cooled with heat recovery and water condensation, then passes through the carbon dioxide absorbtion tower (11) where it is stripped of carbon dioxide with a circulating potassium carbonate solution. The spent carbonate solution is regenerated (12) and the carbon dioxide free gases are dried in the glycol unit (13). The SNG at this point could be distributed, but it has a lower heating value, 980 Btu/scf, than that currently being distributed by BG&E; consequently, it will be spiked with a small amount of propane (approximately 2%) (14). The SNG is then of pipeline quality with a heating value of 1,015 Btu/scf. Auxiliary systems shown in the flow diagram include boiler units and associated superheaters, and the hydrogen production system.

Operating Characteristics of the SNG Facility

It is planned that the steam boilers at the SNG facility will be fired with No. 6 residual fuel oil having a sulfur content of 1 percent or less, an approximate ash content of 0.05 percent and a heating value of 18,500 Btu/lb. The fuel will be consumed at a rate of about 14,000 pounds per hour. The superheaters will be primarily fired with waste fuel gas, generated in the process producing LNG, which would otherwise be flared.

The starting heater, reactor feed heaters, and reforming furnaces will burn naphtha having a maximum sulfur content of 2,000 ppm or waste fuel gas. Under design conditions, naphtha will be burned at a rate of about 3,000 pounds per hour during start up (about 48 hours).

During operations at design conditions, the overall efficiency of the process should be about 90 percent. However, actual operating conditions will cause the efficiency to vary. For example, lower radiational heat losses, better heat recovery and lower carbon to hydrogen ratio of the naphtha than design conditions will result in increased efficiency. Lower operating rates, prolonged periods of standby operation, and losses and cooling of desulfurized naphtha will lower the efficiency.

Based on maximum production capacity and under design point conditions, the mass and energy balances of the SNG facility are summarized below:

Input	Pounds per Hour	10^6 Btu per Hour
Naphtha	123,355	2,474.16
Propane	6,240	134.88
Residual Fuel Oil	14,000	262.08
Electricity	-	12.45
Water	116,930	0.
Total		2,883.57

Output	Pounds per Hour	10^6 Btu per Hour
SNG	110,910	2,598.55
Carbon dioxide vent	104,646	9.75
Sulfur	262	1.05
Wastewater	20,012	0
Air Cooler Effluent	-	127.00
Radiation	-	105.70
Other losses	-	41.52
Total		2,883.57

The feedstock to be used in the production of SNG is naphtha, and will be purchased from the St. Croix refinery of Amerada Hess Corporation. The consumption of naphtha will be as required, but will not exceed 2,186,000 bbl per year by 1979. The naphtha will be transported by tanker to the Amerada Hess Baltimore Harbor Marine terminal storage area and will then be shipped by BG&E barge to the Riverside Steam Electric Generating Station (Riverside power plant) docking facilities and from there by pipeline to the SNG facilities storage tanks. The addition of propane (spiking) to the SNG is anticipated in order to increase the heat content of the final SNG output so that it will be compatible with the heating value of the natural gas which is currently being distributed by BG&E. Propane use could be about 6,240 lb/hr. The total volume of propane employed by BG&E would remain within its current allocation limits, since BG&E's propane-air plant would be used less. Odorant will also be added to the product in minor quantities.

3.4 Environmental Aspects of the SNG Facility

Air Quality Aspects

The major sources of air contaminant emissions at the SNG facility will be the steam boilers and superheaters. As previously described, the steam boilers will be fired with No. 6 residual fuel oil having a sulfur content of 1.0 percent or less, an appropriate ash content of 0.05 percent and heating value of 18,500 Btu/lb. The superheaters will be primarily fired with waste fuel gas, generated in the process producing

SNG. These heaters could burn naphtha containing up to 0.2 percent by weight sulfur when fuel gas is not available. Sulfur dioxide, particulate matter and oxides of nitrogen resulting from combustion processes have been estimated based on a maximum process steam requirement of approximately 170,000 pounds per hour. It has been assumed that the steam boilers and associated superheaters alone meet this total requirement since this may occur under start-up conditions when heat recovery boilers are not up to full pressure. It has also been assumed that the superheaters will fire fuel oil similar to that of the steam boilers, producing, therefore, a conservatively high estimate of the expected contaminant emissions from combustion processes.

Other sources of contaminant emissions at the SNG facility are: the hydrodesulfurization system, the carbon dioxide vent, the SNG dryer vent, the flare system, the reformer furnace and the naphtha storage tanks. The types and quantity of pollutants and the flow conditions associated with each of these sources are discussed below. Available air quality control devices and techniques and applicable emission regulations are also detailed in the discussion. Table 3.4-1 summarizes contaminant discharges from each source at the plant. Figure 3.4-1 identifies the sources of contaminant emissions in the process and support systems.

Desulfurization Unit

Sulfur originates from in the hydrodesulfurization (HDS) unit in the process area which processes the raw naphtha and removes its sulfur content in the form of hydrogen sulfide gas. A maximum of 5,900 lb. of sulfur will be recovered daily based on a sulfur content in the raw naphtha of 2,000 ppm. Typically, the sulfur content will be as low as half this level in the raw naphtha.

The sulfur recovery process consists of a Stretford unit. Gaseous discharges from the recovery are incinerated prior to discharge to ensure oxidation of residual H_2S, to SO_2 and vented to a 75-foot stack. The maximum SO_2 emission resulting from the sulfur recovery system would be less than 10 lb. per hour assuming only 96 percent recovery and 2,000 ppm sulfur in the naphtha.

TABLE 3.4-1

CONTAMINANT EMISSION FROM THE SNG FACILITY

Source	Contaminant	Quantity (lb/hr)
Boilers	SO_2	200
	Particulates	6.4
	NO_x	54
	CO	trace
Superheaters*	SO_2	80
	Particulates	2.6
	NO_x	24
	CO	trace
Sulfur Recovery Unit	SO_2	< 10
Carbon Dioxide Vent	CH_4	trace
TEG Unit	CH_4	trace
	CO	< 4
Reformer Furnace	Particulates	< 1
	SO_2	trace
	CO	trace
Flare System	N.A.	trace
Naphtha Storage Tank	NMHC (Nonmethane hydrocarbons)	< 9
	CH_6	<26

*Boiler and superheater emissions include emissions from the direct-fired process heater.

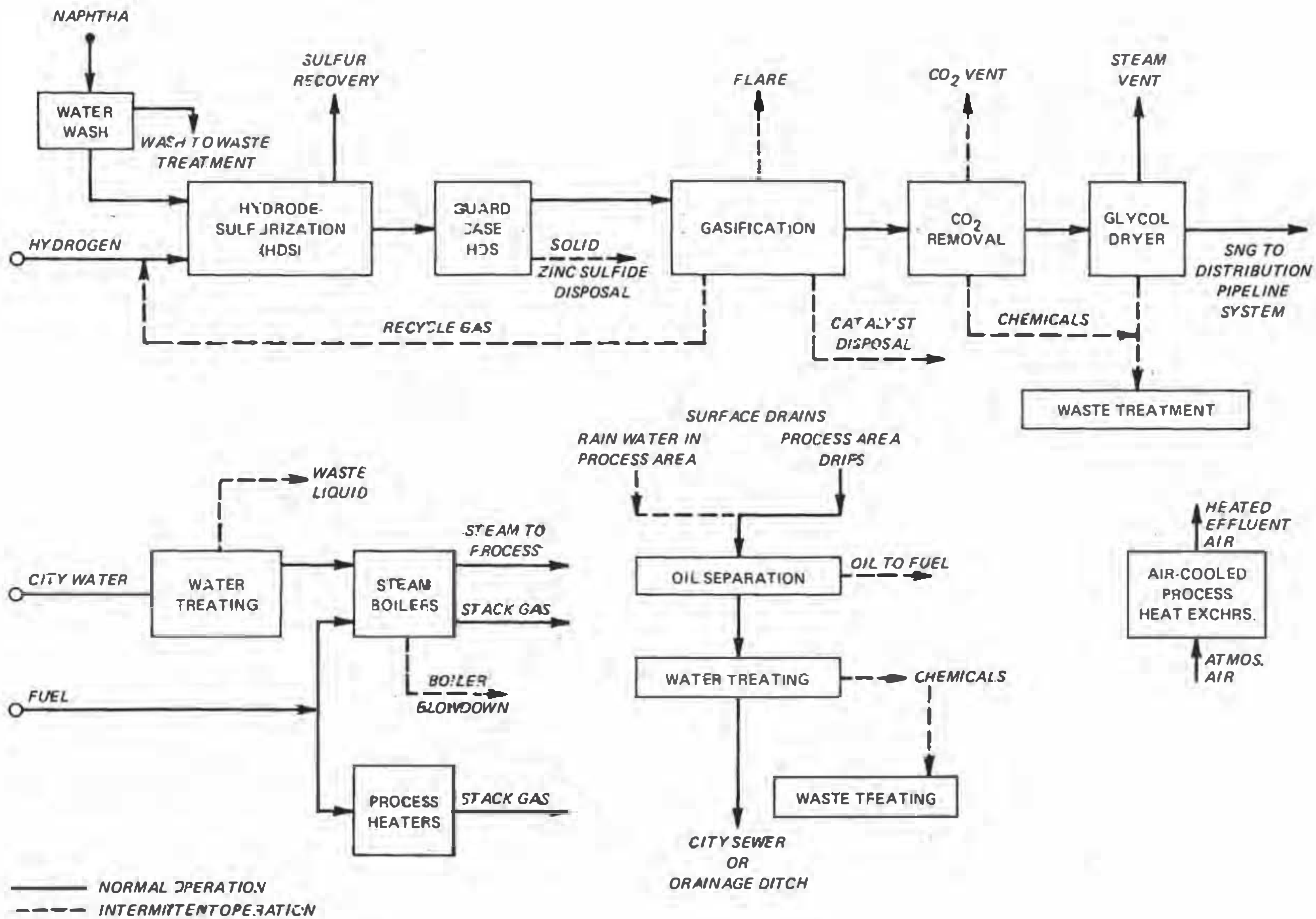


Figure 3.4-1 Environmental Systems

Carbon Dioxide Vent

Under normal SNG facility operation, the carbon dioxide removal system will vent to the atmosphere approximately 105,000 lbs/hour or 23,000 scfm of wet gas containing carbon dioxide and trace amounts of methane. The wet gas vented at less than 150°F will be visibly seen as a "stream" plume under certain atmospheric conditions due to condensation of the water vapor in the atmosphere. The methane content of the wet gas should be about no greater than 1.0 percent by volume of wet gas under normal operation.

TEG Unit

Under full load operation, the TEG unit will vent to the atmosphere about 250 lbs of water vapor per day. The vapor vented at temperatures between 130°F to 200°F will be visibly seen as a steam plume due to condensation caused by the colder atmosphere. Trace quantities of glycol, methane and carbon monoxide may also be present.

Flare System

During full load operation, the flare system will be in standby condition with the pilot flame burning 4,000 to 5,000 scf per hour of natural gas, discharging carbon dioxide and water vapor. All vent lines and emergency relief valve lines from process vessels are connected directly to this flare system. Most hydrocarbon emissions which would otherwise be vented to the atmosphere are, therefore, burned harmlessly in the flare. In addition, the design capacity of the flare is greater than the normal volume of expected hydrocarbons during emergency conditions. These plant emergency conditions or upsets are normally not detectable outside plant boundaries, except where relief valves automatically open in which case a visible flame from the flare may be observed.

Reformer Furnace

The hydrogen reforming furnace discharges exhaust gases at a rate of 31,000 lb per hour. The gases consist primarily of CO_2 and water, with minor quantities of particulate matter, SO_2, and CO.

Naphtha Storage Tanks

Four naphtha storage tanks, each having a capacity of 150,000 bbl, are located on site. The tanks are of floating roof design to minimize hydrocarbon emissions. Each tank has an internal nitrogen vapor blanket which serves to reduce vaporization. However, minor vapor leakage does occur. Based on an emission factor of approximately 0.033 lb of hydrocarbons per day per 1,000 gallons of petroleum fraction stored and the assumption of 75 percent nonreactive hydrocarbons, principally butane, the emission of nonmethane hydrocarbon is expected to be less than 208 lb per day or 8.7 lb per hour. Tank design is in compliance with regulations promulgated by the Air Quality Control Boards of Baltimore metropolitan area and the State of Maryland.

Steam Boilers Superheaters and Process Heaters

Emissions and flow characteristics have been calculated based on the following conditions:

1) steam will be generated at a rate of 170,000 lb per hour, during normal operation;

2) two package boilers at equal rating are required to generate this quantity of steam;

3) two superheaters are also required; and

4) process heaters and reformer furnace fire naphtha under normal operation.

The following operating and stack parameters have been estimated or assumed as typical of an SNG facility.

Unit	Boiler	Superheater
Number	2	2
Stack Height, ft	75 each	75 each
Exit Velocity, fps	40 each	40 each
Fuel Rate, gph	673 each	202 each
Flue Gas Rate, acfm	28,000 each	12,000 each
Exit Temperature, °F	315	350

The maximum sulfur content of the fuel oil to be burned in the steam generators is 1.0 percent. Based on a maximum daily fuel consumption of 1,000 bbl and 100 percent oxidation of fuel sulfur, the maximum SO_2 emission rate is 280 lb per hour or 1.08 lb per 10^6 Btu of heat input. Each boiler will discharge approximately 100 lb of SO_2 per hour, and each superheater 40 lb of SO_2 per hour.

Particulate emissions from the steam generating facilities were determined based on the following conditions;

1) The maximum ash content of the fuel oil will be 0.05 percent;

2) Fifty percent of the total particulate emission will be in the form of combustibles in the boiler, and only trace quantities of combustibles will be present in the super heater effluent;

3) All ash and combustible products in the boilers will be discharged to the particulate collection devices, and

4) The cyclones will have collection efficiencies of 50 percent.

The resulting total emission is then 9.2 lb/hour, or 0.036 lb per million Btu of heat input: 3.2 lb/hour from each boiler, and 1.4 lb/ hour from each superheater.

The other contaminant to be discharged in significant quantities is oxides of nitrogen. Due to the anticipated boiler heat input rating, i.e., less than 250 million Btu/hr, no regulation governs the emission of this pollutant. The expected emission rate, however, is 27 lb/hour from each of the two boilers and 12 lb/hour from each superheater.

Water Quality Aspects

Liquid wastes associated with the operation of the SNG facility will be both continuous and intermittent in nature. The sources of these discharges are presented in the flow diagram in Figure 3.4-1. Those wastes containing either oil or organic salts will be treated prior to discharge; thus, two unique collection systems are required to aggregate these waste streams. The basic components of the liquid waste treatment system are:- 1) a neutralization tank, 2) an oil-water separator, and 3) an equalization basin common to both streams. All other wastes not treated by this system will be either recycled or drummed for off-site disposal. The treated effluents will then be discharged to Baltimore Harbor. The expected composition and properties of the discharge is presented in Table 3.4-2.

A summary of the wastewater discharges are listed below by treatment method to be employed.

Treatment	Source
Neutralization	Boiler blowdown continuous at 5 gpm; demineralizer regeneration waste intermittent at 22,000 gallons/ 4 hours, twice a day. carbonate/activator solutions, intermittent at 9 gpd.
Neutralization	carbon solution - H_2 production area continuous at 0.5 gpm.
Oil Removal	Naphtha storage tank area runoff process area runoff, variable; design 500 gpm naphtha coalescer wastes, continuous at 5 gpm startup; loop knock-out drum wastes, intermittent at 1 gpm for 2 hours once a year; equipment drains.
Drummed for Off-site Disposal	Spent Stretford solution, intermittent at 50 gpd; triethylene glycol (TEG), intermittent at 1 gpd.
Sewage Treatment	Conveyed to city sewage treatment system sanitary wastes intermittent at 600 gpd.
No Treatment	Cooling tower blowdown (stream 22), continuous at 10 gpm.

The nonoily waste collection system will handle the majority of liquid wastes from this SNG facility. The nonoily wastes will be the continuous steam boiler blowdown and intermittent wastes from the water treatment equipment (demineralizer regeneration) and the carbonate solutions. These waste streams will be conveyed to a tank for batch process neutralization. When sufficient quantities of these wastes have

TABLE 3.4-2

COMPOSITION OF EFFLUENT FROM THE EQUALIZATION BASIN

ph 6.0-8.5

Temp. Ambient

Range of Effluent Concentration

Constituent	Minimum (ppm)	Minimum (ppm)	Average Concentration (ppm)
Na & Mg (Sodium & Magnesium)	44	530	180
Ca (Calcium)	23	285	100
Al (Aluminum)			0.17-0.50*
Fe (Iron)	0.02	0.02	0.07
K (Potassium)	10	130	45
NO_3 (Nitrate)	3	40	14
NCO_3 (Bicarbonate)	41	535	185
SO_4 (Sulfate)	100	1150	400
CI (Chlorine)	27	370	115
F (Fluorine)	1	12	4
SiO_2 (Silica)	12	150	52
Oil (Dissolved)	0	20	13
TDS (Total Dissolved Solids)	300	3200	1120

*Based on sampling conducted on January 6, 1978 by BG&E.

been collected in neutralization tank, a PH meter will initiate the addition of acid or caustic. After agitation for a fixed period the PH will again be measured and the neutralization cycle continued if further treatment is required. The neutralized liquid will be pumped automatically to the equalization basins prior to discharge into Baltimore Harbor.

The storm water collection system will convey oil-contaminated water into a corrugated plate oil-water separator. The oil-water separator will treat wastewater from the naphtha coalescer reactor effluent separator, floor and equipment drainage, and storm water runoff from the process and naphtha storage area. After process storm water has been treated, the storm water collected in the naphtha storage diked area will be drained to the oil separator at a controlled rate.

The oil recovered by this separator will be pumped to the slop oil tank where it will be filtered for reuse as fuel. The effluent from the separator, containing less than 20 ppm of oil will be discharged to the equalization basin prior to discharge into Baltimore Harbor. The slop oil tank will receive and store TEG waste as well as the recovered oil from the corrugated plate separator.

The collected slop-oil will be filtered for reuse as boiler fuel. Spent Stretford solution containing sodium carbonate, sodium metavansdate, anthroquinone disulfonic acid, sodium citrate, sodium thiosulfate, and a chelating agent will be drummed for off-site disposal. The drummed effluent will be collected and disposed of by a licensod private contractor. Cooling tower blowdown will be conveyed at a continuous rate of 10 gpm to the equalization basin prior to discharge into Baltimore Harbor.

The equalization basin will retain the treated wastewater from the oil-water separator, the neutralization tank, and from cooling tower blowdown. The expected characteristics of the effluent from the basin, as shown in Table 7 will be monitored for pH, oil concentration, temperature, conductivity, disulved oxygen and turbidity. Flow from the equalization basin will be 750 gpm. Sanitary wastes, at a flow rate of approximately 600 gpd, will be conveyed to the city sewage system.

Solid Waste Aspects

Under normal SNG facility operation, approximately 200,000 lb of spent catalyst and zinc oxide will have to be replaced every two or three years. Licensed waste disposal contractors will haul away these solid wastes to a disposal site, or the material will be returned to the manufacturer for reworking. Normally, the return of the spent or used material to the catalyst manufacturer for recovery of the contained metals is incorporated in the original purchase order. Other solid wastes generated on-site will be of nominal amounts and nonreactive in composition, and will not present a disposal problem.

Noise Aspects

The major sources of noise at an SNG facility are: furnace firing roar, induction fans of the combustion air system, air cooler fans of the process heat exchangers, safety and relief valves, flare flame roar under emergency operation, and pumps and compressors. Design of each of these process and auxiliary system components will minimize both the on-site and off-site impact of these sources, and ensure compliance with applicable regulations and prevent annoyance to the general public.

On-site the individual health standards currently enforced by the federal government under the Occupational Safety and Health Act (OSHA) of 1970. The OSHA standards, along with proposed standards are tabulated below:

OSHA Noise Standards

	Standard, dBA	
Duration of Exposure, Hours	Current	Proposed
8	90	85
6	92	87
4	95	90
3	97	92
2	100	95
1.5	102	97
1	105	100
0.5	110	105
0.5 or less	115	110

These standards are designed to prevent or minimize the possibility of hearing loss or impairment by an industrial worker. Employees at an SNG plant do not experience exposure of more than two to four hours per day of noise. It is, therefore, not anticipated that any difficulty will be encountered in complying with current OSHA standards. Should advanced engineering calculations indicate higher-then-acceptable noise levels, remedial measures will be instituted and incorporated into the design of equipment.

The major off-site noises originate with the air cooler fans and steam boiler. The fan housings and the boilers will be so designed and insulated so as to hold noise levels at a given distance within current OSHA standards, local zoning ordinances or "nuisance" regulations.

Safety Aspects

The two major areas involving the safety of plant employees and the general public are: the possibility of oil spills and the potential for fire at the SNG facility.

Oil Spill Prevention, Contaminant, and Disposal

Oil spill prevention and containment procedures rely predominantly on the design and layout of the process and naphtha storage and unloading areas. The process area is properly paved and diked such that process leaks are collected separately and not be included in ground surface run-off water. Surface effluent from this area will be drained and piped to the waste treatment facility (see discussion on "Water Quality Aspects: Oily Wastes"). The naphtha storage tank area will be diked in accordance with API and OSHA standards. In case of spillage or leakage, the diked area will either be drained to the waste treatment facility or pumped out to waste disposal trucks by licensed contractors for haulage and disposal off-site. During unloading of naphtha at the Riverside plant facility, an oil boom will be situated around the barge so as to contain any accidental spillage that may occur.

Fire Protection

To provide protection against ignition in the naphtha storage tank farm, all floating roof naphtha storage tanks will be internally blanketed with nitrogen gas. Should a fire occur despite this precaution, foam stations will be strategically located around the perimeter of the naphtha storage tanks. Nozzles at these locations will be designed to apply foam to the tops of the floating roofs to extinguish any fire, not only seal fires, but also a fully involved floating roof storage tank fire condition.

In addition, there will be a fire water loop around the diked tank farm, with strategically placed rotatable monitor fire nozzles which tie into the fixed foam system. It will also be possible to tie the facility's foam truck into this fire loop as a "reserve supply" of foam to the fixed system. A manually operated fixed foam solution supply and control system is located in a storage building near the tank farm.

A 30-minute fire-rated coating on the floating roof pontoon deck (not in contact with the naphtha) will be applied in case of fire; its purpose is to provent excessive heating and deformation of the floating roof in a storage tank adjacent to a fully involved storage tank fire. Similarly, the above-grade naphtha tank with fill and withdrawal lines inside the diked area will have a one-hour fire-rated coating applied to minimize the possibility of a fire-induced failure in these lines.

The tank farm area will be enclosed with an earthen dike constructed in accordance with the fire code, with a containment volume equal to 110 percent of the largest tank. In addition, there will be small separator dikes between storage tanks which will isolate small spills. In order to avoid the danger of dike grass fires, as well as to avoid dike erosion and to minimize dike maintenance, dikes will be surfaced with a layer of gravel and small stones which is fixed in place with a sprayed coating of tar.

The large volumes of naphtha associated with the tank farm are not present in the SNG process area, but spill fires are possible, which could rapidly involve process equipment unless extinguished. To provide a fast response, in addition to the foam truck, pre-connected water and/or foam hose lines will be provided.

To supplement the fire fighting capabilities of the foam truck, a dry chemical fire truck (charged with potassium base dry chemical agent) will be acquired. This truck will have a driver-operated monitor nozzle plus two reel-mounted dry chemical hose lines.

The two propane pressurized storage vessels, located between the naphtha storage and process areas will be protected by a 1-hour full engulfment fire-rated sublimation compound. Finally, a fully supplied foam generating station will be situated at the unloading dock, located at the Riverside power plant to provide effective fire protection capabilities.

4. DESCRIPTION OF THE ENVIRONMENT AFFECTED BY THE ACTION

This section describes the existing environmental conditions in the area of the Sollers Point SNG Facility (SNG facility) of the Baltimore Gas & Electric Company (BG&E). It is this area which will be influenced by the proposed action before the Federal Energy Administration.

4.1 Land Use

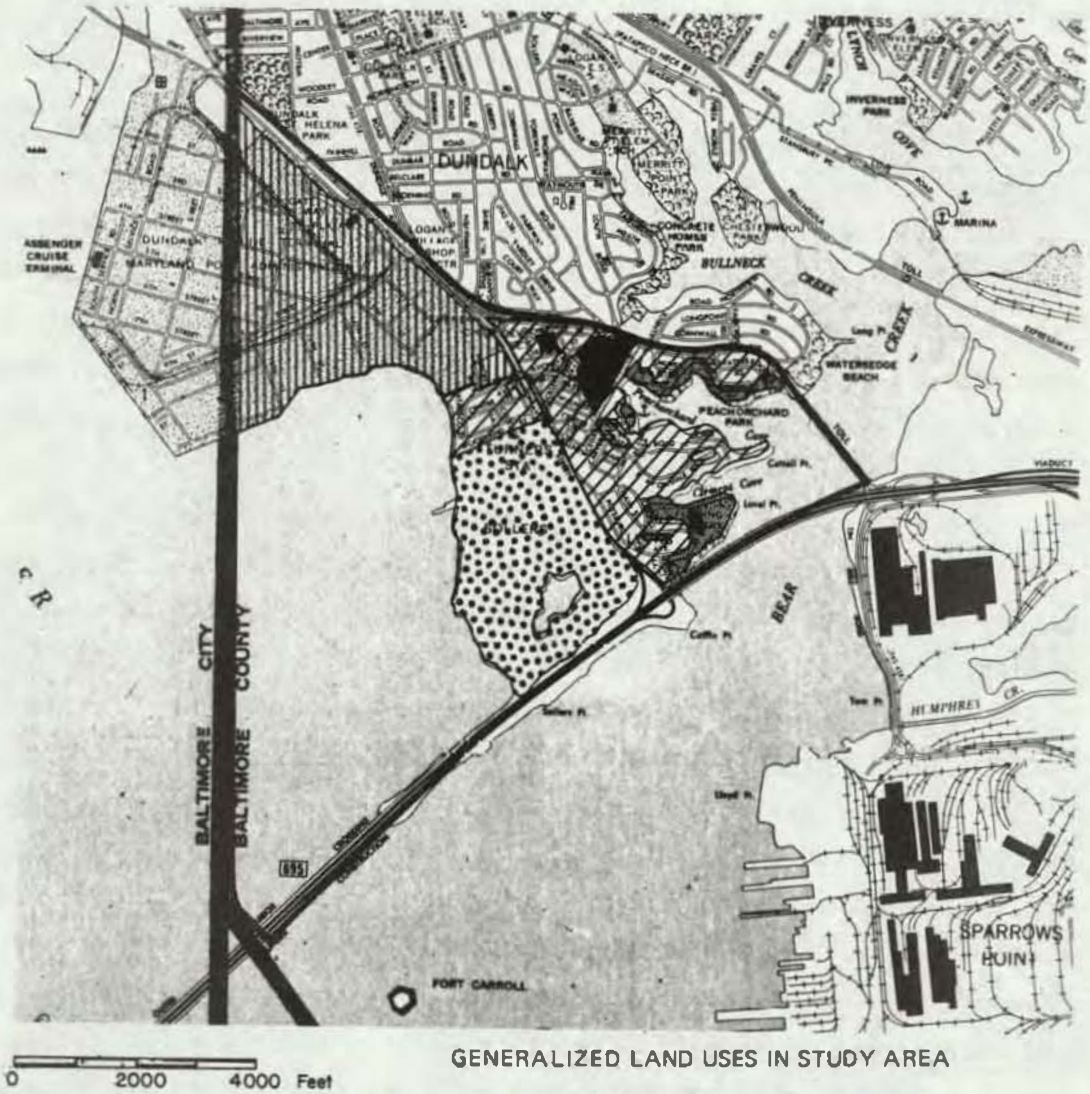
General Land Uses

BG&E's SNG facility is located in southeast Baltimore County, in Dundalk, a highly developed residential and industrial area just east of the Baltimore City limits. Major industries that are within approximately one mile of the site include Bethlehem Steel, the Amerada Hess Terminal, the U. S. Coast Guard Shipyard, the Riverside Steam Electric Generating Station (Riverside power plant), the Dundalk Marine Terminal, General Motors and Westinghouse. A map of the site showing general land use patterns is provided in Figure 4.1-1.

The site of the SNG facility contains approximately 101 acres. Of these, 24 have been dedicated to the SNG facility itself. The remaining acreage which includes a shallow pond of about 13 acres has been left vacant; it serves as a buffer zone between a nearby residential area.

Maryland's largest port facility, the Dunkalk Marine Terminal, is located about one-half mile north of the SNG facility. Immediately north of the facility and adjacent to it is BG&E's Riverside power plant. A small subdivision called West Turners is located between the Marine Terminal and the power plant. The Patapsco River and Baltimore Harbor are west of the SNG facility. Portions of the Outer Harbor Crossing, a causeway which completes the I-695 beltway around the City of Baltimore and which is still under construction, are south of the SNG facility.

The East Turners neighborhood, adjacent to the site to the northeast, consists primarily of one- and two-story, multifamily, brick row houses and wood frame dwelling units. There are some single family units. The small West Turners subdivision consists primarily of single family, two-story, wood frame dwelling units. Both neighborhoods are oriented toward lower income families.[1]



GENERALIZED LAND USES IN STUDY AREA

Industrial
Utility
Residential
Recreational
Institutional
Commercial
Vacant
Study area boundaries

Figure 4.1-1 General Land Uses

Source: Baltimore County Working Map-Current Land Use

Three institutional uses are in the vicinity of the SNG facility, the Fleming Community Center, the Dundalk Vocational Technical School, and the Turners Occupational Development Center. The Fleming Community Center, situated about 0.3 miles east-northeast from the nearest boundary of the SNG facility, services the East Turners neighborhood housing three different service agencies, the Community Health Center, the Turner Day Care Center, and a Head Start Center. No overnight care is provided at any of these facilities.[2] The Dundalk Vocational Technical Center is situated about 0.4 miles north-northeast of the SNG facility. A total of 618 students, 24 teachers and 6 other personnel were involved with the school during the past academic year.[3] Turners Occupational Development Center, a Baltimore County school for special education, is located about 0.6 miles north of the SNG facility, and had a student enrollment of about 60 (in addition to 6 staff members) during the past school year.[4]

Zoning and Land Use Plans

The facility site, as well as the immediately adjacent land, is zoned for heavy manufacturing (M H-IM). This is the most permissive zoning classification in Baltimore County. The Baltimore County Comprehensive Plan (1975) identifies the area in which the facility is located as best suited for heavy industrial purposes.

The state is currently drafting a land use plan to be published within a year. Sollers Point, where the SNG facility is located, has been initially classified for the most part as "existing settlement" by the Maryland Department of State Planning. "Existing settlement" is the most intensive usage in the state classification system and refers to an area in which more than 76 percent of the land is urbanized and less than 24 percent is vacant.

The Maryland Outdoor Recreation and Open Space Plan (1974) has no identifiable plans for the SNG facility site or the immediately surrounding area.

Recreational Resources

There are no developed public recreational facilities located in the immediate vicinity of the SNG facility, with the exception of the

Patapsco River. However, this water body has little recreational value at present due to the high fecal coli counts found in the water. Moreover, the Patapsco River is not utilized very much for recreational boating since more aesthetically pleasing areas exist off Hart Island and in the vicinity of the Middle River.

The nearest developed public park is Turner Station-Lyons Homes, a 11.4 acre parcel containing a natural environmental area and playfields. This park is situated approximately 0.3 miles ENE of the SNG facility. Other developed recreational facilities in the larger area include Fleming Park, a 11.2 acre community park, and Peach Orchard Park, a 9.5 acre community park. Fleming Park is situated approximately 0.5 miles ENE of the SNG facility, while Peach Orchard Park is located approximately 0.7 miles to the NE.

Historical Resources

State and county officials have indicated that there are no structures present in the immediate vicinity of the SNG facility which are currently on or nominated to any national register, including the National Register of Historic Places. There are, however, several sites of regional or local interest. Fort Carroll located on an island about 1.2 miles south of the SNG facility is listed as a historic site by the Maryland Historic Trust.[5] In addition, the "site" where Francis Scott Key wrote the "Star Spangled Banner" is situated about 0.6 miles southwest of the SNG facility in the coastal waters off Sollers Point; this is listed as a historic site by the Dundalk-Patapsco Neck Historical Society.[6] A buoy once marked this location, but it has been removed.

Visual Quality

The SNG facility is located in an area of moderate to high visibility, with exposure available from the Patapsco River and most nearby shoreline locations but limited from most interior positions. The relatively flat topography; the tall vegetation along the small lake on the site; and the residential building along Pittsburg Avenue combine to limit long and expansive inland views of the SNG facility. The existing Riverside power plant also serves to block views emanating from a northerly direction including views from the residential neighborhood of West Turners.

4.2 Socioeconomic Characteristics

The residential population living in closest proximity to the applicant's SNG facility are situated in two areas: 1) the small cluster of homes north of the Riverside power plant and 2) the larger neighborhood east of Main Street. These two residential areas are a part of the larger unincorporated community of Dundalk and are identified by the United States Bureau of the Census as census tracts 4213 and 4214. These two areas are shown in Figure 4.2-1 and have been combined to form the study area due to their proximity to the SNG facility. Comparative census statistics for the study area, Dundalk and Baltimore County are presented in Table 4.2-1.

The study area can be described as being a predominately black, stable neighborhood of families. The people have tended to be less educated than those in the greater communities of which they are a part. They tend to be employed in blue collar occupations, earn modest incomes, and live in rented quarters. Over 25 percent of the dwelling units have been occupied by the same residents since 1949.

In 1970, the study area contained 5,334 people which was 6 percent of the total population of Dundalk. In comparison, Baltimore County recorded a 1970 population of over 621,000. The population of the study area is predominately black (85%) and contains more than 90 percent of Dundalk's black population. Nearly all of the study area's population were native born and over 96 percent lived in families. Similar statistics were recorded for Dundalk and for Baltimore County.

Educational attainment statistics, as measured by the number of years of schooling completed by persons 25 years and older, indicate that nearly 70 percent of the residents of the study area had not completed high school. Comparative statistics for Dundalk and Baltimore County were 64 percent and 47 percent, respectively.

The occupational distribution of employed persons (16 years and older) in the study area revealed that nearly half held blue collar

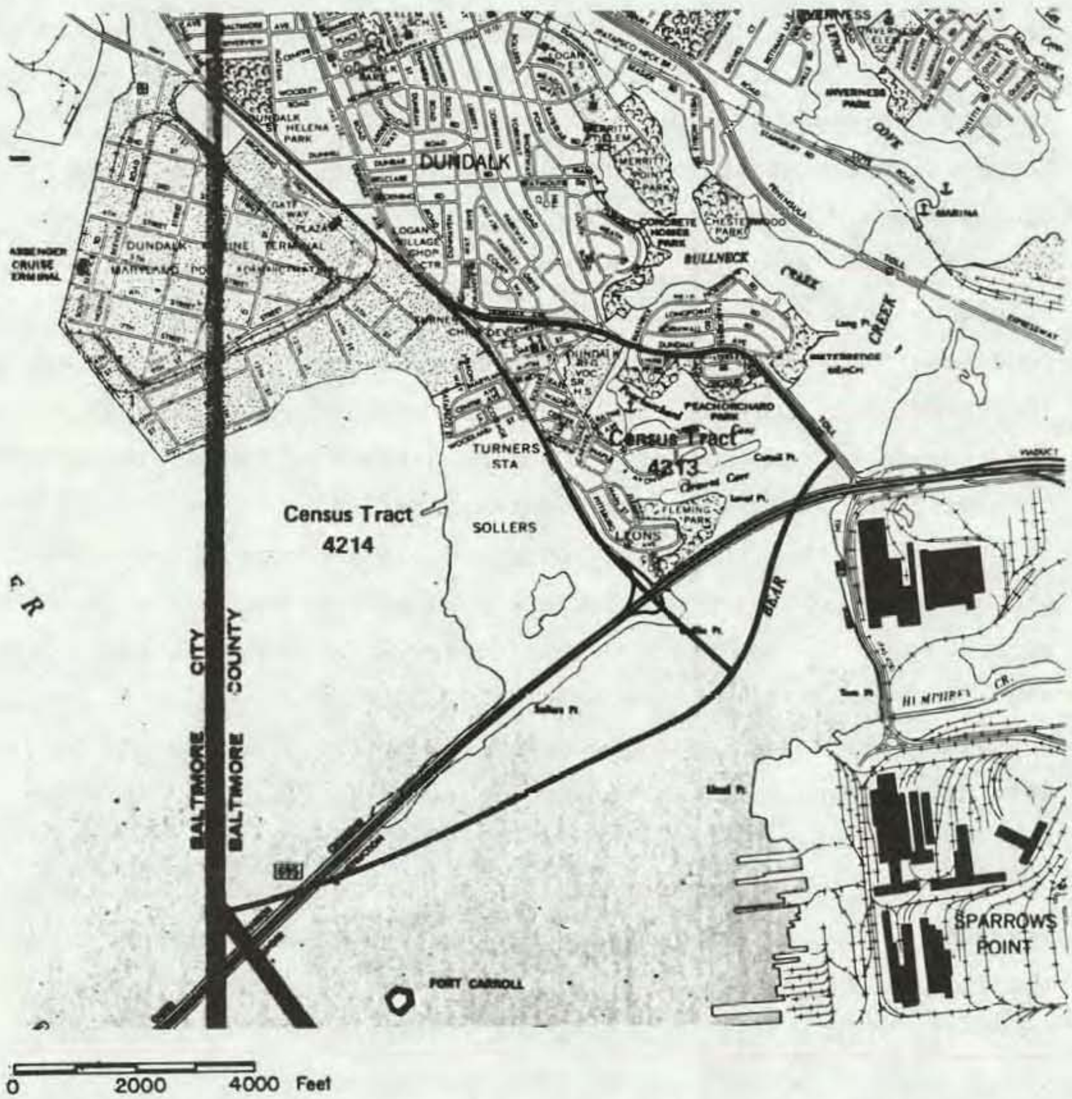


Figure 4.2-1 Census Tracts in Study Area

TABLE 4.2-1

SELECTED SOCIOECONOMIC CHARACTERISTICS (1970)

	Study Area[a]		Dundalk		Baltimore County	
	Number	Percent	Number	Percent	Number	Percent
POPULATION						
Total Population	5,334		85,377		621,077	
Under 5	505	9.5	7,115	8.4	49,055	7.9
5-17	1,513	28.4	24,102	28.2	162,721	26.2
18-64	3,057	57.3	50,211	58.8	363,618	58.5
65 and over	259	4.8	3,949	4.6	45,683	7.4
White	814	15.3	80,089	93.8	598,989	96.4
Black	4,508	84.5	4,936	5.8	19,597	3.2
Other	12	0.2	352	0.4	2,491	0.4
In Families	5,140	96.4	82,511	96.7	584,661	94.1
Primary Individuals	174	3.2	2,762	3.2	22,621	3.7
In Group Quarters	20	0.4	104	0.1	13,795	2.2
Native	5,151[b]	99.5	83,516[b]	98.0	602,920	97.1
Foreign Born	28[b]	0.5	1,730[b]	2.0	18,157	2.9
Total Population, 25 Years Old & Over	2,526		45,018		344,162	
Less than High School	1,765	69.9	28,734	63.8	162,356	47.2
High School or Beyond	761	30.1	16,284	36.2	181,806	52.8
LABOR AND INCOME						
Civilian Labor Force, 16 Years Old and Over	2,196		35,768		266,209	
Employed	2,138	97.4	34,583	96.7	259,351	97.4
Unemployed	58	2.6	1,185	3.3	6,858	2.6
Total Employed Persons, 16 Years Old and Over	2,138		34,583		259,351	
White Collar Occupations	633	29.6	13,673	39.5	153,059	59.0
Blue Collar Occupations	1,042	48.7	17,623	51.0	82,423	31.8
Service Occupations	463	21.7	3,267	9.4	22,388	8.6
Farm Occupations	-	-	20	0.1	1,481	0.6
Mean Family Income ($)	9,729		11,252		14,047	
Families with Income less than Proverty Level	110	8.9	884	4.0	5,610	3.5
HOUSING						
Total Year-Round Housing Units	1,447		25,445		189,899	
Owner Occupied	483	33.4	17,615	69.2	129,572	68.2
Renter Occupied	943	65.2	7,397	29.1	55,278	29.1
Vacant	21	1.4	433	1.7	5,049	2.7
Lacking Some or All Plumbing Facilities	18	1.2	313	1.2	4,005	2.1
Total Occupied Year-Round Housing Units	1,426		25,012		184,850	
1.01 or more Persons per Room	339	23.8	2,012	8.0	8,561	4.6
Population per Occupied Unit	3.7		3.4		3.3	
Year Structure Built	1,437		25,428		189,938	
1960 to March 1970	11	0.8	3,289	12.9	57,345	30.2
1940-1959	1,032	71.8	17,561	69.1	96,365	50.7
1939 or Earlier	394	27.4	4,578	18.0	36,228	19.1
Year Moved into Unit	1,406		24,993		184,850	
1965-1970	386	27.5	8,934	35.7	82,533	44.6
1950-1964	664	47.2	12,246	49.0	80,533	43.6
1949 or Earlier	356	25.3	3,813	15.3	21,784	11.8
Median Value, Owner Occupied ($)	9,700 in CT 4213 7,200 in CT 4214		11,700		17,500	
Median Contract Rent, Renter Occupied ($)	73 in CT 4213 76 in CT 4214		103		114	

[a]Census Tracts 4213 and 4214.

[b]Census data does not account for total population in this category. Percents shown reflect portion of that which is given.

SOURCES: 1) U. S. Bureau of the Census, Census of Population: 1970, Vol 1, Characteristics of the Population, Part 22, Maryland, U. S. Government Printing Office, Washington, D.C., 1973.

2) U. S. Bureau of the Census, Census of Housing: 1970, Vol. 1, Housing Characteristics for States, Cities and Counties, Part 22, Maryland, U. S. Government Printing Office, Washington, D.C., 1972.

3) U. S. Bureau of the Census, Census of Population and Housing: 1970, Census Tracts, Final Report PHC(1)-19 Baltimore, Maryland SMSA, U. S. Government Printing Office, Washington, D.C., 1972.

positions and less than 30 percent were in white collar occupations. This relative concentration of blue collar workers in the study area reflected the general orientation of the work force throughout Dundalk. In contrast, in Baltimore County less than 32 percent of its employed persons held blue collar positions and 59 percent were in white collar occupations. Unemployment in the study area was 2.6 percent in 1970, slightly lower than the Dundalk average of 3.3 percent but the same as the county average. While no recent estimates of unemployment levels for the study area are available, current estimates for Dundalk place the average rate at 8.8 percent in 1975 and 7.6 percent in June, 1976.[7]

Families residing in the study area generally lived in more modest circumstances than did those found elsewhere in Dundalk and Baltimore County. The average 1970 family income was $9,229 in the study area, $11,252 in Dundalk and $14,047 for Baltimore County. Nearly 9 percent of all families in the study area had incomes less than the poverty level. In contrast, only 4 percent of all families were similarly situated in Dundalk and 3.5 percent in Baltimore County.

Housing within the study area tended to be characterized by older structures, for 72 percent were constructed between 1940 and 1959 and 27 percent before 1940. Dundalk's structures were somewhat newer and in comparison over 30 percent of the units in Baltimore County had been built after 1959. Over 25 percent of the study area's dwelling units had been occupied by the same residents since 1949 or earlier, in contrast to Dundalk and Baltimore County in which 15 percent and 12 percent of the units respectively fell into that category. Unlike Dundalk and Baltimore County, the majority of the yearround dwelling units in the study area (65%) were renter occupied, with an overall vacancy rate of 1.4 percent in 1970. On the other hand, the housing stock in Dundalk and Baltimore County is heavily oriented toward owner occupancy. Rents and housing values are generally lower in the study area than in Dundalk and Baltimore County. The median rent in the study area was approximately $75 and the median housing value of owner occupied dwellings was $9,700 in Census Tract 4213 and $7,200 in Census Tract 4214. In contrast, median rents in Dundalk were $103 while the county median was $114. Median housing values in Dundalk were $11,700, with the county median substantially higher ($17,500).

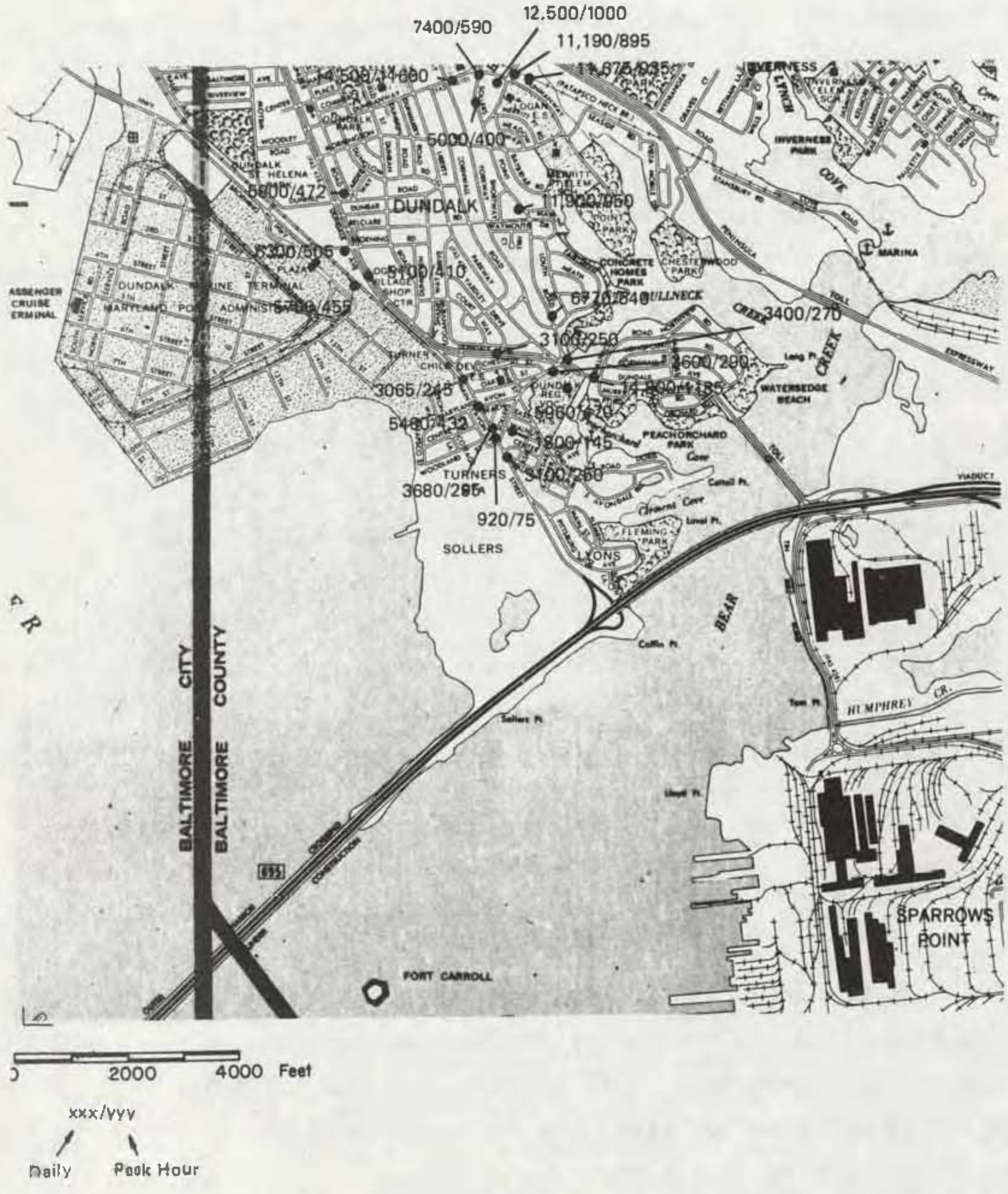


Figure 4.3-1 Current Traffic Volumes

Overcrowding appears to be a problem within the study area; the average population per occupied unit was 3.7 persons and nearly 24 percent of the units had more than one person per room. Comparative statistics for Dundalk averaged 3.4 persons with only 8 percent of the occupied units housing more than one person per room. In comparison Baltimore County had even less overcrowding, with an average of 3.3 persons per occupied unit and less than 5 percent of the residents living with more than one person per room.

4.3 Transportation

The transportation environment near the SNG facility is typical of an urban one, with fairly high street saturation and service by surface transit operations. In addition to these more conventional modes, extensive port facilities are nearby and are important in the overall transportation environment in the vicinity of the plant.

Access to the plant area is achieved primarily by motor vehicle. Major regional highways which provide access include Interstate 695 which circles the Baltimore metropolitan area and will pass adjacent to the SNG facility when the Outer Harbor Crossing Bridge is completed, and Interstate 95 which passes about 4.5 miles from the SNG facility. Other major access roads include Merritt Boulevard, Dundalk Avenue, and the Brooning Highway all of which run in a southerly direction toward the Sollers Point site. Many arterial roads provide reasonably good access from all directions.

Traffic Volumes

According to the Baltimore County Traffic Engineering Department,[8] there are few if any capacity problems in this area of Dundalk (for purposes of explaining the traffic situations, the area being presented consists of the area generally south of Dunmanway and Peninsula Toll Expressway). It was reported that this section's intersections operate at a level of service of C or better.[9] Furthermore, a TOPICS[10] plan of the area, (a program to improve road capacity and safety performed in 1973) did not show any capacity problems. The fairly low level of traffic congestion, despite a rather irregular street pattern, and in some cases narrow winding streets, may be attributed to the fact that the Sollers Point area has been a peninsula with no access to through traffic. Consequently, much of the traffic has been residentially generated. This should not be expected to change when the Outer Harbor Crossing opens in late 1976,[11] since all traffic bound for that facility will use the new access road which parallels Main Street. Access to the Outer Harbor Crossing is restricted.

Current traffic volumes are shown in Figure 4.3-1, representing annual average daily traffic and peak hour traffic. Studies have shown that the peak hour of traffic on these streets accounts for approximately 8 to 10 percent of the daily traffic.[12] Main Street, the road most affected by operations of the SNG facility, and currently the only access road to the plant, has an estimated peak hourly load of 250 vehicles at the nearest point for which counts are available. For even the most congested two-lane two-way streets with parking, this figure is probably well below the capacity. Dundalk Avenue, the nearest arterial with through traffic, carries about 1,185 vehicles in the peak hour, for both directions combined. Again, for a major arterial, this is considerably below capacity.

Parking

There is no public off-street parking near the site. On-street parking is available and is not metered in the residential areas. The closest meters are in downtown Dundalk.

Port Facilities

Currently there are major port facilities near the SNG facility on the Patapsco River. Dundalk Terminal is the closest, located adjacent to Sollers Point. There is a passenger cruise terminal located there, although no passenger lines currently service the area. The Maryland Port Administration operates all port facilities.

According to the Maryland Port Administration, Division of Marine Statistics,[13] the Dundalk Terminal had 1,156 ships dock in 1975 with a total short tonnage of 3,234,979.

Transit

The Sollers Point area is currently served by buses of the Metropolitan Transit Authority. Two bus lines run through or near Sollers Point. The main service is provided by Route 10 which originates in the northwest corner of Baltimore City and terminates at Sparrows Point at the Bethlehem Steel plant. Time between buses is about 6 to 7 minutes in peak periods, and about 14 minutes at other times.

The other route which serves the area is Route 4. This provides less direct service to Sollers Point, entering the area on Dundalk Avenue, crossing via Dunmanway to Sollers Point Road and rejoining Dundalk Avenue to cross to Sparrows Point. Service on this line is less frequent; time between buses is approximately 25 minutes during peak periods, and 30 minutes at other times.[14]

4.4 Ambient Air Quality

Air contaminant levels within an eight mile radius of the site of the SNG facility are high. The Sollers Point location is situated in a heavily industrialized portion of the Baltimore metropolitan region (Baltimore, Anne Arundel, Harford, Howard and Carroll Counties). Emissions from fuel burning, industrial processes as well as Baltimore Harbor shipping traffic are the primary causes of such air quality levels. Automobile trips generated by these various employment centers also contribute to these high air contaminant levels. Table 4.4-1 presents the levels of air contaminants measured on Sollers Point and compares them to federal and state air quality standards.[15,16] This table shows that in the immediate vicinity of the SNG facility only suspended particulates exceeded air quality standards. It is probable that the high levels of particulates were a result of construction taking place in the area. The air contaminants, SO_2, NO_2 and particulates, were measured at two locations, one on the site of the SNG facility and the other about one-half mile to the northeast. Measurements were performed by the state and BG&E, and the results shown are for 1975.[17,18,19,20]

In comparison, the maximum air contaminant concentrations recorded at six locations beyond Sollers Point but within an eight mile radius are shown in Table 4.4-2. The comparison of measurements at each of the

TABLE 4.4-1

MAXIMUM CONCENTRATIONS OF AIR CONTAMINANTS MEASURED ON SOLLERS POINT

Air Contaminant	Averaging Period	Concentration	National Ambient Air Quality Standards		State of Maryland Air Quality Standards	
			Primary	Secondary	Serious	More Adverse
Sulfur Dioxide (SO_2)	1-Hour	Not Available	-	-	920 $\mu g/m^3$	-
	3-Hour	Not Available	-	1,300 $\mu g/m^3$	-	-
	24-Hour	116 $\mu g/m^3$	365 $\mu g/m^3$	-	262 $\mu g/m^3$	-
	Annual (arithmetic mean)	33 $\mu g/m^3$	80 $\mu g/m^3$	-	79 $\mu g/m^3$	60 $\mu g/m^3$
Suspended Particulates (TSP)	24-Hour	270 $\mu g/m^3$	260 $\mu g/m^3$	150 $\mu g/m^3$	160 $\mu g/m^3$	140 $\mu g/m^3$
	Annual (geometric mean)	98 $\mu g/m^3$	75 $\mu g/m^3$	60 $\mu g/m^3$*	75 $\mu g/m^3$	65 $\mu g/m^3$
Settleable Particulates	Monthly	0.52 $mg/cm^2/mo$	-	-	1.0 $mg/cm^2/mo$	0.7 $mg/cm^2/mo$
	Annual (arithmetic mean)	0.31 $mg/cm^2/mo$	-	-	0.5 $mg/cm^2/mo$	0.35 $mg/cm^2/mo$
Carbon Monoxide (CO)	1-Hour	Not Measured	40 mg/m^3	-	40 mg/m^3	-
	8-Hour	Not Measured	10 mg/m^3	-	10 mg/m^3	-
Nitrogen Dioxide (NO_2)	Annual (arithmetic mean)	46 $\mu g/m^3$	100 $\mu g/m^3$	-	100 $\mu g/m^3$	-
Photochemical Oxidants	1-Hour	Not Measured	160 $\mu g/m^3$	-	160 $\mu g/m^3$	-
Hydrocarbons (HC)	8-Hour	Not Measured	160 $\mu g/m^3$*	-	160 $\mu g/m^3$*	-

*This is a guideline, not a standard.

TABLE 4.4-2

MAXIMUM CONCENTRATIONS OF AIR CONTAMINANTS MEASURED IN THE AREA SURROUNDING SOLLERS POINT

Air Contaminant	Averaging Period	Concentration	National Ambient Air Quality Standards: Primary	National Ambient Air Quality Standards: Secondary	State of Maryland Air Quality Standards: Serious	State of Maryland Air Quality Standards: More Adverse
Sulfur Dioxide (SO_2)	1-Hour	1,247 $\mu g/m^3$	-	-	920 $\mu g/m^3$	-
	3-Hour	541 $\mu g/m^3$	-	1,300 $\mu g/m^3$	-	-
	24-Hour	19[illegible] $\mu g/m^3$	365 $\mu g/m^3$	-	262 $\mu g/m^3$	-
	Annual (arithmetic mean)	5[illegible] $\mu g/m^3$	80 $\mu g/m^3$	-	79 $\mu g/m^3$	60 $\mu g/m^3$
Suspended Particulates (TSP)	24-Hour	405 $\mu g/m^3$	260 $\mu g/m^3$	150 $\mu g/m^3$	160 $\mu g/m^3$	140 $\mu g/m^3$
	Annual (geometric mean)	99 μ/m^3	75 μ/m^3	60 μ/m^3*	75 $\mu g/m^3$	65 $\mu g/m^3$
Settleable Particulates	Monthly	0.34 $mg/cm^2/mo$	-	-	1.0 $mg/cm^2/mo$	0.7 $mg/cm^2/mo$
	Annual (arithmetic mean)	0.23 $mg/cm^2/mo$	-	-	0.5 $mg/cm^2/mo$	0.35 $mg/cm^2/mo$
Carbon Monoxide (CO)	1-Hour	27 mg/m^3	40 mg/m^3	-	40 mg/m^3	-
	8-Hour	17 mg/m^3	10 mg/m^3	-	10 mg/m^3	-
Nitrogen Dioxide (NO_2)	Annual (arithmetic mean)	91 mg/m^3	100 $\mu g/m^3$	-	100 $\mu g/m^3$	-
Photochemical Oxidants	1-Hour	510 $\mu g/m^3$	160 $\mu g/m^3$	-	160 $\mu g/m^3$	-
Hydrocarbons (HC)	8-Hour	2,484 $\mu g/m^3$	160 $\mu g/m^3$*	-	160 $\mu g/m^3$*	-

*This is a guideline, not a standard.

six monitoring locations shows that those contaminants usually associated with motor vehicles, carbon monoxide, nitrogen dioxide, photochemical oxidants and hydrocarbons, were the highest in the center city area and near heavily traveled roads.

Particulate levels were high at Sollers Point and at Fort Howard. These monitors are probably influenced by activities on Sparrows Point which is between the monitor locations. More detailed information about the locations of monitors and the results obtained are presented in Appendix B.

Diffusion Climatology

The State of Maryland, located on the eastern or leeward side of the North American continent in the middle latitudes, is classified as having a temperate continental climate. Since the region is situated in the southern part of this general climatic type, it can further be categorized as a warm summer subtype. Thus, summer is characterized by warm humid weather owing to the influence of the Bermuda High, a subtropical high pressure system typically situated off the southeast coast of the United States during the warm season. Summer rainfall is primarily due to convectional showers and thunderstorms which develop in these maritime tropical air masses. Although the heaviest precipitation occurs in the summer, it is less dependable and more variable than in winter.

The southward migration of the upper level zonal westerlies during the winter season places the area on the boundary between continental polar air to the north and maritime tropical air to the south. Consequently, even though winter is relatively cold, periods when maritime tropical air overspreads the region are not uncommon. Winter precipitation is mainly frontal and cyclonic in origin. Low pressure systems which move through the Ohio River Valley and regenerate along the mid-Atlantic coast, and those that form along the Gulf coast provide much of this precipitation. Snowfall can be quite variable with lesser amounts along the coastal areas due to the warming influence of the Atlantic Ocean and with greater amounts inland over higher terrain. Fall and spring are the transition seasons. They are not only brief, but are also mainly composites of winter and summer types of weather.[21,22]

Climatological data from Baltimore-Washington International Airport adequately describe the meteorology of the study area, since the airport is located about 13 km to the southwest of the SNG facility site.[23] The five-year (1960-1964) wind rose, presented in Figure 4.4-1, shows that west winds occur most frequently (15.9%) followed by west-northwest (13.8%), northwest (8.2%) and west-southwest (7.1%) winds. This predominant westerly flow is a result of synoptic scale weather patterns rather than mesoscale phenomena. Average wind speeds decrease from a springtime maximum to a summertime minimum. The higher average wind speeds during spring tend to cause good atmospheric mixing due to mechanical turbulence generated by the wind flow over the underlying surface. Over the same five-year period (1960-1964) neutral stability conditions are the most frequent (49.4%) on an annual basis as shown in Table 4.4-3. Neutral stability occurs during cloudy, windy, or transitional conditions. The relatively high frequency of stable conditions (34.4%) can be attributed to the establishment of low-level nocturnal inversions. These conditions occur during clear nights with light winds and tend to inhibit vertical mixing. Unstable conditions (16.2%) are characterized by strong solar heating and light to moderate winds which result in thorough mixing of the lower atmosphere. Average monthly air temperatures range from a maximum of 76.8°F in July to a minimum of 34.8°F in January. Colder ambient air temperatures result in greater plume buoyance during winter than summer.

An Air Pollution Episode System is designed for the State of Maryland which establishes standards and procedures to be followed whenever pollution of the air has the potential of reaching an emergency condition. Episode criterion is subdivided into various stages depending upon the severity of the air stagnation causing the pollutant buildup; forecast stage, alert stage, warning stage and emergency stage.[24] Table 4.4-4 lists the declared air pollution alerts which affected the Baltimore metropolitan area in 1974, 1975 and 1976 (through August 15). These were issued from the State of Maryland Bureau of Air Quality and Noise Control.[25] The National Weather Service Forecast Office at Washington, DC issues air stagnation advisories and statements for the State of Maryland.[26] These statements may or may not lead to or be coincident with the air pollution episode in the Baltimore metropolitan area. Statements are issued for stagnation periods 24 hours or less in

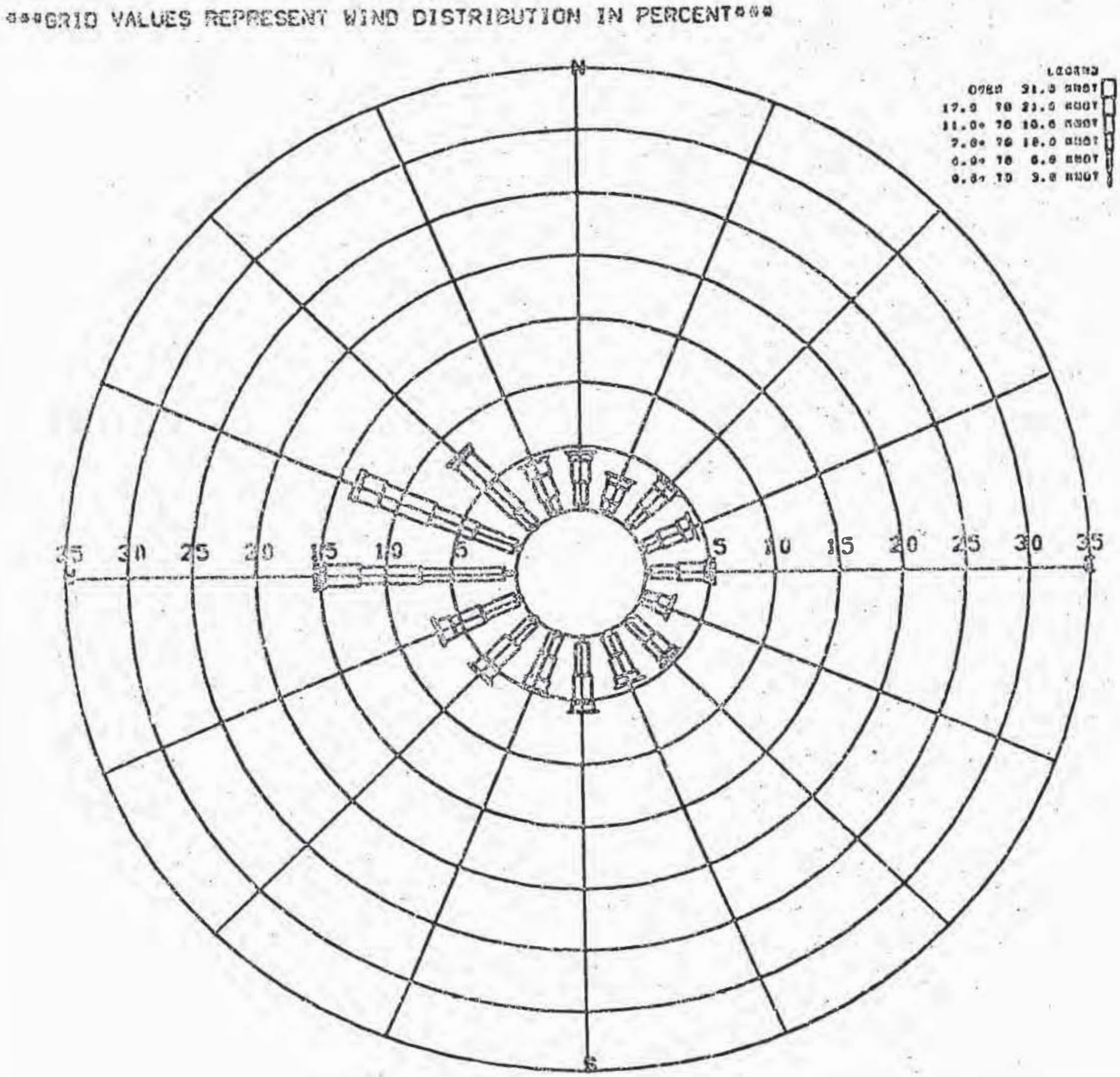


Figure 4.4-1 Annual Wind Rose, Baltimore Washington International Airport, 1960-1964

TABLE 4.4-3

DISTRIBUTION OF STABILITY CLASSES FOR
BALTIMORE WASHINGTON INTERNATIONAL AIRPORT DERIVED FROM
DATA TAKEN OVER A FIVE-YEAR PERIOD (1960-1964)

Stability Class	Frequency (%)
Unstable	16.2
Neutral	49.4
Stable	34.4

TABLE 4.4-4

AIR POLLUTION ALERTS DECLARED IN THE
METROPOLITAN BALTIMORE AREA FROM JANUARY 1, 1974
THROUGH AUGUST 24, 1976

Year	Month	Days	Pollutant
1974	July	08-11	Photochemical Oxidants
1975	June	24-26	Photochemical Oxidants
1975	July	30-	Photochemical Oxidants
1975	August	05	Photochemical Oxidants
1976	June	10-13	Photochemical Oxidants

length, and advisories when air stagnation periods 24 hours or less in lenth, and advisories when air stagnation persists longer than a day. Table 4.4-5 lists the statements and advisories issued for the State of Maryland in 1974, 1975 and 1976 (through August 27). It is important to note that only five of the 44 air stagnation advisory days occurred after October 1 and before May 1 (the season for operation of the SNG facility). Also, only ten of the 32 special statements issued fell in this operational season. Most important, none of the air pollution alerts declared in 1974, 1975 and 1976 (through August 24th) occurred during what is expected to be the SNG operational period.

4.5 Water Quality

The Baltimore Harbor where the SNG facility is located is generally divided into inner and outer portions by an imaginary line from Sollers Point to Hawkins Point. Since the facility lies on this imaginary boundary, baseline water quality has been reviewed for the entire harbor system.

Baltimore Harbor can be characterized as a brackish tidal embayment of the Patapsco River which discharges to the upper Chesapeake Bay south of Back River. As shown in Table 4.5-1, it is relatively shallow except for the navigation channels, which have an average depth of 40 feet.

Water quality within Baltimore Harbor and many of its tributaries is severely degraded due to various factors relating to metropolitan Baltimore's urban environment. Poor estuarine circulation is an added factor in the degradation of Baltimore Harbor waters. These problems are especially critical for the Inner Harbor, according to the following excerpt from the State of Maryland Department of Natural Resources 305(b) Report[27] on the Patapsco River subbasin.

> Inner Baltimore Harbor waters do not meet the dissolved oxygen (DO) nor the bacteria standard. The DO standard is not met at the 15-foot depth and below, and is not met at any depth in the Upper Middle Branch. DO is depleted because of strong oxygen demand by bottom sediments and restricted harbor circulation.

TABLE 4.4-5

AIR STAGNATION ADVISORIES* AND STATEMENTS* DECLARED FOR MARYLAND FROM JANUARY 1, 1974 THROUGH AUGUST 30, 1976

Year	Air Stagnation Advisory Month/Day-Month/Day	Air Stagnation Statement Month/Day		
1974	7/8 - 7/11	7/18		
	9/10- 9/11	7/19		
	10/30-11/1	9/9		
		12/6		
		12/11		
1975	6/24- 6/25	1/23	7/3	11/6
	7/23- 7/25	1/24	7/10	11/25
	7/29- 8/5	5/29	7/28	12/12
	11/19-11/20	6/18	8/13	12/17
		6/19	8/29	
1976	4/19- 4/21	1/19	6/15	8/6
	6/9 - 6/12	4/16	6/28	8/23
	6/29- 6/30	5/27	7/15	8/24
	7/6 - 7/7	5/28	7/28	
	7/19- 7/22	6/8	7/29	
	8/1 - 8/5			
	8/11- 8/14			
	8/25- 8/27			

*Statements are issued for air stagnation periods less than or equal to 24 hours in length. Advisories are issued for air stagnation periods greater than 24 hours in length.

TABLE 4.5-1

PHYSICAL CHARACTERISTICS OF BALTIMORE HARBOR-PATAPSCO RIVER

Area	- 34 square miles	Mean Tidal Range	- 1.1 feet
Mean Depth	- 15.8 feet	Mean Tidal Velocity	
Volume	- 15×10^9 ft^3	at Mouth	- 0.26 FPS
Length	- 10 miles	at Sollers Point	- 0.098 FPS

Source: Garland, C.F., A Study of Water Quality in Baltimore Harbor, State of Maryland Board of Natural Resources, 1952

Interestingly, conditions in the outer harbor are somewhat better except in the vicinity of Sollers Point. Bear Creek bottom waters and those of Stonehouse Cover do not meet standards for dissolved oxygen (DO). The 305(b) report defines possible sources of Baltimore Harbor's problems as follows:

- STP (Sewage Treatment Plant) wastes from Baltimore City's Patapsco River plant (Inner Harbor)
- STP wastes from Anne Arundel County's Cox Creek plant (Outer Harbor)
- Wastes from Back Creek STP via Bethlehem Steel Company's process water (Outer Harbor)
- Urban runoff from Baltimore City
- Toxic chemicals from industries
- Overflowing sewers and septic tank effluents
- Wastes from ships and boats including oil spills

Discharges from the above sources have resulted in three particular problems for Baltimore Harbor. The first involves the accumulation of polychlorinated biphenyls (PCB's) and chlorinated hydrocarbons (CHC's) in bottom sediments and aquatic life. A second problem results from discharges of inorganic toxicants from several industries abutting Baltimore Harbor. A third involves nutrient enrichment of harbor waters resulting from nonpoint urban sources.

The accumulation of PCB's and CHC's in Baltimore Harbor waters, sediments and aquatic life has recently been studied by a consortium of private firms and local universities for the Maryland Department of Natural Resources.[28] A quantitative summary of their findings is provided in Table 4.5-2. As shown in Table 4.5-3, these values are 5 to 10 times as great as the maximum levels found in the upper Chesapeake Bay.

The use of DDT and Chlordane has been banned (1972 and 1975, respectively). These compounds were associated with agricultural use as pesticides, although their use in an urban environment was also prevalent.

TABLE 4.5-2

MAXIMUM CONCENTRATIONS OF PCB's, CHLORDANE AND DDT IN BALTIMORE HARBOR

	Concentration in Bottom Sediments (ppm)	Concentration in Suspended Sediments (ppm)	Recommended Maximum Concentrations in Water (μg/ℓ)[1]
PCB	3.7	3.8	0.01
Chlordane	0.082	0.34	0.05
DDT	0.19	0.30	0.003

[1]Recommended concentrations for the maintenance of fresh and aquatic life as developed by the U.S. EPA in Quality Criteria for Water, 1975. No standards have been established for concentrations in bottom or suspended sediments. It should be noted that the production (and hence, discharge) of Chlordane and DDT is banned.

Source: Department of Natural Resources, Upper Bay Survey, State of Maryland, Water Resources Administration, 1975.

TABLE 4.5-3

MAXIMUM CONCENTRATIONS OF PCB'S CHLORDANE AND DDT IN UPPER CHESAPEAKE BAY

	Concentration in Bottom Sediments (ppm)	Concentration in Suspended Sediments (ppm)	Recommended Maximum Concentrations in Water (μg/ℓ)[1]
PCB	0.28	0.92	0.01
Chlordane	0.0052	0.061	0.05
DDT	0.051	0.057	0.003

Source: Department of Natural Resources, Upper Bay Survey, State of Maryland, Water Resources Administration, 1975.

PCB's are currently used as industrial chemicals and their existence in Baltimore Harbor waters are either directly or indirectly a result of industrial discharges.

Nutrient levels in Baltimore Harbor have been found to be insufficient quantities to support algal growth. Average values, by season, for the 1969 through 1971 survey are shown in Table 4.5-4.

Another indicator of the state of eutrophication of Baltimore Harbor is the concentration of chlorophyll a in harbor waters. The above-mentioned survey indicated levels as would be expected from the data in Table 4.5-4. Highest values (25 to 60 μg/ℓ) were found in the summer months of August and September.

The accumulation of heavy metals in urban harbors and estuaries of the eastern United States is relatively well documented. A study by Wapora, Inc.[29] in 1971 found excessively high levels of metals in Baltimore Harbor sediments in the vicinity of Sollers Point as shown in Table 4.5-5. Pollutant levels, such as are indicated in Table 4.5-5 prohibit any diverse benthic life. Only the most durable species can live at such concentrations.

A more recent report addresses heavy metal concentrations in the waters of Baltimore Harbor. The concentrations presented in Table 4.5-6 are based on the mass loadings of various sources and the steady-state hydrology of Baltimore Harbor. The estimates have been compared to recommended EPA limits for the marine aquatic environment. These data show that although Bear Creek does not constitute a hazard to marine life, its water quality approaches levels which constitute a minimal risk. It should be emphasized that these data are only estimates and are not observed values. The quality of the waters off Sollers Point would lie between that of Bear Creek and the Inner Harbor.

4.6 Noise Levels

Sound measurements were made in the Sollers Point area by Lewis Goodfriend and Associates for BG&E.[30] These measurements were made in 1975 in relation to activities at the Riverside power plant. They were taken to demonstrate ambient sound levels at various times of the day at nine different locations during different types of operation taking place at the Riverside power plant. Since these measurements are in the

TABLE 4.5-4

AVERAGE NUTRIENT CONCENTRATIONS IN BALTIMORE HARBOR 1969-1971

Season	Nitrite-Nitrate Nitrogen (mg/ℓ)	Ammonia Nitrogen (mg/ℓ)	Organic Nitrogen (mg/ℓ)	Total Phosphate Phosphorus (mg/ℓ)
Spring	0.56	0.68	0.75	0.17
Summer	0.18	0.73	0.67	0.14
Fall	0.12	0.73	1.06	0.09
Winter	0.40	0.90	1.85	0.22

Source: Department of Natural Resources, 305 (b) Report, State of Maryland, Water Resources Administration, 1975.

TABLE 4.5-5

SEDIMENT ANALYSIS FOR BALTIMORE HARBOR

Parameter	% Dry Weight
Volatile Solids	8.50
COD (Chemical Oxygen Demand)	25.90
TKN (Total Kjeldhal Nitrogen)	0.22
Oil-Grease	0.45
Mercury ($X10^{-5}$)	0.41
Lead	0.10
Zinc	0.17
Cadmium	0.017
Chromium	0.15
Copper	0.02

Source: Wapora, Inc., Baltimore Gas & Electric Company, Proposed Dredging Project, 1971.

TABLE 4.5-6

ESTIMATED CONCENTRATIONS OF HEAVY METALS IN BALTIMORE HARBOR AND EPA RECOMMENDED LIMITS

	Curtis Bay (µg/ℓ)	Inner Harbor (µg/ℓ)	Bear Creek (µg/ℓ)	EPA Recommended Limit (µg/ℓ)	
Antimony	-	0.01	2.8	200[a]	-[b]
Arsenic	-	0.007	0.9	50	10
Cadmium	-	0.001	0.19	10	0.2
Chromium	0.01	0.0003	9.7	100	50
Copper	0.23	0.001	1.7	50	10
Iron	0.01	-	32.8	300	50
Lead	0.003	0.0006	2.9	50	10
Mercury	-	-	0.01	0.1	-
Nickel	0.01	0.01	1.17	100	2
Tin	-	-	0.003	-	-
Zinc	0.004	0.004	29.6	100	20

[a] Concentration which constitutes a hazard to the marine environment.

[b] Concentration which constitutes a minimal risk of deleterious effects.

(Metals concentrations are based on complete mixing and daily inputs).

Sources: Quirk, Lawler & Matusky, Engineers, Water Quality of Baltimore Harbor, Maryland Environmental Service, August 1973.

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vicinity of the SNG facility, they are representative of the ambient noise environment which will be influenced by the SNG facility. The nine locations of noise measurements are shown in Figure 4.6-1.

The results of this study are presented in Table 4.6-1. This table shows that background levels of noise are equal to or above Maryland's day-night noise standard. (The background level does not include any noise from operations of the Riverside power plant.)

The noise measurements were made in early July and early November of 1975 during both the day and night during three distinct operating conditions of the Riverside power plant:

- No power plant operations (July-daytime and nighttime),
- Steam plant in operation (November-daytime and nighttime),
- Only gas turbines in operation (July-nighttime).

The results of the noise surveys were reduced to statistical sound levels commonly used in assessing community noise impact; namely L_{10}- the noise level exceeded 10 percent of the time, (the so-called "intrusive" noise level); L_{50}- the median level, exceeded 50 percent of the time; and L_{90}- (the "background" level, exceeded 90 percent of the time.

Community noise standards promulgated by the State of Maryland are expressed, however, in terms of the "day-night average sound level" (L_{dn}) defined as the 24 hour average sound level with the noise occurring between the hours of 10:00 PM and 7:00 AM considered as being 10 decibels higher than the actual noise level recorded during that time. Current Maryland standards, by zoning district, are as follows:[31]

Zoning District	Maximum Allowable Day-Night Sound Level (L_{dn})
Residential	55 dBA
Commercial	64 dBA
Industrial	70 dBA

Day-night levels for the nine monitored locations were estimated from the L_{10}, L_{50} and L_{90} levels provided by Goodfriend. These estimates, given in Table 4.6-1, indicate that L_{dn} levels in both the East

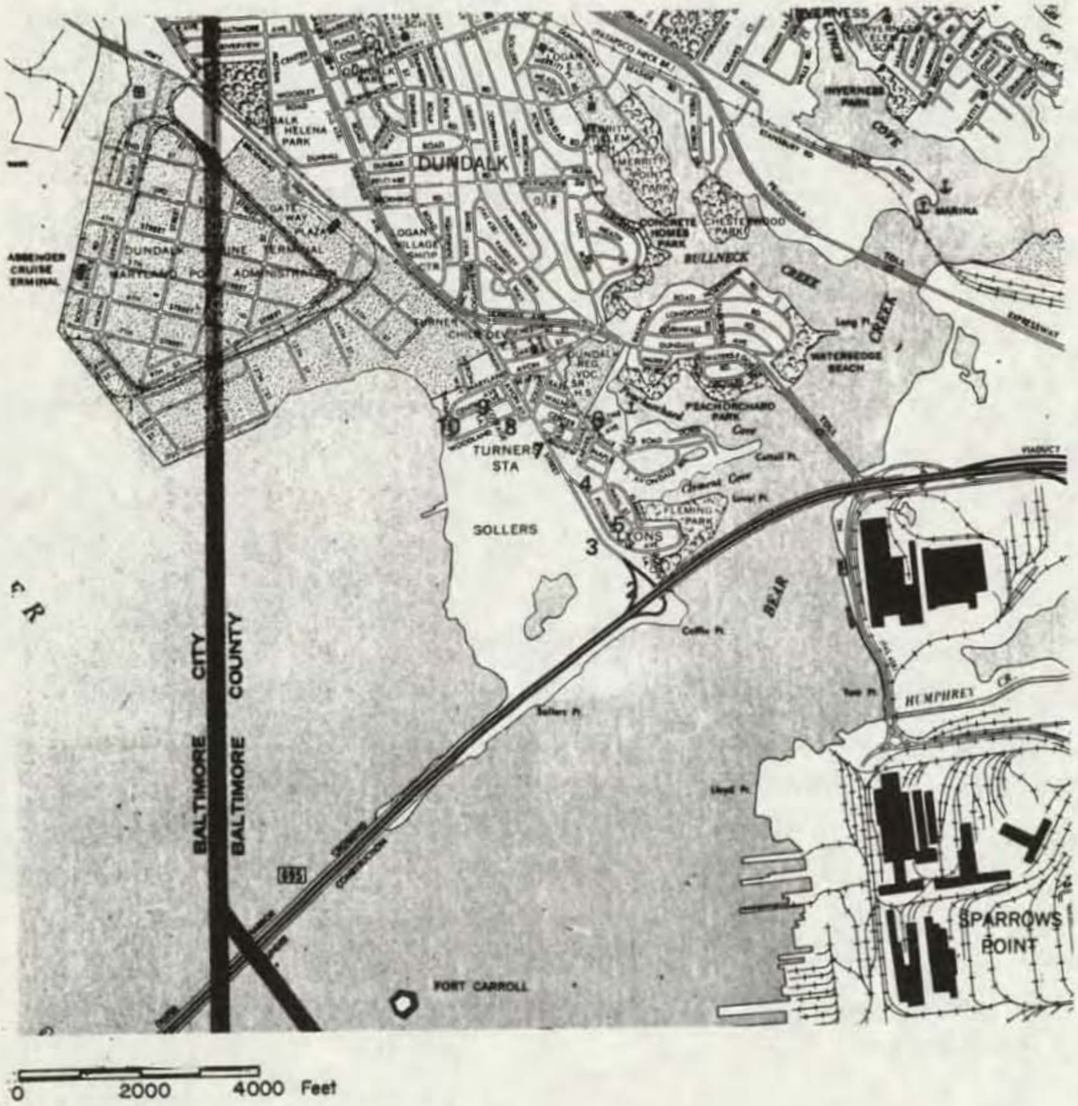

Figure 4.6-1 Locations of Noise Measurements

TABLE 4.6-1

EXISTING (1975) EQUIVALENT AND AVERAGE DAY-NIGHT NOISE LEVEL ESTIMATES IN THE SOLLERS POINT IMPACT AREA

Site Number	Location	Approx. Distance from Nearest Point of Riverside Plant (ft.)	Land Use Designation	Maryland L_{dn} Standard	Mean Day-Night (L_{dn}) Noise Levels: Steam Plants & Turbines Not Operating (Background)	Mean Day-Night (L_{dn}) Noise Levels: Steam Plants Only[a]	Mean Day-Night (L_{dn}) Noise Levels: Turbines Only[b]	Mean L_{eq} Noise Levels: Steam Plant & Turbines Inoperative (Background)[a,c] Day	Steam Plant & Turbines Inoperative (Background)[a,c] Night	Steam Plant Only Day	Steam Plant Only Night[a]	Turbines Only Nighttime Only[b]
2	S.E. end of Main St.	600	Res.	55	51	58	54	48	44	53	51.5	47
3	Main St. & Breckenridge Dr.	IA	Util.	70	55	62	61	54	47	59	55	53
4	New Pittsburgh Ave, entrance to Lyon Homes Development	100	Res.	55	56	61	62	53	48	55	54.5	54
5	Parking lot - N.E. side of New Pittsburgh Ave.	150	Res.	55	54	61	61	51	46	58	53.5	53
6	Avondale Rd. & Walnut Ave.	350	Res. Inst.	55	57	60	63	55	48	60	51	55
7	Main St., across from Balnew & Ash intersection	IA	Util.	70	57	63	62	55	48	60	56	54
8	Woodland & Falcon Way	IA	Util.	64	55	64	58	52	48	55	58	51
9	Cottage Ave & Centre Ave.	150	Res.	55	56	62	56	54	48	56	56	48
10	Patapsco & Centre Ave.	150	Res.	55	54	64	62	53	45	52	58	53

Res. = Residential
Rec. = Recreational
Com. = Commercial
Util. = Utility (Industrial)
Inst. = Institutional
IA = Immediately adjacent

[a] 10:00 PM - 7:00 AM noise levels are approximately 12M-6:00 AM measurements.

[b] 10:00 PM - 7:00 AN noise levels are approximated by 8:45 PM-12M measurements. Daytime leg with turbines operating are estimated by assuming that the difference between day and night leg is the same with the turbines operating as with both turbines and steam plants inoperative.

[c] Daytime conditions: Unit 2 at 30 Mw and Unit 5 at 50 Mw; Nighttime conditions: Units 2 and 5 at 10 Mw each.

Source: Lewis S. Goodfriend & Associates, Community Noise Impact Study for Sollers Point, Dec. 22, 1975

Turners and West Turners residential areas are at or just above the Maryland standard of 55 dBA when neither the gas turbines nor the steam plant is operating. Standards in both these neighborhoods were exceeded by 5 to 10 decibels during the noise measurement program when the Riverside power plant was operating. Noise levels monitored at the nonresidential sites satisfied Maryland criteria during all three conditions of power plant operation.

Average sound levels (L_{eq}) for the individual monitoring periods are also shown in Table 4.6-1. The figures indicate that:

- Background nighttime noise levels average 4 to 8 dB less than background daytime levels.
- During the day, noise levels are elevated above background levels by 5 dB or less, at most sites, as a result of steam plant operation.
- At night, noise levels are elevated above background levels by 7 to 10 dB as a result of steam plant operation.

4.7 Terrestrial Ecology

The 101 acre site includes a 13 acre freshwater pond, 17 acres of tidal marsh and approximately a 24 acre area that has been disturbed by construction. The remaining acreage is generally open area. No detailed field surveys were conducted since the construction activities which usually create most of the environmental impacts have already been completed. Species that have a potential to inhabit the site were identified based on lists of species found in the Baltimore metropolitan area and on maps showing areas where the species are likely to live. The terrestrial species which could inhabit the site are those which are common to highly urbanized ecological systems. Three species which are rare and endangered could inhabit the site.

One way to characterize the ecological conditions of the site is to identify the vegetation productivity of the various soil types. Wildlife and wildlife habitat are in turn related to the soil productivity. The seven types of soils on the site are described in Section 4.9 of this report. The suitability of these soils for providing elements necessary of wildlife habitat and for classes of wildlife is presented in Table 4.7-1.

TABLE 4.7-1

SUITABILITY OF THE SOILS FOR ELEMENTS OF WILDLIFE HABITAT AND FOR CLASSES OF WILDLIFE

Site Soil Series and Map Symbols	Elements of Wildlife Habitat: Grain &[1] Seed Crops	Grasses &[2] Legumes	Wild Herbaceous Upland Plants[3]	Hardwood[4] Woody Plants	Coniferous[5] Woody Plants	Wetland Food[6] & Cover Plants	Shallow Water[7] Developments	Classes of Wildlife: Open-land[8]	Woodland[9]	Wetland[10]
Barclay	Fair	Fair	Good	Good	Poor	Fair	Fair	Good	Fair	Fair
Mattapex										
silt loam (0-2% slope)	Fair	Good	Good	Good	Poor	Poor	Poor	Good	Good	Poor
silt loam (2-5% slope)	Fair	Good	Good	Good	Poor	Not Suited	Not Suited	Good	Good	Not Suited
urban land complex	--	--	--	--	--	--	--	--	--	--
Made Land	--	--	--	--	--	--	--	--	--	--
Othello	Poor	Fair	Fair	Good	Fair	Not Suited	Not Suited	Good	Good	Not Suited
Tidal Marsh	Not Suited	Not Suited	Not Suited	Not Suited	Not Suited	Good	Poor	Not Suited	Not Suited	Fair

1. Grain and seed groups - seed producing annuals, such as corn, sorghum, wheat, oats, cornpeas and other plants commonly grown for grain or seed.
2. Grasses and legumes - domestic grasses and legumes that are established by planting, such as bluegrass, fescue, brome, clover, alfalfa.
3. Wild herbaceous upland plants - perennial grasses and weeds that generally are established naturally, such as bluestem, quackgrass, goldenrod, wild carrot, and dandelion.
4. Hardwood woody plants - trees, shrubs, and woody vines that produce nuts or other fruits, buds, catkins, twigs or foliage that are a source of food for wildlife. Generally, they are established naturally but can be planted. Among the native species are oak, cherry, maple, poplar, sassafras, huckleberry, sweetgum, suburnium and brier.
5. Coniferous woody plants - cone-bearing evergreen trees and shrubs that are used by wildlife primarily as cover, though they also provide _____ and seeds. Among these are Virginia pine, lablolly pine, pond pine, red cedar and Atlantic white cedar. The plants are established naturally in areas cover of woods and sod is thin.
6. Wetland food and cover plants - wild, herbaceous, annual and perennial plants that grow on moist to wet sites, such as smartwood, wild millet, bulrush, sedges, pondweed, duckweed, waterwillow, wetland grasses and cattails.
7. Shallow-water developments - impoundments or excavations that provide areas of shallow water near food and cover for wetland wildlife. Examples are shallow dugouts, level ditches and marshes where water is kept at a depth of 6 to 24 inches.
8. Open-land wildlife - such as quail, pheasant, meadowlark, dove, cottontail rabbit, and woodchuck.
9. Woodland wildlife - such as ruffed grouse, woodchuck, thruch, grey squirrel, raccoon, and wild turkey.
10. Wetland wildlife - such as ducks, geese, rails, herons, shore birds and muskrat.

Source: U.S. Department of Agriculture, Soil Conservation Survey, Soil Survey, Baltimore County, Maryland, 1976.

Soils rated good can provide wildlife habitat with little attention; soils rated fair can provide wildlife habitat, but good management and frequent attention are required; soils rated poor can provide wildlife habitat but management is difficult and expensive, and intensive attention is required.

Table 4.7-1 indicates that wildlife habitat can be developed or maintained on the site. It should be recognized that the majority of land within the site was not rated for its suitability since it consists of land fill or it has been disturbed by construction activities.

In order to identify mammal, bird and reptile species which could inhabit the site lists of these animals were prepared from species' checklists available from resource areas in the metropolitan Baltimore area. These lists also show the potential of having each animal on the site. These lists are contained in Appendix C.

A list of endangered species of mammals, amphibians and reptiles has been prepared in accordance with the Maryland Wildlife Conservation Regulation 08.03001 (1972). Bird species on the Federal Endangered Wildlife List are also protected within the state. Of those animals listed in Appendix C, only the Eastern Tiger Salamander (Ambystoma tigrinum), the Bald Eagle (Haliaeetus leucocephalus) and the Peregrine Falcon (Falco peregrinus) are endangered.

4.8 Aquatic Ecology

The major offsite aquatic system that could be affected by the SNG facility is the Patapsco River in the vicinity of Bear Creek. Onsite aquatic systems consist of a 13 acre freshwater pond and 17 acres of tidal marsh.

The water quality of the Patapsco River, which is part of the Baltimore Harbor system, is degraded as shown by the distribution and abundance of aquatic organisms. Only 31 species of invertebrates were found to be inhabiting the bottom sediments of Baltimore Harbor compared to 51 at control sites in the Chester River which is relatively unpolluted.[32] No gastropods (snails) were found in Baltimore Harbor, although suitable habitats for snails were observed. Likewise, the oyster Crassastrea virginea and clam Gemma gemma were not found but normally would be expected to occur. Their absence has been attributed to environmental factors rather than overfishing because shellfish farming is no longer practiced in the Patapsco River.

Annelids (worms) dominated the benthic fauna of Baltimore Harbor and were most abundant in areas with high concentrations of decaying organic matter.[33] The greatest concentrations of the annelid Lirnnodrilus, an indicator of excessive organic enrichment, were found in Bear Creek which is adjacent to the east side of the Sollers Point SNG facility.[34] Lipson and Miller found that much of the bottom sediment in Baltimore Harbor was composed of black silt and clay having the appearance and odor of petroleum.[35]

Baltimore Harbor sediments have been classified as semi-healthy, semi-polluted and polluted on the basis of the distribution and abundance of organisms (benthos) inhabiting the sediments.[36] The Patapsco River was classified as a semi-polluted transition zone where many species, especially crustaceans and mollusks, were incapable of surviving. Dramatic decreases in the diversity and abundance of benthic organisms occurred in Bear Creek which was classified as a polluted area.[37]

The blue crab (Callinectes sapidus), a commercially important species of the Chesapeake Bay region, has declined in importance in the Patapsco River as the result of its unattractive appearance and unpalatability. Many crabs are covered with a black petroleum-like substance. It was found that lower blue crab populations in the inner harbor are indicative of degraded water and sediment quality.[38]

Investigation was conducted of the impact of pollution in Baltimore Harbor on the spawning and development of fish.[39] A total of seventeen adult species were found including river herring, bay anchovy, naked goby, silversides, white perch and others. The absence of eggs and presence of a limited number of larvae and juveniles indicates that the Baltimore Harbor is not a significant spawning and nursery habitat because of poor water quality.

Polluted bottom sediments were found to be a factor inhibiting reproductive success of the hogchoker which was absent from Baltimore Harbor. An absence of bottom fish in Baltimore Harbor was noted which was attributed to heavily polluted bottom sediments.[40]

A survey conducted by the Maryland Department of Natural Resources (1970-1975)[41] revealed that hickory shad was the only species of fish to inhabit the waters immediately adjacent to the SNG facility. Appendix D contains lists of invertebrate organisms and fish species found in Baltimore Harbor and the Patapsco River.

In July 1976, personnel from the Environmental Research and Technology, Inc. visited the plant site and inspected the freshwater pond and saltwater marsh. They found that the pond is eutrophic as evidenced by massive algal blooms and an odor characteristic of organic decay. Grassy drainage areas surrounding the pond may be a source of nutrients to the pond. The pond is shallow (3 feet deep) and stagnant (with no inlets or outlets) which are conditions favorable to excessive algal growth. Fish were not observed in the pond, although field investigations were not performed to verify these observations.

The tidal marsh on the plant site is probably affected by the generally polluted condition of the adjacent rivers and bottom sediments. It is not expected to support the full range of aquatic organisms found in a healthy saltwater marsh habitat.

4.9 Geology and Soils

Physiography

The Maryland Geologic Survey has provided the following geologic description of the site:[42]

> The site is comprised of the sand facies of the Patapsco Formation within the Potomac Group. This Lower Cretaceous facies is the result of both point and channel bar deposition from a local river during that time (110-130 million years ago). The deposit consists of medium to fine grained quartz sand 0.5 to 30 meters thick. Potentially present in this deposit is ferruginous cementation as ledges or pods within the sand.

Topography

The site is flat and level and lies at an elevation of about 10 feet above mean sea level.

Soils

Seven different types of soils are on the site. These soils and their approximate acreage are as follows: tidalmarsh - 17 acres; Mattapex silt loam (0-2% slope) - 15 acres; Mattapex silt loam (2-5% slope) - 17 acres; Mattapex urban land complex - 29 acres; Othello silt loam - 3 acres; Made land - 3 acres; Barclay - 3 acres. A soils map of the site is shown in Figure 4.9-1. The various soils found on the site are described below:[43]

Tidal marsh consists of areas covered regularly by tidal water. The soils range from sand to clay and in some areas, it is peaty or mucky. Most areas have a high salt content, but a few are brackish. The vegetation is marsh grass, sedges, salt-tolerant herbs, and low shrubs.

The Mattapex series of soils consists of deep, moderately well drained, nearly level to gently sloping soils on uplands of the Coastal Plain. They are fairly easy to work, but at times in the spring are not dry and do not warm soon enough for early planting. Artificial drainage is needed for some crops, especially in the more level areas. These soils are strongly acidic to very acidic and have a high available moisture capacity. Permeability is moderately slow and seasonal wetness and impeded drainage impose moderate to severe limitations for many nonfarm uses. Erosion is a moderate hazard in sloping areas. The native vegetation are mixed hardwoods that tolerate wetness.

Mattapex silt loam soils are moderately productive and present no major limitation for woodland management.

Mattapex Urban Land complex consists of soils of the Mattapex series which have been graded, cut, filled, or otherwise disturbed for nonfarm uses. In about 40 percent of this complex, the soils have been covered by as much as 18 inches of fill material or have as much as two-thirds of the original profile removed by cutting or grading. Except where fill materials are deep, seasonal wetness limits the suitability of this complex for building sites, septic

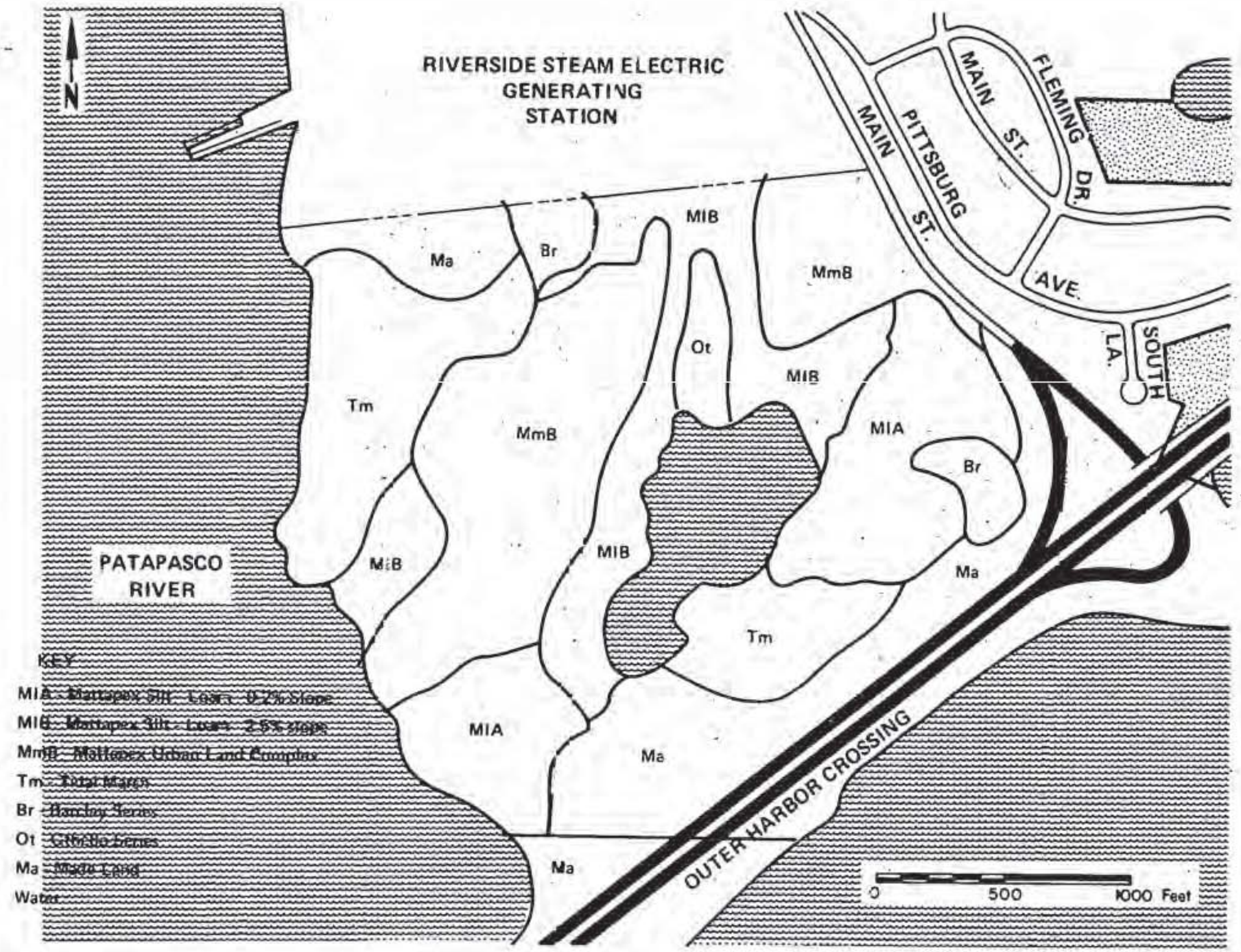

Figure 4.9-1 Map of Soils on the Site

tanks, and other nonfarm uses. The soil materials and most fill materials are fairly suitable for lawn grasses, ornamental shrubs and other vegetation.

Othello silt loam series consists of deep, poorly drained soils underlaid by older sandy sediments. The native vegetation are wetland hardwoods, mostly oak, sweetgum, blackgum, red maple and holly. This soil type is not difficult to work at a favorable moisture content, but should not be worked when the water table is near the surface. These soils have a high available moisture capacity, and range from very strongly to extremely acidic throughout. Permeability is moderately slow. Artificial drainage is needed for most crops and other non-farming uses.

Made land (Ma) consists of land areas that have been created by man, usually composed of industrial wastes, mostly clay and cinders, spoil material from excavations or hydraulic fill from harbor and channel deeping. Some industrial wastes, incinerator ash, and miscellaneous solid garbage wastes have been covered by hydraulic fill, especially in areas that were originally tidal marshes. Large areas of this land have been used for industrial sites, miscellaneous buildings, and railroad yards.

Barclay soils are fairly easy to work where moisture content is favorable, but they commonly are wet for long periods. Permeability is moderate and water moves fairly readily through the surface and subsoil. The water table is fairly close to the surface, and in places it is at the surface for short periods. Artificial drainage is needed for most common crops, and soils have a moderate to severe limitation for many nonfarm uses.

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5. ENVIRONMENTAL IMPACT OF THE PROPOSED ACTION

This section describes the impacts that may be anticipated as a result of the Federal Energy Administration's action of granting the requested naphtha allocation. Most of the impacts are directly related to operation of the Sollers Point SNG facility (SNG facility) which is dependent on the FEA's action. Since the SNG facility is already built, construction related effects are not addressed.

5.1 Land Use Impacts

The operation of the SNG facility should have no adverse land use impacts. The use of the site is compatible with current zoning and land use plans. The plant should not induce growth locally or change adjacent land use patterns. Views of the site from sensitive land uses such as recreational facilities are well screened. Furthermore, there are no historic sites in the vicinity of the SNG facility with the exception of Fort Carroll, which is located in the harbor, approximately 1.1 miles away. Views from this land use already encompass a variety of similar industrial land uscs. Moreover, the presence of the Outer Harbor Crossing should serve as a screen and prevent a significant portion of the SNG facility from being seen from Fort Carroll. The following sub-sections describe in more detail the results of the land use analysis.

Compatibility with Land Use Plans and Ordinances

The SNG facility is designated by Baltimore County as being within a heavy manufacturing zoning district, MH-IM. According to Mr. Eric DiNenna, Zoning Commissioner of Baltimore County, an SNG facility is a permitted use within this zoning district.[1] Therefore, the use of the site for the manufacturing of synthetic natural gas is consistent with local zoning regulations.

Three land use plans have been identified which delineate the SNG site as being within their respective "planned areas." These include the Baltimore County Comprehensive Plan (1975); the Baltimore Harbor Plan (1975) and; the Maryland Outdoor Recreation and Open Space Plan

(1974). The latter two plans have no identifiable uses proposed for the SNG site. Therefore, the use of the site is compatible with these two plans.

The Baltimore County Comprehensive Plan (1975) represents the 20-30 year land use objectives of Baltimore County.[2] This long-range plan identifies the SNG site as being preferably reserved for industrial purposes. The SNG facility is thus considered compatible with the County's plan.

In conclusion, the SNG facility is consistent with all relevant and applicable land use plans which have bearing upon the use of the plant site. In all instances, there are either no specific uses designated or the site is identified as being best reserved for industrial or heavy manufacturing activities.

Effect on Adjacent Land Uses

An evaluation of the long-term adjacent land use impacts associated with the operation of the SNG facility has considered two factors: (1) to what extent will the facility result in induced or secondary growth locally and regionally, and (2) to what extent will the facility potentially affect adjacent property values.

The analysis of the induced growth question must begin by reviewing the various factors upon which location decisions are made. According to noted location specialists such as William Alonso, Walter Isard, Edgar Hoover and Chauncy Harris,[3] industrial location decisions are primarily determined by such factors as the distance to markets, labor, raw materials or transportation facilities. Given these considerations, the presence or absence of an SNG facility seemingly does little to change the inherent attractiveness or unattractiveness of an area as an industrial location, except at the margins. Even for energy dependent industries such as aluminum manufacturing, there is no particular incentive to locate near an SNG facility, for gas rates are regulated statewide. As a result, there is no cost advantage associated with proximity to a particular energy source. Moreover, Baltimore Gas and Electric Company's (BG&E's) service area extends over a multicounty area which encompasses some 590 square miles. Consequently, any residential, commercial or industrial growth that does occur, and which can be tied directly to the presence of the SNG facility, will likely be dispersed throughout this large service region. As a result, secondary growth impacts related to the operation of the SNG facility are expected to be minimal, since concentrated growth in any one location is not likely to occur.

While the SNG facility is unlikely to induce growth to any particular area, the possibility does exist that the operation of such a facility may have a negative impact upon adjacent residential areas, particularly the East Turners and Lyons neighborhoods which are situated north of Main Street in Dundalk. The degree of impact is difficult to determine because of the many factors which determine the demand for, and price of residential land.

Eugene Brigham writes in his article entitled, "The Determinants of Residential Land Values," that since "the supply of land is fixed, land value is determined by the demand for space."[4] Based on his study of Los Angeles County, Brigham concludes that,

> ...the demand function for any site in any given metropolitan area is a function of the site's accessibility, amenity level, topography, certain quantitative phenomena that may be considered 'historical accidents,' and the value of land in non-urban uses.[5]

In a study by Kain and Quigley, it was found that 60% of the variation in housing values in St. Louis were attributable to five factors:[6] (1) basic residential quality which measures "the overall condition of the structure and the parcel, the amount and quality of landscaping, the cleanliness of the sample parcel and blockface, and the condition of streets, walks, and driveway";[7] (2) dwelling unit quality which measures "the physical condition and housekeeping of the interior of the sample dwelling units";[8] (3) quality of proximate properties which measures "the cleanliness, landscaping, and condition of nearby properties";[9] (4) nonresidential use which reflects "the effect of the nonstructural characteristics such as noise, smoke, and traffic as well as the proportion of property on the block devoted to nonresidential use";[10] and (5) average structural quality which measures "the overall quality of structures on the blockface."[11]

These two studies illustrate the range of considerations which influence residential demand and housing values. Although the presence of a major industrial facility such as an SNG facility may negatively affect residential land use decisions through lowering neighborhood amenity levels or by representing a noncompatible adjacent land use, it is impossible to accurately evaluate how different households will react to the situation, for consumer tastes, preferences and budgets vary substantially. Moreover, it could be argued that adjacent property values are already negatively affected by proximity to the existing Riverside Steam Electric Generating Station (Riverside power plant) or to the Outer Harbor Crossing. Given these considerations, the SNG facility may negatively affect nearby residential property values to a certain extent; however, the magnitude of change cannot be determined.

The above considerations indicate that the operation of the SNG facility will have only a minimal effect upon adjacent land use patterns and property values. Although residential property values along Main Street may be adversely affected by the project due to potential lowering of neighborhood amenity levels, the degree to which this impact is internalized in the form of changes in the future residential development of the area is unclear. This uncertainty is due to the fact that there are a number of factors which combine to influence residential location decisions. Local amenity levels represent only one variable in the decision process. In terms of induced changes in adjacent land use patterns, the proposed project should not attract complimentary economic activity into the immediate area. Changes in public policy are expected to have a far greater influence on adjacent land use patterns than will the presence of the SNG facility.

Effect on Recreational Resources

The operation of the SNG facility will not affect access to or use of any nearby developed recreational areas. Although three parks are within relative proximity to the SNG facility there are no views of the plant from any of them. Residential buildings located between the plant and these parks serve to screen such views. As a result, the operation of the SNG facility will not have a visual effect on the recreational resources of the area.

There are no developed public recreational facilities located in the immediate vicinity of the SNG facility, with the exception of the Patapsco River. However, this water body has little recreational value at present due to the high fecal coli counts found in the water.[12] Moreover, the Patapsco River is not utilized very much for recreational boating since more aesthetically pleasing areas exist off Hart Island and in the vicinity of the Middle River.[13]

The nearest developed public park is Turner Station-Lyons Homes, a 11.4-acre parcel containing a natural environmental area and playfields.[14] This park is situated approximately 0.3 miles ENE of the SNG facility. Other developed recreational facilities in the larger area include Fleming Park, a 11.2-acre community park and Peach Orchard Park, a 9.5-acre community park.[15] Fleming Park is approximately 0.5 miles ENE of the SNG facility, while Peach Orchard Park is located approximately 0.7 miles to the NE.

Effects on Historical, Archaeological and Cultural Resources

Discussions were conducted with Mr. John N. Pearce, State Historic Preservation Officer; Dr. Robert V. Riordan, Staff Archaeologist with the Maryland Historic Trust; Mr. George J. Andreve, Architectural Historian with the Maryland Historic Trust, and Mr. Ben Womer, founder of the Dundalk-Patapsco Neck Historical Society. According to these persons, there are no structures present in the vicinity of the SNG facility which have been placed on any national registry, including the National Register of Historic Places.[16] Dr. Riordan has also stated that "no archeological sites are known in the immediate vicinity of the plant."[17] However, this does not preclude the possible presence of such cultural resources for no archeological field reconnaissance was conducted on or around the SNG facility. Furthermore, as indicated by Dr. Riordan, "Any such location along the water would have to be rated an area of good archaeological potential for both prehistoric and historic occupations."[18] Impacts on archeological resources would have occurred during the construction of the project, and it is not expected that any new impacts would occur.

Although there are no historic sites of national significance in the immediate vicinity of the plant site, there are two areas of state and local significance.

The Maryland Historical Trust has included Fort Carroll in its state survey records. Fort Carroll was built by Robert E. Lee in 1848 and was to serve as part of the defense of Baltimore City. This granite fort is located off Sparrows Point in the Baltimore Harbor, approximately 1.1 miles SSW of the SNG facility. It is doubtful whether the operation of the SNG facility could negatively affect this historical site except by disturbing the visual quality of the views from the fort. However, even this impact is unlikely, for the surrounding shoreline area is already heavily industrialized. As a result, the visual quality of the landscape as viewed from Fort Carroll was already disturbed prior to the construction of the SNG facility. Moreover, the presence of the Outer Harbor Crossing should serve as a screen and prevent a significant portion of the SNG facility from being seen from Fort Carroll.

In 1973, the Dundalk-Patapsco Neck Historical Society placed a colorful buoy off the shore of Sollers Point to commemorate the location where the ship carrying Francis Scott Key was anchored when he wrote the "Star-Spangled Banner."[19] The operation of the SNG facility will not affect this monument since it was removed when the Coast Guard refused to maintain it.[20]

5.2 Socio-Economic Impacts

The operation of any large scale industrial project will have a variety of real and potential implications for the local and regional socioeconomic environment. This section discusses these anticipated effects, including the likely costs and benefits accruing to Dundalk, Baltimore County and Baltimore metropolitan area.

Effect on Employment and Wages

The permanent work force requirements of the SNG facility have been estimated to be 35 persons (6 management, 17 skilled workers and 12 semi-skilled).[21] These employees will be obtained primarily from existing

BG&E personnel in the Baltimore metropolitan area. It is expected that no relocation will be required as all the permanent employees already reside within a reasonable daily commuting distance to the SNG facility.[22] The annual payroll will be approximately $581,000. In addition, it has been estimated that BG&E will spend approximately $100,000 annually for the purchase of industrial supplies and materials.[23] These purchases are likely to be from vendors in the Baltimore metropolitan area.[24] Thus, the operational phase will inject approximately $681,000 annually into the Baltimore metropolitan economy either through direct wage payments or through the purchase of supplies from area vendors. The overall economic benefits associated with employment and wages are anticipated to have a more direct and substantial effect at the metropolitan level than on the economy of Dundalk. The major County benefits will be in the form of taxes.

Effect on Taxes

The major benefit to Baltimore County to be derived from the facility will be associated with the property tax payments. The current assessed value of the site's land is $151,555.[25] When the facility becomes operational, the State Department of Assessments and Taxation will assess the facility based upon income and depreciation factors.[26] Mr. Michael Hinkle of BG&E's tax department estimates that the assessed valuation of the improvements will be in the neighborhood of $30,400,000 based on construction costs of $38 million.[27] The current assessed valuation of Baltimore County is $4.28 billion.[28] Therefore, the SNG facility will increase the assessed valuation of the County by 0.7%.

Baltimore County has a current property tax rate of $3.11 per $100 assessed valuation.[29] In addition, the State of Maryland imposes a property tax of $0.23 per $1,000 assessed valuation.[30] The State's property tax revenue is used to retire debt while that of the County goes primarily to the support of education (50.4%).[31]

Prior to the construction of the SNG facility, BG&E paid $5,062 in property taxes on the 101-acre unimproved site. Baltimore County received $4,713 of the taxes while the state received $349.[32] It is not possible to foresee what future tax rates will be. However, if the SNG facility were operational today, it would yield approximately $950,500 annually in property taxes.[33] This amount would be divided as follows:

County Tax on Land	$ 4,713
County Tax on Improvements	945,440
State Tax on Land	349
Total	$950,502

There is no state property tax imposed on utility improvements. The property tax revenues to be derived from the SNG facility compares favorably with the former revenue yield of nearly $5,100.

The major positive fiscal benefit associated with the SNG facility will thus be the generation of substantial tax dollars each year during the plant's life. These tax benefits will be distributed throughout Baltimore County. The impact of these tax revenues as they affect individual homeowners will ultimately depend upon how the County utilizes its new revenues. If these taxes are used to subsidize the tax burden, each homeowner may then expect a reduction in property tax bills. On the other hand, if the County decides to expand the level of services offered, individual property tax bills may remain essentially unchanged or increase. Given the uncertainty of the situation, the only conclusive statement that can be made is that regardless of local and regional expenditure patterns, the taxes to be paid by the operation of the proposed facility will undoubtedly represent a subsidy for the homeowner.

Effect on Population and Housing

Since all permanent employees of the SNG facility are expected to be hired from the Baltimore metropolitan area, the operational phase is anticipated to have no effect upon local, regional or metropolitan population growth for it is likely that these persons already reside in the metropolitan area. Furthermore, the SNG facility will not result in a significant secondary population growth within BG&E's service area since the plant will be operated to offset gas shortages rather than to serve new customers.

There should be no effect on housing demand, since it is likely that permanent employees already reside in the metropolitan area. Consequently, employment at the SNG plant will not create an increase in demand for housing.

Effect on Community Facilities and Services

The construction of a major facility may affect the level of service and the quality of local community facilities and services in two ways: (1) the excess demands placed by permanent employees and their families who relocate to the area and (2) the excess demands placed by the project itself, primarily in terms of police and fire protection and disruption or congestion of local roadways. The following paragraphs discuss each of these major considerations. Traffic-related effects, however, are reserved for separate analysis in Section 5.3.

Since it is anticipated that all permanent employees will come from the Baltimore metropolitan area, no additional demands on community facilities and services are expected to be generated by the employees.

The proposed SNG facility itself will utilize various public utilities, most notably water. BG&E will use an average of 355,000 gallons of water a day (see Section 3.3). The existing hydrologic transmission facility is assessed as more than adequate and once the new water main becomes operational later this summer, the water supply will be "virtually unlimited."[34] The SNG facility will impose no burden on the sewer system in that process wastewater will be treated on site and then discharged directly into the Baltimore Harbor. Sanitary wastes of approximately 600 gpd will go to the Baltimore County sewer system.

Likewise, the SNG facility should not impose a significant burden upon local police and fire protection services. BG&E will have its own private security guards as it does for each of its other facilities. As a result, local police will not be required except in an extreme emergency. Similarly, the SNG facility will not require the services of the Baltimore County Fire Department except as a secondary line of defense. In the event of a fire, primary reliance will be placed upon the plant's own internal protection system which includes: (1) foam stations located around the perimeter of the naphtha storage tanks; (2) fire water loop with rotatable monitor fire nozzles strategically placed around the naphtha storage tanks; (3) a foam truck and a dry chemical fire truck; (4) preconnected water and/or foam hose lines which extend to the process area from the foam stations and fire water loop; and (5) hydrants and portable fire extinguishers located around the plant.

The operational phase of the SNG facility will not affect the level or quality of the service associated with various community facilities and public services available in the area. In most instances, current or expected future capacity estimates are sufficient to meet the additional demands which are anticipated to be generated by the SNG facility operations and by its permanent plant personnel. In other cases, most notably police and fire protection, the plant will provide its own personnel and equipment, thus negating the need to place primary reliance upon such local services, except in the event of an extreme emergency.

Effects on Visual Quality

The SNG facility is located in an area of moderate to high visibility, with exposure available from the Patapsco River and from most nearby shoreline locations but limited from most interior positions.

The area of visual impact or the area within which views of the plant are present is identified in Figure 5.2-1. The visual impact area has been defined through field observations. The visual impact area denotes where major views of the SNG facility exist and excludes from consideration the less dominant, intermittent views which are likely to be available from selected, elevated positions found elsewhere in the area.

As distance from the SNG facility increases, the degree of visual instrusion associated with the plant facilities will decrease, for the SNG facility no longer represents a visually dominant feature, but rather appears subservient to the views and becomes secondary elements within the composition of the landscape scene.

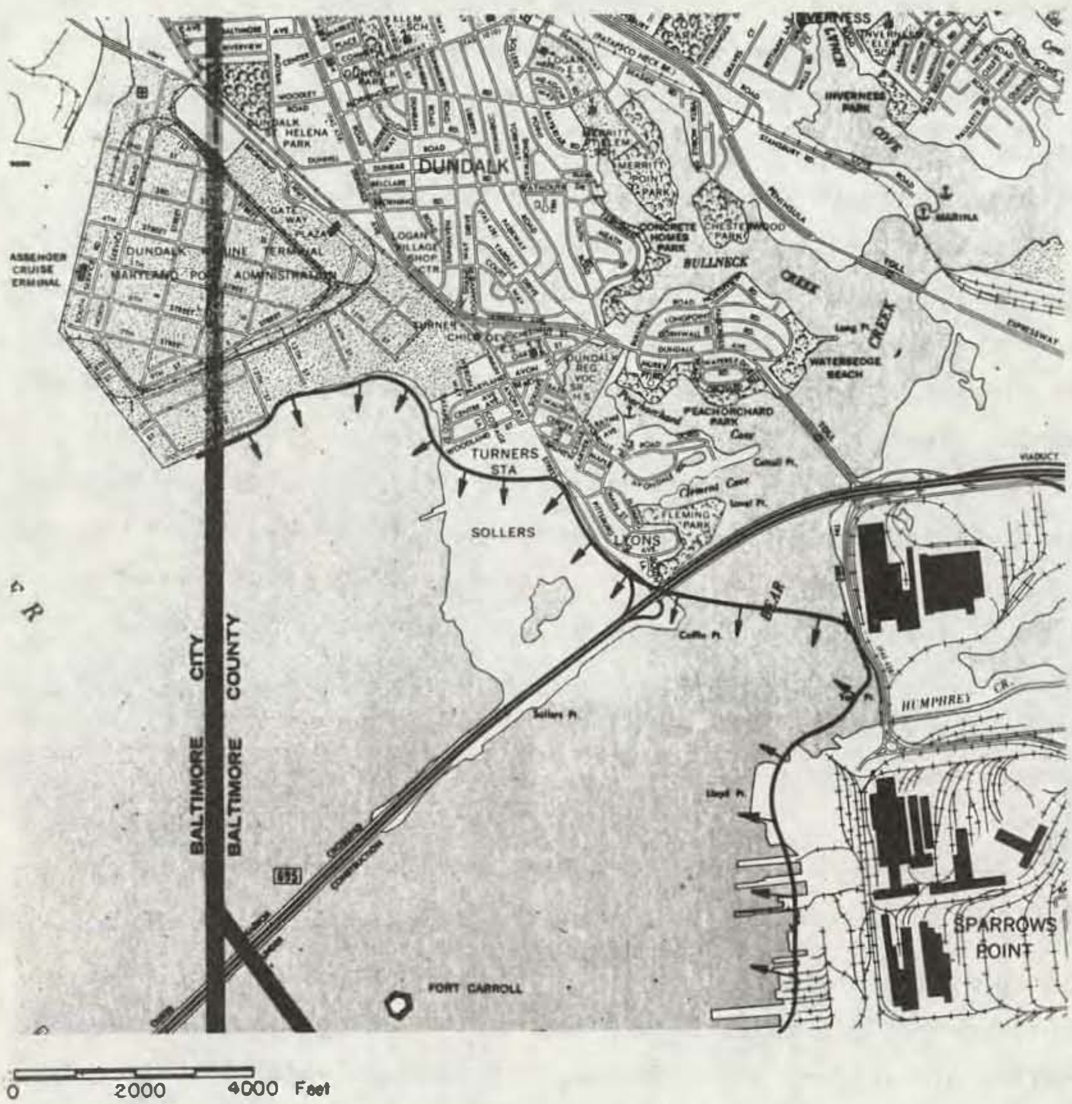


Figure 5.2-1 Primary Area of Visual Impact

The residents who live near the site along Pittsburg Avenue are among the persons most adversely affected by the change in visual quality which has resulted from the presence of the SNG facility. Views of the plant from along Pittsburg Avenue primarily consist of stacks associated with the process area and the tops of the naphtha storage tanks. The degree to which these stacks constitute a disrupting element in the visual landscape for the persons residing along Pittsburg Avenue is unsure; for prior to the construction of the SNG facility, the Sollers Point area was already disturbed by the presence of several transmission towers and the Riverside power plant. These two facilities represent more dominant elements in the visual landscape than do the various components related to the SNG facility. Thus, the SNG facility cannot be considered as the primary disrupting influence upon the visual quality of the area, but rather as one of a contributing factor, for the area was already disturbed from a visual orientation long before the SNG facility was erected.

Persons traveling along Pittsburg Avenue as well as persons who in the future utilize the Outer Harbor Crossing will be affected by changes in the visual quality of the Sollers Point area. This impact upon present and future highway users is not considered of particular significance since the area was already industrially oriented and the duration of the view of the SNG facility likely constitutes a minor portion of the total trip time.

Effect on Users of Natural Gas and Naphtha within the Service Area of BG&E

The operation of the SNG facility has been intended by BG&E to avoid shortages of gas to firm customers in FPC categories 1, 2 and 3. The benefits of avoiding a gas shortage can best be understood by defining those impacts which would occur if the SNG were not available. This is discussed in Section 10 of this report.

The use of SNG will add to the price of gas paid by BG&E's firm customers in FPC categories 1, 2 and 3. The average price of gas was about $2.78 last spring. BG&E has estimated that the cost of SNG would raise the price of gas to about \$3.00/mcf. This is approximately an 8% increase in the cost of gas. The average residential customer using 70 mcf during a normal winter would have a fuel bill of \$198 increased to \$210. (It should be recognized that the price of gas has been increasing; the average residential customer paid about \$130 for gas in 1975.)

The allocation of naphtha to this SNG facility could not directly affect naphtha users within BG&E's service area because Amerada Hess Corporation does not supply naphtha to any class of users in BG&E's service area. It is possible, however, that the unavailability of naphtha to local users (because of its allocation to this SNG facility) would not allow industries dependent upon naphtha to expand production. It is also possible that the unavailability of naphtha to users outside the service area would indirectly affect people within the service area who use and rely on products dependent upon naphtha. However, those considerations are beyond the scope of this environmental report. The Federal Energy Administration has prepared a programmatic environmental impact statement which addresses regional and national environmental issues of naphtha allocations.

5.3 Transportation Impacts

Effect on Traffic

It has been proposed by BG&E that the plant would be operational by the end of 1976, and it may have an operating life of 25 years, or until about the year 2001. Since the plant is not expected to generate a substantially different number of trips during any particular part of its operating life, two years were chosen for analysis of traffic impacts: 1977, representing plant start-up; and 1990, representing typical future conditions near the plant.

For the analysis of traffic impact of the SNG facility during future operating phases, two external factors have been considered: the future road network and projected growth of traffic on that network. For the two analysis years chosen, 1977 and 1990, only two major additions to the current network are forecast. The first is the Outer

Harbor Crossing, shown in Figure 5.3-1. This limited access facility is currently under construction and is due to open in mid-1977. Present plans call for an interchange at the new access road, as shown in Figure 5.3-1.

The other major addition to the network immediately near the site is the proposed construction of an Outer Harbor Access Road, a two-lane facility which will parallel Main Street, and lie 13 feet from its existing right-of-way. The right-of-way was formerly used for trolley tracks. The alignment has been graded but not paved. One purpose of the road is to segregate industrial traffic from residential traffic.[35] It also is intended that traffic bound for the Crossing will be channeled onto the new road and off residential Main Street. The approximate alignment of the new road is also shown in Figure 5.3-1.

According to the Baltimore County Traffic Department, growth rate of traffic in the area has been averaging about 3 to 3-1/2% per year. While this is to be considered high for a densely settled area with a relatively stable population, it is probably not unreasonable for projected short-term growth rates, considering the impending network changes outlined above, and increases in traffic bound for points outside the neighborhood.[36]

For the purposes of this analysis, an annual traffic growth rate of 3.5% has been assumed through 1990. This is considered to be a high and therefore conservatively high estimate of growth, since it predicts worst-case congestion effects. Future traffic volumes on selected roads for years 1977 and 1990 are shown in Figures 5.3-2 and 5.3-3, respectively. Traffic projections for the new access road are derived from the Baltimore County Highway Department.

Even in 1990, little capacity problem will exist on Main Street, or the upper part of Dundalk Avenue. It appears that unless it is upgraded, the lower part of the Dundalk Avenue will experience some congestion effects. Sollers Point Road will remain at less than capacity in the peak hour.

The main impact of the SNG facility on the traffic patterns will be from the commuter traffic to the site. According to BG&E,[37] there will be round-the-clock operations in three shifts when the plant is operational. The day shift will employ 25 workers (five on weekends), and

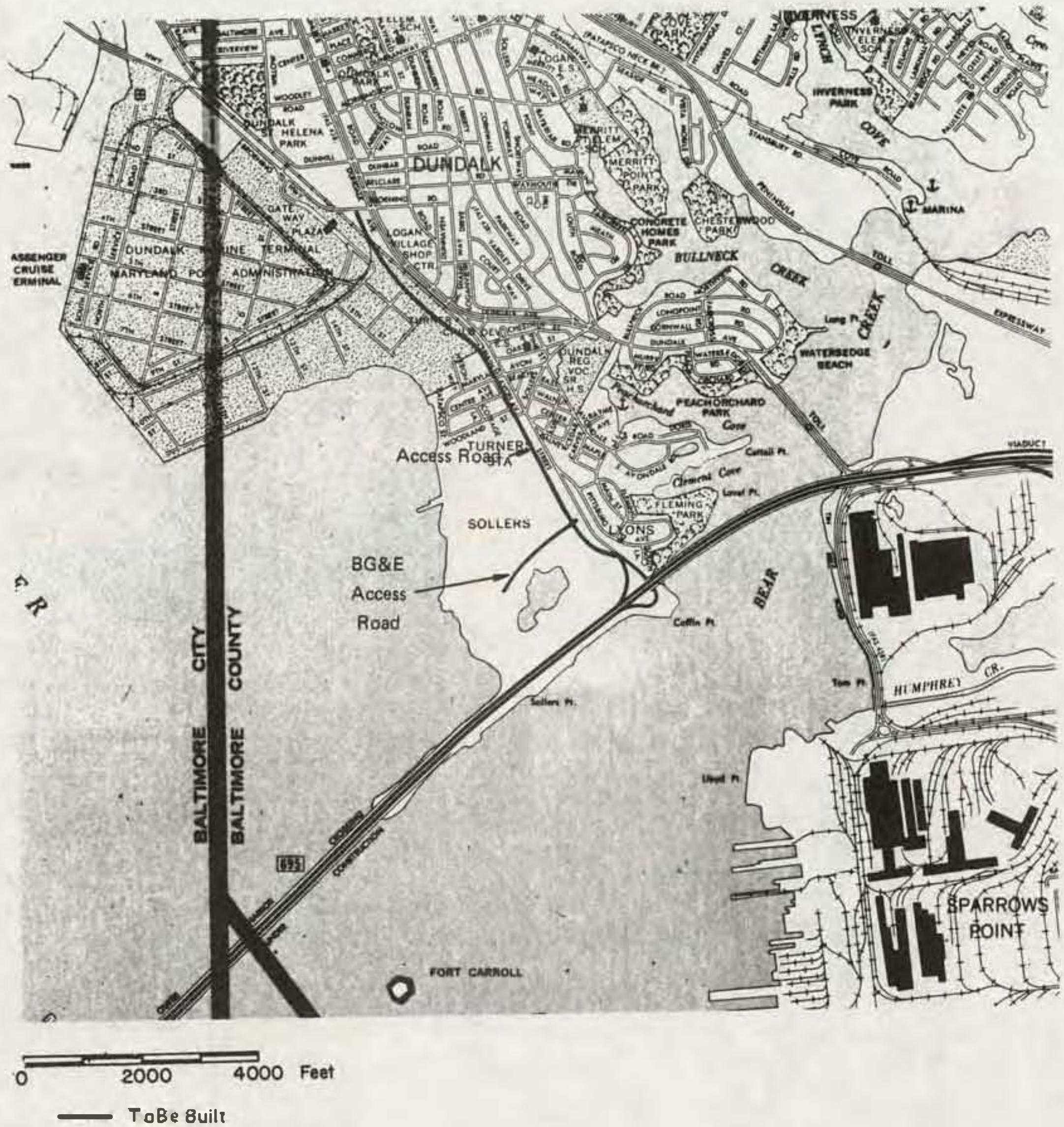


Figure 5.3-1 Additions to the Current Road Network

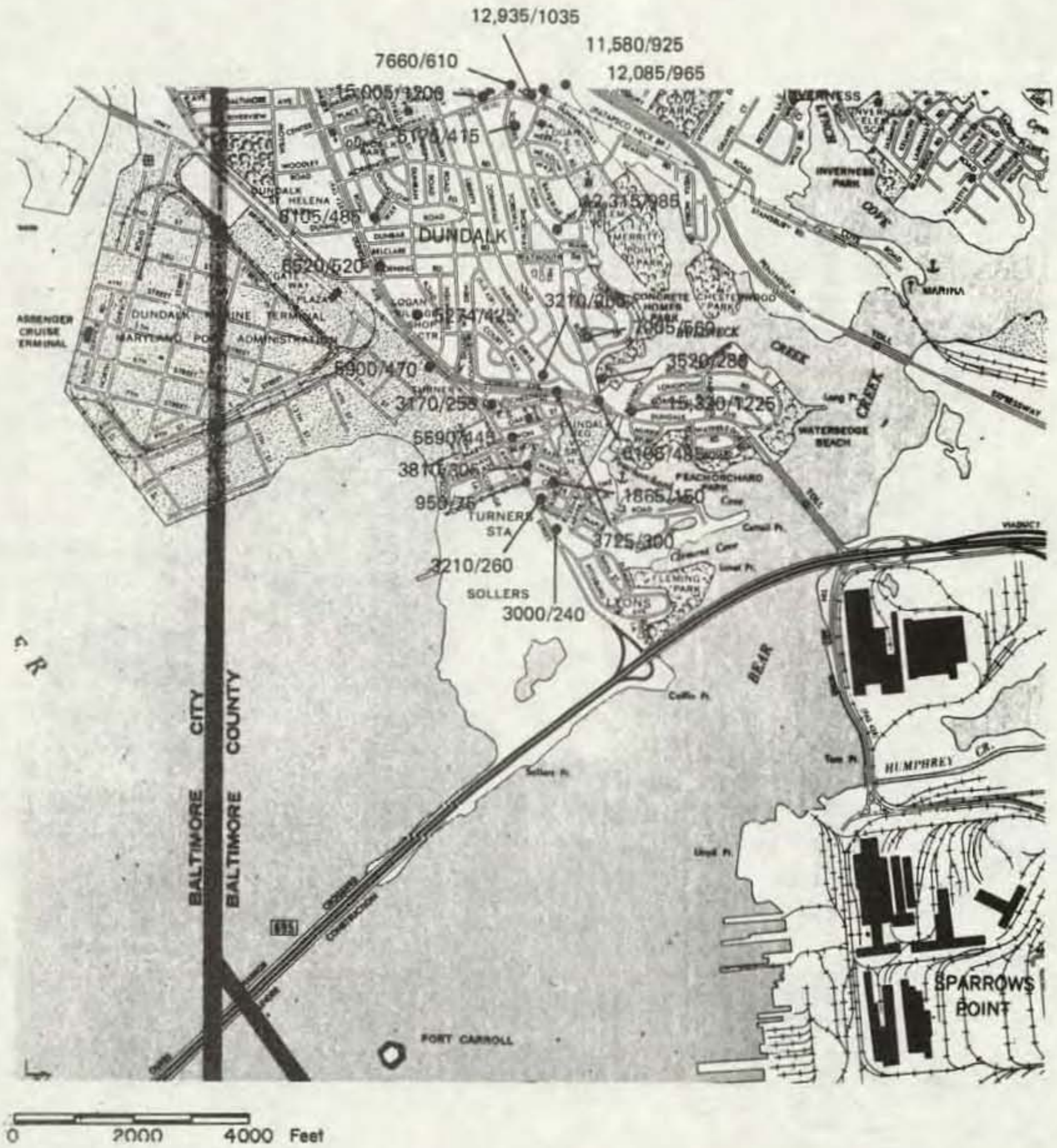


Figure 5.3-2 Traffic Volumes Anticipated for the Year 1977

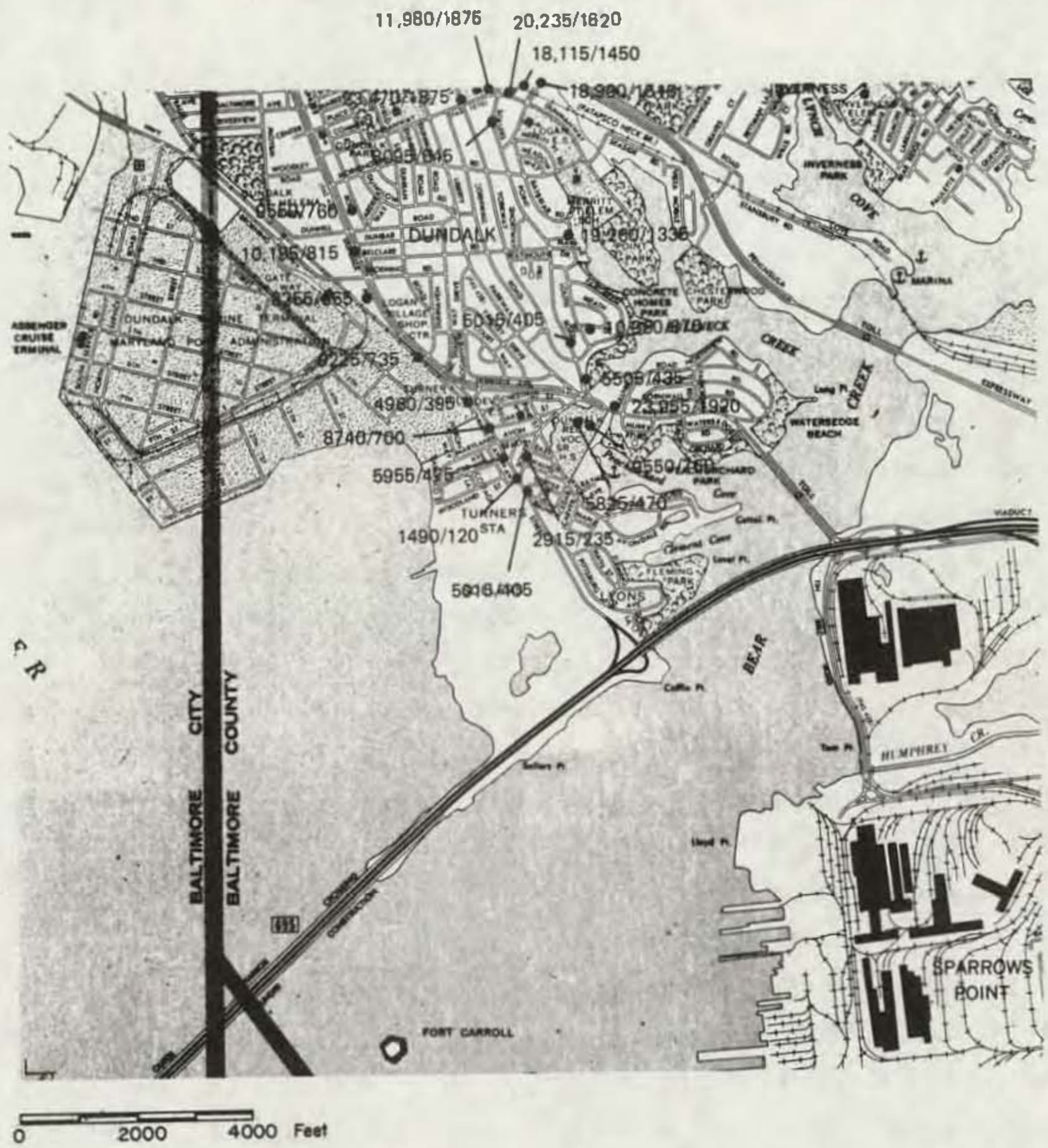


Figure 5.3-3 Traffic Volumes Anticipated for the Year 1990

each of the other shifts will employ five workers. Even assuming one worker per car, the impact on existing arterials will be negligible, considering the excess capacity described above and the small number of workers at the SNG facility.

There will be no impact on parking in the area, as there will be adequate on-site parking for all employees (36 in the lot, 30 more in the plant area).

There will be an increase in truck traffic to the site of two to four truck deliveries, or eight one-way trips per day. They will be routed via the new access road when complete, and via Main Street from Dundalk Avenue prior to that. Again this number is minimal.

Effect on Port Facilities

The SNG facility will receive its naphtha via pipeline from BG&E's off-site dock facilities at the Riverside power plant. Naphtha feed-stock will arrive at the dock via barge from the Amerada Hess Terminal, located in the Hawkins Point area. No. 6 oil will likely also come from the Amerada Hess Terminal or the Exxon Harbor Terminal. BG&E estimates that the maximum number of barges per year will be 150.[38] This represents approximately 3.3 percent of the total non-self-propelled barge traffic in Baltimore harbor. Each barge will dock at Riverside for an average of 16 hours, though only four hours will be required for unloading. The naphtha will arrive at the Amerada Hess Terminal by tanker. About 20 tankers per year are expected to unload there at maximum plant production. This represents approximately 2.3% of the total self-propelled tanker traffic in Baltimore harbor. For total harbor traffic on an annual basis the tanker and barge shipments for the BG&E SNG plant represents approximately 0.005 percent of total movements. These figures, supplied by BG&E and the Army Corps of Engineers, are based upon ship capacities of 100,000 bbls. Each tanker will be docked for two to three days.

The relatively small increase in harbor traffic will have minimal impact on public port facilities since all ship unloadings take place at private facilities. Increase risk of oil spill is not significant.

A detailed discussion of barge and tanker risks is contained in the Final Programmatic Environmental Impact Statement on the Allocation of Petroleum Feedstocks to Synthetic Natural Gas Plants, Federal Energy Administration, August 1977.

Effect on Bus and Rail Service

There will be little or no impact on bus operations due to the operation of the SNG facility. Since there will be no deliveries to the site by rail, no impact on rail service will occur.

5.4 Air Quality Impacts

This section describes the air contaminant emissions expected from the SNG facility and their predicted impact on ambient air quality.

The SNG facility is expected to contribute low amounts of air contaminants resulting in little effect upon ambient concentration levels surrounding the plant site. The process boilers and super heater units are anticipated to be the major sources of air contaminants with the emission of sulfur dioxide (SO_2), nitrogen dioxide (NO_2) and particulates. Minor source emissions due to leakage or the burn off of flares may produce negligible quantities of hydrocarbons and carbon dioxides. The major sources will emit continuously during SNG operations. The minor source emissions would occur periodically during plant operations as well as during plant shutdown. The area of primary impact is expected to occur within five kilometers (three miles) of the site.

All the SNG facilities have been designed to be in compliance with the state and local air pollution control regulations described in Section 3.

All national, state and local air quality standards applicable to this plant should be met while the SNG facility is operating at design capacity.

The following is a more detailed discussion of the expected air quality impact due to operations of the SNG facility.

In order to assess the air quality impact of the SNG facility, a mathematical model was used to describe the dispersion and dilution of air contaminants once they leave their source. This type of atmospheric diffusion modeling has been accepted by the Environmental Protection Agency as an appropriate tool for determining impact of various contaminant sources.

Environmental Research & Technology, Inc.'s Gaussian Point Source Diffusion Model, PSDM, was used to evaluate SO_2, NO_2 and particulate concentrations for short and long-term averaging periods suitable for comparison with the State of Maryland and National Ambient Air Quality Standards. PSDM calculates ground-level pollutant concentrations for emissions from a point source for 768 separate meteorological conditions (a combination of 8 stability classes, 16 wind directions and 6 wind speed categories). Long-term average concentrations were calculated by weighting the computed ground-level concentrations with a stability wind rose. (A wind rose represents a statistical combination of joint frequency of wind direction, wind speed and stability, which in this case was derived from observations taken at the Baltimore International Airport, Baltimore, Maryland.)[39]

The receptor array for the PSDM model extends downwind of the source along the plume centerline. Twenty-eight receptors in each of the 16 wind directions were selected to define the contaminant concentration distribution out to a maximum downwind distance of 10 km (6 miles).

Ground-Level Concentrations

The SNG facility's expected emissions during normal operating conditions are detailed in Section 3.2. These emissions which were used as input to computer program PSDM are summarized in Table 5.4-1. The primary sources of contaminants are the plant boilers and superheater units, both expected to burn oil having a sulfur content of 1.0%. As described in Section 3.2, the superheaters will be fired with waste fuel gas generated from the process producing SNG. These heaters could burn naphtha containing up to 0.2% by weight sulfur when the waste fuel gas is not available. For the purpose of estimating the expected air quality impacts, the conservative assumption was made that the superheaters will fire 1.0% sulfur content fuel oil. The following is a discussion of the calculated short- and long-term SO_2, NO_2 and particulate concentrations due to operation of the boilers and superheaters.

TABLE 5.4-1

STACK AND EMISSION PARAMETERS FOR THE SOLLERS POINT SNG FACILITY*

Parameter	Boiler 1	Boiler 2	Super Heater 1	Super Heater 2
Stack Height (ft)	75	75	75	75
Stack Diameter (ft)	3.2	3.2	-	-
Exit Temperature (°F)	315	315	350	350
Flue Gas Rate (acfm)	28,000	28,000	12,000	12,000
SO_2 (lb/hr)	100	100	40	40
NO_2 (lb/hr)	27	27	12	12
Particulates (lb/hr)	3.2	3.2	1.3	1.3

*There are three identical boilers and three identical super heaters. Only two of each will operate at one time, with one of each on standby.

Sulfur Dioxide (SO_2)

The predicted SO_2 concentrations attributable to the SNG facility alone are below state and federal ambient air quality standards. The ambient SO_2 levels at Sollers Point are also in compliance with those air quality standards. The combined effect of the background SO_2 values near the SNG facility and the expected concentrations from the plant are not expected to exceed air quality regulations.

The maximum expected contributions of SO_2 to ground-level concentrations are listed in Table 5.4-2. Column 1 shows the predicted 1-hour, 3-hour, 24-hour and annual concentrations. Column 2 shows the peak 1975 recorded SO_2 values taken at the closest monitor to the SNG site.[40] For reference, the applicable state and federal ambient air quality standards[41] for SO_2 are listed in Column 3. These standards would be maintained even if the maximum measured values were added to the concentrations contributed by the SNG facility.

Contours showing locations of equal levels of annual SO_2 concentrations are shown in Figure 5.4-1. This figure illustrates the distribution of SO_2 concentrations that would occur around the SNG facility based on continuous operation, 365 days per year. Since the SNG facility is expected to operate for no more than 180 days per year, the 365 days/year operations basis results in a conservative overestimate of the expected annual average SO_2 concentrations. The assumption that the superheaters will fire 1.0% sulfur content fuel oil as opposed to lower sulfur content naphtha or waste fuel gas contributes to this conservative overestimation.

Nitrogen Dioxide (NO_2)

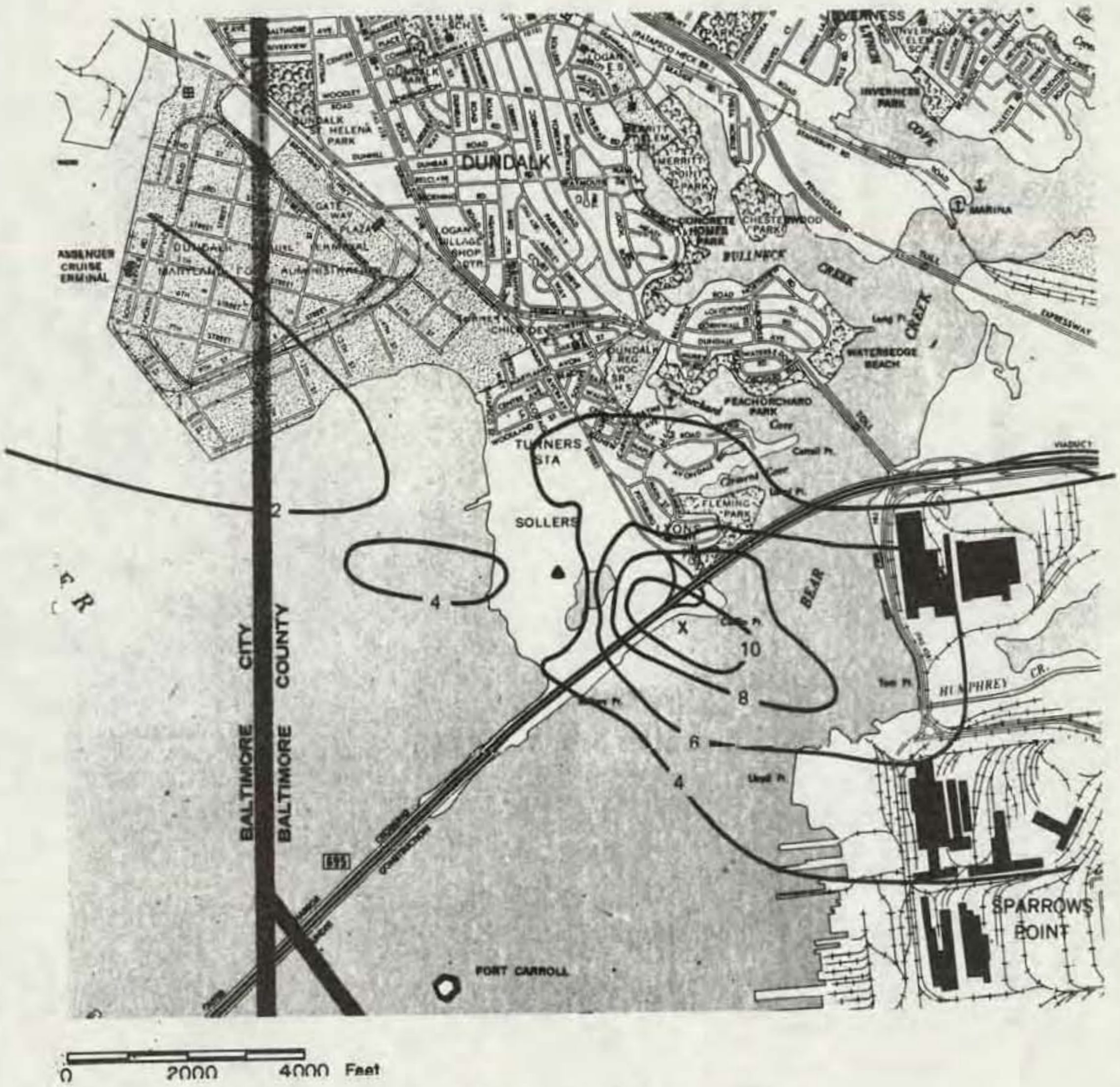
Because of the significantly low amounts of NO_2 anticipated to be emitted from the SNG facility, there should be no effect on the ambient NO_2 levels in the surrounding area. The combination of annual average NO_2 values monitored at Sollers Point plus the maximum predicted NO_2 contribution from the SNG facility would continue to meet state and federal standards of 100 $\mu g/m^3$.

The maximum predicted annual average NO_2 contribution to ground-level concentrations is 3.3 $\mu g/m^3$ as listed below. Also listed is the peak NO_2 concentration recorded in 1975 at the nearest sensor to the SNG site.[42] For reference, the applicable state and federal ambient air quality standards for NO_2 are included.[43]

TABLE 5.4-2

CONTRIBUTIONS OF SULFUR DIOXIDE CONCENTRATIONS TO THE AMBIENT AIR QUALITY

	Maximum Model Predicted Concentration ($\mu g/m^3$)	Peak Monitored Concentrations ($\mu g/m^3$)	Federal Standard ($\mu g/m^3$)		Maryland Standard ($\mu g/m^3$)	
			Primary	Secondary	Serious	More Adverse
1-Hour Average	603	Not Available	-	-	920	-
3-Hour Average	389	Not Available	-	1,300	-	-
24-Hour Average	132	116	365	-	262	-
Annual Average	12	33	80	-	79	60



Δ SNG Facility
χ Maximum Predicted SO2 Concentration, 12 μg/m³

Figure 5.4-1 Predicted Annual Average Plant-Related SO2 Concentrations (μg/m3) in the Vicinity of the Sollers Point SNG Site

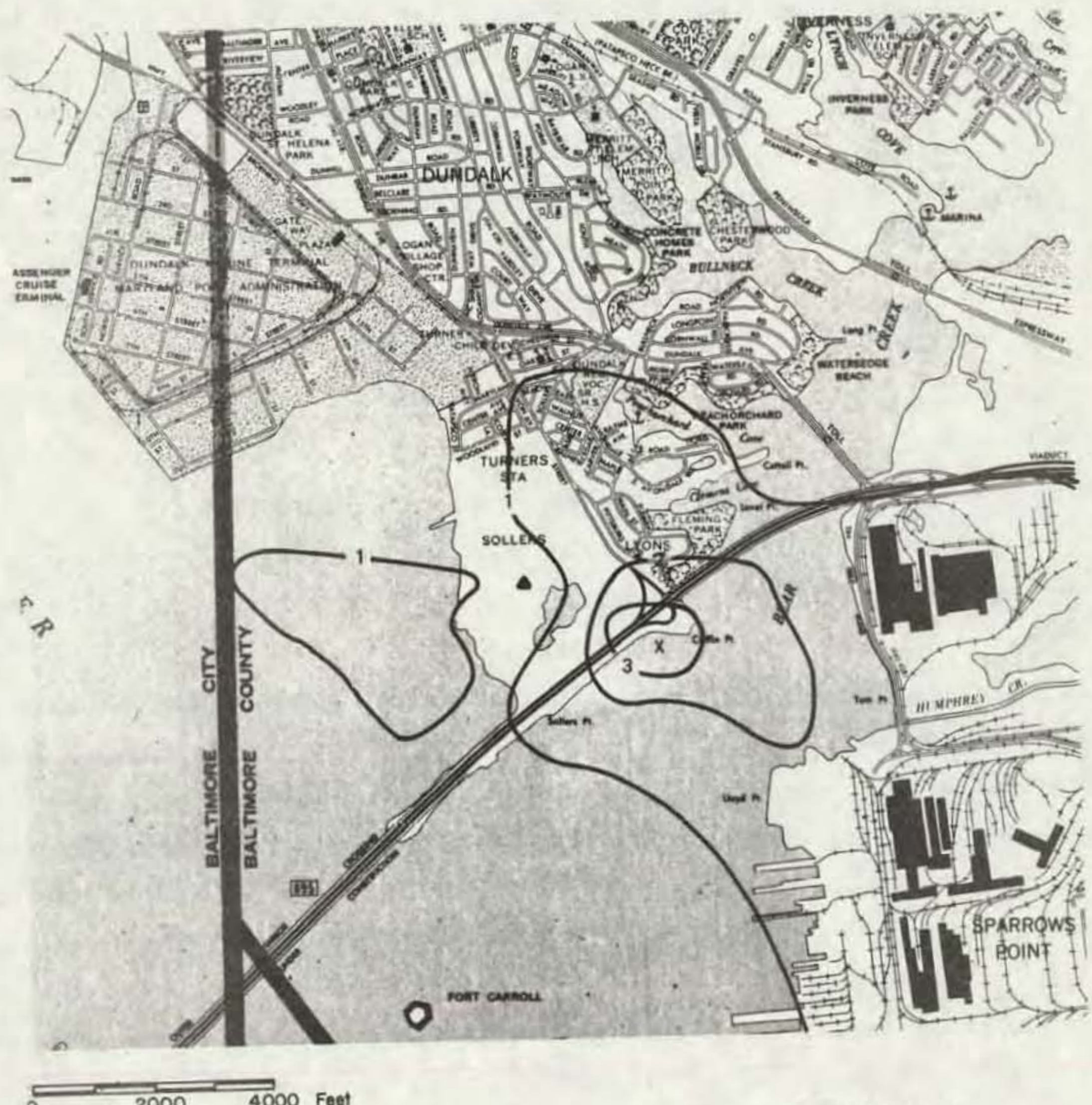
	Model Predicted Concentration ($\mu g/m^3$)	Maximum Recorded Concentration ($\mu g/m^3$)	Federal and State Primary NO_2 Standard ($\mu g/m^3$)
Annual Arithmetic Mean	3.3	46	100

Contours of annual concentrations are shown in Figure 5.4-2 and demonstrate the distribution of NO_2 concentrations in the vicinity of the SNG facility. Operations were based on 365 days/year as opposed to the actual expected operation of no more than 180 days per year. This assumption results in a conservative overestimation of the annual NO_2 concentration contributed by the SNG facility.

Particulates

The particulate levels in the vicinity of Sollers Point are high and the SNG facility will add to the situation. The contributions from the SNG facility are, however, expected to be small.

The maximum expected contributions of particulate ground-level concentrations are listed in Table 5.4-3. Column 1 shows the model predicted 1-hour, 3-hour, 24-hour and annual concentrations.[44] In Column 2 are the peak 1975 recorded particulate values taken at the closest monitor to the SNG site.[45] For reference, the applicable state and federal ambient air quality standards for particulates are listed in Column 3.[46] The 24-hour and annual ambient concentrations are already in excess of the federal and state air quality standards, and any contributions from this SNG facility will aggravate the situation. While the levels may be high due to construction activities, they may also be a result of industrial emissions in the area. Since it is difficult to identify the source of particulate matter, involvement of the state regulatory agencies will be required to control those sources expected to be contributing the most to the high particulate levels. At this time it is not possible to determine if the 24-hour particulate contribution from the SNG facility will be additive to the maximum recorded particulate concentrations. Contours of expected annual particulate concentrations are presented in Figure 5.4-3 showing the distribution of predicted particulate contributions around the site.



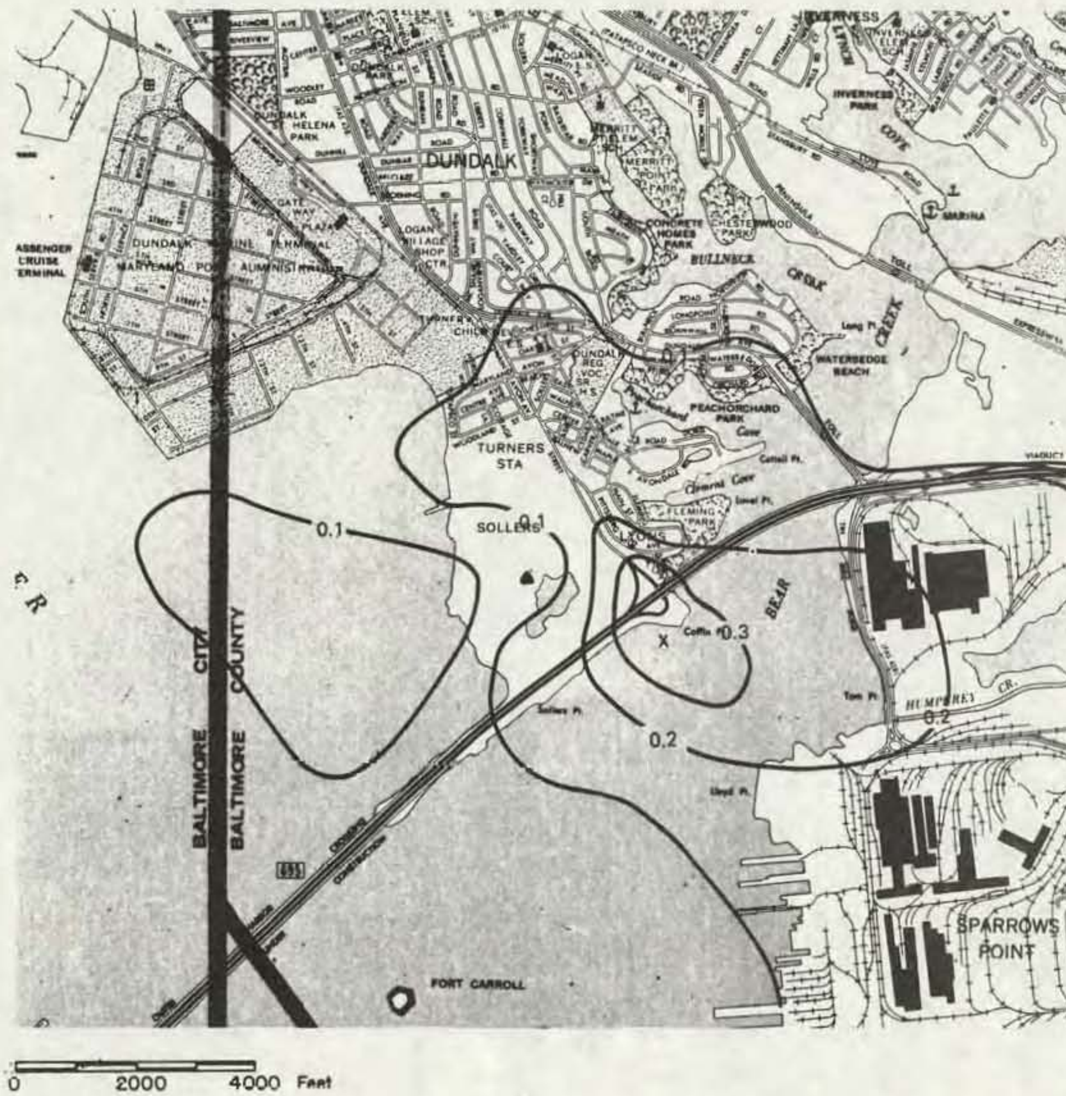
Δ SNG Facility
χ Maximum Predicted
NO2 Concentration,
3.3 μg/m^3

Figure 5.4-2 Predicted Annual Average Plant-Realted NO_2 Concentrations ($\mu g/m^3$) in the Vicinity of the Sollers Point SNG Site

TABLE 5.4-3

CONTRIBUTIONS OF PARTICULATE CONCENTRATIONS TO THE AMBIENT AIR QUALITY

	Maximum Model Predicted Concentration ($\mu g/m^3$)	Peak Monitored Concentrations ($\mu g/m^3$)	Federal Standard ($\mu g/m^3$)		Maryland Standard ($\mu g/m^3$)	
			Primary	Secondary	Serious	More Adverse
Maximum 24-Hour Average	4.3	270	260	150	160	140
Annual Mean	0.37	98	75	60	75	65



Δ SNG Facility
χ Maximum Predicted
Particulate Concentration,
0.37 μg/m³

Figure 5.4-3 Predicted Annual Average Plant-Related Particulate Concentrations ($\mu g/m^3$) in the Vicinity of the Sollers Point SNG Site

Air Quality Impact from Other SNG Plant-Related Contaminant Sources

Sulfur Recovery Unit

As described in Section 3.3, the sulfur recovery unit will operate at an efficiency of about 96% and maximum emissions will be less than 20 lb of SO_2 per hour. More typically this Stretford unit will emit about 8 lb of SO_2 per hour. This emission rate combined with its high exit temperature of 950°F and a stack height of 90 feet will prevent any significant ground-level concentrations from occurring.

Employee Vehicle Emissions

No more than 30 to 40 persons are expected to be employed during 24 hours of normal operations. Based on 1.2 persons per vehicle, hydrocarbon and carbon monoxide emissions from 29 vehicles would not produce a significant effect. The short operational period also helps prevent occurrence of air contamination problems from this source.

Carbon Dioxide Absorber

As described in Section 3.3, the carbon dioxide (CO_2) absorber unit will vent large amounts of CO_2 and water along with some methane. These nonreactive hydrocarbons emissions expected at approximately 200 lb/hr, are considered small, producing no significant air quality impact.

Other Emissions

Trace amounts of SO_2 are expected from the process heaters. The four naphtha storage tanks should emit small amounts of reactive hydrocarbons (about 9 lb/hr) as well as about 26 lb/hr of nonreactive hydrocarbons, principally butane. Periodic trace amounts of contaminants from the flare system will have little effect on the ambient air quality surrounding the plant site.

5.5 Water Quality Impacts

Most sources of industrial waste discharge have a potential for creating significant environmental impacts. However, proper attention to treating the wastes can usually result in an effluent which is environmentally acceptable. It is believed that waste streams from the SNG facility can be properly controlled so that no significant impact will result. The following discussion presents the waste streams and effluents, and compares the effluents to conditions in Baltimore Harbor.

All wastewaters generated at the SNG site are to be discharged to Baltimore Harbor from a common equalization basin. However, two distinct waste streams will be conveyed to the equalization basin before discharge. Nonoily wastes will be neutralized prior to equalization while oil contaminated wastes will first be treated in an oil/water separator.

Waste streams containing inorganic salts are derived from boiler blowdown, demineralizer regeneration waste, carbonate/activator solutions and carbonate solution from the hydrogen production area in the following expected quantities:

Boiler Blowdown	7,200 GPD	
Demineralizer Regeneration Waste	44,000 GPD	
Carbonate/Activator Solution	9 GPD	(intermittent)
Carbonate Solution	720 GPD	
Total	51,929 GPD	

The pH of these wastes will be adjusted by the addition of either caustic or acid as necessary. Treatment will be by batch process and the effluent from the tank will be pumped directly to the equalization basin.

Oil contaminated wastes from the naphtha storage tank area runoff, process area runoff and equipment drains will be conveyed to an oil/water separator. Because most of these streams involve variable sources (i.e., stormwater) BG&E has designed the treatment facilities based on an estimated maximum flow rate of 500 gallons per minute. Effluent from the oil/water separator is expected to contain a maximum concentration of 20 ppm dissolved oil.

The two waste streams will be pumped to a common equalization basin which contains an additional oil skimmer. The expected effluent from the basin is described in Table 5.5-1. The estimated average flow rate is 57,600 gallons per day.

TABLE 5.5-1

ESTIMATED EFFLUENT FROM BG&E EQUALIZATION BASIN

Constituent	Minimum (ppm)	Maximum (ppm)	Average (ppm)
Na and Mg (Sodium and Magnesium)	44	530	180
Ca (Calcium)	23	285	100
Al (Aluminum)			0.17-0.50*
Fe (Iron)	0.02	0.2	0.07
K (Potassium)	10	130	45
NO_3 (Nitrate)	3	40	14
HCO_3 (Bicarbonate)	41	535	185
SO_4 (Sulfate)	100	1,150	400
Cl (Chlorine)	27	370	115
F (Fluorine)	1	12	4
SiO_2 (Silica)	12	150	52
Oil (Dissolved)	0	20	13
TDS (Total Dissolved Solids)	300	3,200	1,120

Source: Baltimore Gas & Electric Company

*Based on sampling conducted by BG&E on January 6, 1978.

The SNG facility lies on the northern shore of Baltimore Harbor adjacent to Bear Creek. The effluent is proposed to be discharged to the surface waters of the harbor via a 6-inch pipe. According to a recent water quality survey, the harbor is characterized as containing a well-mixed surface layer extending to a depth of 10 to 15 feet. Surface wind currents, which dominate the surface layer, will have a marked effect on dilution of the SNG effluent.

A comparison of the quality of the SNG effluent and harbor water is provided in Table 5.5-2. The data for Baltimore Harbor are based on both estimated values and observed values as indicated. Aluminum in the effluent is derived primarily from the raw water supply which was found to contain concentrations of 0.06 to 0.13 ppm.* Increases in aluminum concentrations between that found in the raw water and that identified in the effluent are attributable to the SNG plant. In either case the aluminum concentrations will be below toxic or hazardous levels. Based on these data, there will be minimal impact on the harbor.

Other materials that are proposed to be discharged in relatively high concentrations include silica (SiO_2), nitrate, sulfates and BOD. Silica is a particularly harmless substance (sand) and is not considered a pollutant. Nitrate nitrogen will most probably be diluted to a level equivalent to that of the harbor and, therefore, should not create an impact (the harbor is already considered eutrophic). The concentration of sulfate in the harbor is questionable and is most probably higher than the indicated value. Finally, the indicated discharge concentration of BOD is a maximum and will also be subject to dilution in the upper 15 feet of the harbor.

Compliance with NPDES Permit

BG&E has received its State of Maryland (No. 76-DP-1290) and NPDES (No. MD 0053678) permits for discharge to the Patapsco River. Under the requirements of this permit, they are limited for discharges of suspended solids, oil and grease, and pH as shown in Table 5.5-3.

*Jones, Charles, Baltimore Gas and Electric Company. Telephone interview, February 24, 1978.

TABLE 5.5-2

COMPARISON OF SNG EFFLUENT TO BALTIMORE HARBOR WATER AND SEAWATER

	SNG Facility Effluent[a] (ppm)	Baltimore Harbor (ppm)	Seawater[d] (ppm)
BOD	<100	2-4[b]	-
Na and Mg	180	3,600[b]	11,800
Ca	100	~130	410
Al	0.17-0.50[e]	~0.15	0.5
Fe	0.07	0.03[b]	0.002-0.02
K	45	~120	380
NO_3 (as N)	14	0.32[c]	0.01-0.7
HCO_3	185	-	-
SO_4	400	~280	905
Cl	115	6,000[b]	19,400
F	4	~0.4	1.4
SiO_2	52	~0.06-1.2	0.02-4.0
TDS	1,120	10,850	35,000
Oil	13	-	-

[a] Baltimore Gas & Electric Company, Emissions Control Report

[b] Quirk, Lawler & Matuskey, Engineers, Water Quality of Baltimore Harbor, Maryland Environmental Service, August 1973.

[c] State of Maryland, DNR, 305(b) Report, 1975.

[d] Svedrup, H. U., The Oceans: Their Physics, Chemistry and General Biology, New York, Prentice Hall, 1942.

[e] Baltimore Gas and Electric Company, sampling conducted on January 6, 1978.

TABLE 5.5-3

SUMMARY OF BALTIMORE GAS & ELECTRIC
NPDES PERMIT REQUIREMENTS

	Total Suspended Solids	Oil and Grease	Sample Type
Daily Average, lb/day	234	-	Composite
Daily Maximum, lb/day	468	-	Composite
Daily Average, mg/ℓ	30	20	GRAB
Daily Maximum, mg/ℓ	45	30	GRAB

Additional Requirements:

1. pH 6.0 - 9.0
2. No discharge of floating solids or persistent foam in other than trace amounts.

Source: State of Maryland, DNR, State Discharge Permit No. 76-DP-1290 and NPDES No. Md 0053678.

Compliance with the pH and oil and grease limitations is based on the operations of the waste treatment facilities. Assuming the average daily discharge concentration limit for suspended solids is met, mass discharges from the SNG facility will be in compliance with the NPDES permit. Noncompliance with the permit regulations can be expected if the waste treatment system does not perform as indicated.

Impact of Oil Spills*

The potential for hazardous oil spills exists at two locations, (1) the naphtha storage area and (2) the naphtha transfer facility designated OTF-54. Plans and facilities to prevent oil spills and minimize potential impacts are indicated for both locations. The storage tank areas are completely diked, and the storage tank levels are continuously monitored with level indicators and high level alarms. Normal leakage from the area and oil contaminated storm runoff will be treated to limit the maximum effluent concentration to 20 ppm dissolved oil. Waste oil will either be recycled for use as boiler fuel or drummed for off-site disposal. In the event that the latter method is chosen, a licensed private contractor will be utilized. Spent scrubbing solution (50 gpd) and TEG blowdown (1 gpd) will likewise be drummed and disposed off-site by a licensed contractor. Maryland Department of Health regulations (Articles 394, 394A, 394B, Annotated Code of Maryland) and the Department of Natural Resources' Safe Disposal of Hazardous Substances Act (Article 8, Section 1413.2, Annotated Code of Maryland) will ensure that all off-site disposal activities are conducted in an appropriate manner; consequently, no adverse effects are anticipated as a result of off-site waste disposal practices.

Procedures for the safe handling of naphtha during transfer from barges to the storage tanks has been described in "Amendments to Operations Manual, Riverside Station, OTF-54." Special equipment and procedures include the following:

- pressure relief valves on the naphtha transfer manifold
- drip collection equipment conforming to DOT Pollution Prevention Regulations Title 33 Code of Federal Regulations Part 154.530

*For a further discussion see the Final Programmatic Environmental Impact Statement on the Allocation of Petroleum Feedstocks to Synthetic Natural Gas Plants, Federal Energy Administration, August 1977.

- foam generating station in case of fires
- continuous surveillance of transfer facilities

Based on the above procedures and facilities, no significant impact to water quality is expected to result from naphtha spills at either the naphtha transfer facility or the naphtha storage area. In addition, normal discharges from the wastewater treatment system cannot be expected to have a significant impact on water quality in Baltimore Harbor.

5.6 Noise Impacts

The incremental community noise impacts resulting from the normal operation of the SNG facility are estimated to be negligible (imperceptible or nonexistent). The neighborhoods surrounding the Riverside power plant are already characterized by relatively high ambient noise levels (i.e., in violation of the standards specified by the Maryland noise code). Furthermore, these levels are expected to increase by as much as several decibels, particularly along Main Street, upon the completion of the Outer Harbor Crossing in June, 1977. Noise from traffic on Main Street and/or on the Outer Harbor Crossing will totally mask noise emissions from the SNG facility at that time. Elevated noise levels could occur during the operation of the emergency flare. Such operation, however, would be infrequent and of extremely short duration. Details of the investigation are presented below.

Noise Sources

Industrial plants typically contain a multitude of noise producing elements. Inside the plant, most of these sources affect only those workers situated within a few feet of the individual source such as a pump or compressor. From a community noise perspective, however, contributions of the facility to signals received by off-site receptors tend to be dominated by a few major on-site noise sources. (This is based on the fact that the resultant sound level represents the logarithmic, rather than linear, addition of signals emitted by the individual sources. Thus, for example, the logarithmic addition of ten sources each producing 50 dBA with an eleventh source generating 70 dBA amounts to about 70.4 dBA, i.e., an imperceptible contribution by all of the ten 50 dBA sources combined.)

For the SNG facility, the sources of community noise generally considered are as follows:

- sources of combustion, including the reformer furnace, the boiler plant, superheaters and the reactor feed heater;
- air cooler fans and furnace induction fans, boiler preheater fans;
- rotating equipment - pumps and compressors;
- safety and relief "popping" valves; and
- flare operation at high emergency load.

Each of these sources has its own characteristic frequency spectrum which, for a given source category, may depend to a significant extent on the manufacturer, the particular model, special abatement design, or even on the orientation of the element with respect to the receptor. Such variability is exhibited, in particular, by combustion equipment. Table 5.6-1 summarizes the most important characteristics of the noise source categories, including feasible abatement measures. Most of the abatement measures listed are incorporated in the eleven SNG plants already in operation nationally, including the Sollers Point facility. Combustion roar associated with emergency operation of elevated flares is inherent and although research in this area is continuing, the current state-of-the-art is essentially incapable of handling this noise source. Flare combustion roar, however, is extremely infrequent and duration is on the order of several minutes when maximum burn-off is necessitated. The other source of noise associated with flares, namely, steam injection (required for smoke suppression) can be partially controlled by equipping the flare with a multiport nozzle. The elevated flare at Sollers Point utilizes a nozzle of this type.

Community Noise Levels Due to Plant Operation

There are three principal factors which affect facility impact on ambient noise in the surrounding community:

TABLE 5.6-1

NOISE CHARACTERISTICS AND FEASIBLE ABATEMENT MEASURES FOR MAJOR NOISE SOURCES OF A SNG PLANT

Noise Source	Principal Producing Mechanisms	Noise Characteristics	Feasible Abatement Measures
Furnace/Heaters	Combustion roar, primary air inspiration	> 75 dBA @ 50 ft. Primarily low frequency, although varies widely depending on manufacturer, model, etc.	Air intake plenum (~ 25 dB Reduction)* Burner mutes Multiport jets
Fans/Heat Exchangers	Vortex shedding	~ 65-70 dBA @ 50 ft. depending on blade tip speed. Bulk of energy < 500 Hz.	Optimal aerodynamic design -- Reduces noise ~ 10 dB octave bends.
Valves	Turbulent eddies interacting with solid surfaces and shock waves; sound transmitted to duct work and piping.	Valve "popping": ~ 65-70 dBA at 50 ft. Bulk of energy > 500 Hz.	"Optimal" design selection; In-line silencers to prevent propagation of high frequency noise in downstream piping. Noise reduction of ~ 10 dB achievable.
Flares**	Combustion roar, Steam injection	Combustion roar: 60-85 dBA @ 1,000 ft., depending on burn-off rate; bulk of energy in 250-1000 Hz range. Steam injection: ~ 50-60 dBA @ 1,000 ft., depending on design.	Combustion roar: difficult to abate ground level flares show some promise. Steam noise: multiport nozzles afford approximately 10 dB reduction.

*Forced draft may be required by plenum design.

**Emergency operation only.

- the time of day and duration for which the various source elements are operating;
- the distances of the individual source elements from sensitive off-site receptors;
- the presence or absence of intervening structures which block the source-receptor "line of sight"; and
- ambient noise levels due to sources not associated with the facility.

For the purpose of noise impact assessment it was assumed that all of the major noise emitters will be operating together and continuously. Thus, the spectral characteristic of each source was incorporated in the computer model as a constant, continuous one, with 10 dB added to each octave band for the 10 PM through 7 AM period in order to obtain the resultant day-night noise level, L_{dn}.

Day-night noise levels were projected at each of the nine sites included in the Goodfriend survey, discussed in Section 4.6. These projections are presented in Table 5.6-2. Two traffic scenarios were considered in making the preparations.

- prior to completion of the Outer Harbor Crossing (estimated completion: mid-1977);
- after completion of the Outer Harbor Crossing.

Since direct access is provided from Main Street to the Outer Harbor Crossing, traffic on Main Street is expected to increase substantially. This is reflected in the L_{dn} projections, given in Table 5.6-2, for the sites along Main Street, all of which would experience increments of 3 decibels, which is equivalent to a doubling of traffic or more without the SNG facility. Thus, it is expected that noise from the SNG facility will be totally masked at all of the sites by noise from traffic and other sources.

Even during the 1976-77 season when the plant would be operating prior to the opening of the Outer Harbor Crossing, the L_{dn} noise increments due to SNG operations would be negligible or nonexistent (during normal operation) due to the abatement designs incorporated in the major heating elements of the plant. This becomes evident upon analysis of the impact of the SNG facility when considered as an isolated source. Under such an hypothetical circumstance, the contribution of the plant to community L_{dn} levels would range from 35-50 dBA. Those levels are 10 dB or more below existing noise levels at all sites. Furthermore, the analysis performed was conservative to the extent that all three boilers and all three superheaters were assumed to be operating simultaneously when, in fact, only two boilers and two superheaters will operate on a regular basis.

Table 5.6-2 also shows that the maximum day-night sound levels specified by the Maryland noise code would be violated at the closest residential sites irrespective of the SNG facility or the completion of the Outer Harbor Crossing. Projected L_{dn} levels also violate the Maryland standards by as much as 10 dB or more along Main Street and in West Turners. Virtually all of the increase, however, is due to sources other than the SNG facility during normal operation.

Noise from Operation of the Flares

The SNG process involves two flares for the purpose of burning off excess gaseous products, a ground flare and an elevated flare. The latter is utilized strictly in emergency situations, when maximum burn-off rates are required, i.e., in excess of 25,000 pounds per hour. Under such a situation, combustion roar and noise from steam injection could result in noise levels of 80 dBA or more at the nearest community receptors. Based on past experience, however, such high levels, are expected to be of short duration (on the order of a few minutes) and, to occur very infrequently. Thus, it is believed that such an event properly constitutes an "emergency utility operation" exempted by the Maryland noise code. Noise emission from ground-level flares, while of more frequent occurrence, are essentially limited to occasional "popping" during higher than normal process rates and are unlikely to be perceived by off-site receptors. Both ground and elevated flares are located in the most remote portion of the facility, about 3,000 feet or more from the nearest residences in the Dundalk communities.

TABLE 5.6-2

DAY-NIGHT SOUND LEVELS PROJECTED FOR COMMUNITY RECEPTORS IN THE SOLLERS POINT SNG FACILITY IMPACT AREA

Site	Location	Maryland Standard (L_{dn} - dB)	L_{dn} (dB) - Before 6/77		L_{dn} (dB) - After 6/77*	
			Without SNG	With SNG	Without SNG	With SNG
2	S. E. end of Main St.	55	58	59		
3	Main St. & Breckenridge Dr.	70**	62	62	67	67
4	New Pittsburgh Ave, entrance to Lyon Homes Development	55	61	61	65	65
5	Parking lot - N.E. side of New Pittsburgh Ave.	55	61	61	64	64
6	Avondale Rd. & Walnut Dr.	55	60	60	61	61
7	Main St., across from Balnew & Ash intersection	70**	63	63	67	67
8	Woodland & Falcon Way	64	64	64	67	67
9	Cottage Ave & Centre Ave.	55	62	62	64	64
10	Patapsco & Centre Ave.	55	64	64	65	65

*After the opening of the Outer Harbor Crossing, with additional traffic on Main Street.

**Standard for industrial zone is in terms of L_{eq} (24-hour), rather than L_{dn}.

5.7 Impact on Terrestrial Ecology

Operation of the SNG facility is not expected to have a significant impact on terrestrial ecology because the site does not contain a unique ecosystem, species that could inhabit the site are not considered to be significant, and the ecological condition of the site is not vital to the regional ecosystem. Furthermore, any significant impacts would have already occurred as a result of construction.

The height of tower and stacks, and the lighting used is not expected to have an impact on migratory birds. (Tall structures and lights can disorient birds causing them to fly into structures). The 125 foot height of the process towers is less than the 500 feet which is usually considered to be the critical height.

Erosion of the soils could affect the terrestrial ecology of the site. Where areas of the site have been altered by construction, grading to control drainage and revegetation could reduce the potential for impacts to occur.

As discussed in section 4.7, areas of the site do have the potential for producing vegetation and providing wildlife habitat. Planting could increase the ecological value of the site.

5.8 Impact on Aquatic Ecology

Impacts associated with the plant operations upon the aquatic ecology are temperature, toxicants and salinity. Because the process employed requires the use of energy (hot water), discharge of excess heat into the harbor would have to be a major concern. The use of a holding pond, for all process water and runoff from the process site, will allow the heated water to dissipate the excess heat before being discharged.

The impact of toxic substances within the discharged water appears to be minimal. An analysis of the processed water shows that average concentration of aluminum, 6 ppm, is the only toxic substance found to be discharged at a concentration above that which is considered hazardous, 1.5 ppm, by the National Academy of Sciences.[47] This problem can be eliminated by diluting the process water with process area runoff water. The introduction of low salinity process water into the brackish to saline harbor will create an impact upon the aquatic organisms within the vicinity of the discharge area. However, the amount of water to be discharged is not of sufficient quantity to cause an extensive impact. The aquatic organisms in the vicinity of the discharge which cannot tolerate the salinity difference and are mobile, will probably leave the area. To the extent which non-mobile or those of limited mobility exist in the area they will probably not survive.

5.9 Geological Impacts

It is not expected that the SNG facility will have any significant impact on the geological resources of the area. Since the site does not contain any valuable mineral resources, the presence of the project does not affect any mining operation.

The Maryland Geologic Survey indicated that the sandy characteristic of the site provides good drainage, and they do not expect that the project interferes with the flow of groundwater or the height of the water table.

Erosion is of concern since areas of the site have been altered by construction activities. Grading to control drainage and revegetation could reduce the potential for erosion.

5.10 Cumulative Impacts

The main projects or activities within the Baltimore metropolitan area which influence or combine with those impacts of the SNG facility are the Outer Harbor Crossing and the possible conversion of three power plants from oil to coal.

The Outer Harbor Crossing which is nearly complete will increase noise levels and motor vehicle-related air contaminants in the Sollers Point and Dundalk areas. It is expected that noise levels from increased traffic flows would mask sound levels produced by the SNG facility rather than adding to sound levels produced by that plant.

Increased levels of air contaminants from motor vehicles will affect the area as in other heavily trafficked areas of metropolitan Baltimore. Since concentrations of motor vehicle-related air contaminants will be small, the cumulative effect will be not significant.

It is also likely that the Outer Harbor Crossing and the access to it will further separate the community of East Turners from the industrial area of Sollers Point. With the existence of easier access to Sollers Point, there may be more pressure to expand industry but this would be more of a result of the access road and county planning than the SNG facility.

The Federal Energy Administration has issued prohibition orders for three power plants in the metropolitan Baltimore area, the Riverside, Wagner and Crane power plants. These prohibition orders, if made effective by the FEA, will mandate a switch from oil firing to burning coal. This switch could affect air quality since coal has a lower heating value than oil and may generate larger quantities of sulfur dioxide and particulates. However, before the fuel conversions can take place, environmental impact statements will be prepared for each power plant discussing the environmental implications of the fuel switch. These reports will address the effect of all three power plants changing fuels at the same time, and changes in background levels of air quality within the Baltimore metropolitan area. That analysis would include the cumulative air quality impacts associated with the Sollers Point SNG facility. FEA anticipates publication of the draft versions of these EIS's in late 1977.

5.11 Risks from Accidents

A detailed worst case analysis of the risks associated with accidents in the transportation and transfer of feedstocks to an SNG plant and in the operation of a plant is presented in the Programmatic Environmental Impact Statement on the Allocation of Petroleum Feedstocks to Synthetic Gas Plants, Federal Energy Administration, August 1977. In general SNG production is considered less hazardous than refinery operations, although no accident data on SNG plants as a group have been published. It is expected that any fire which might occur at the SNG facility would be confined to the plant site. Specific safety provisions for the BG&E facility are described in pages 3-23 and 3-24.

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6. MEASURES TO MITIGATE ENVIRONMENTAL IMPACTS

The Sollers Point SNG facility (SGN facility) has been designed with certain features which will reduce impacts to the environment. This section describes these features as they relate to the reduction of air contaminants, water effluents, and the mitigation of other impacts associated with the land socio-economic environments.

6.1 Land Use

The location of the SNG facility in an industrial area aids in avoiding land use impacts. Since it is compatible with zoning regulations and land use plans, it is consistent with overall planning for the area. The presence of a buffer zone between the plant facilities and East Turners limits the intrusion of the facility on that neighborhood.

The use of existing barge unloading facilities at the Riverside Steam Electric Generating Station has removed the necessity for an additional on-site barge facility.

Even though the visual quality produced by the project is believed to be minimal, planting of trees and shrubs could enhance the overall appearance. For example, a border of evergreens along the eastern boundary would screen the facility from passing motorists and other ground-level observers.

6.2 Health and Safety

There are a number of provisions which have been adopted in the design of the SNG facility in order to protect the health, safety, and welfare of the plant employees as well as the general population.

The SNG facility incorporates a complete fire protection system including: (1) a fire water loop system around the plant facilities; (2) monitor nozzles placed in appropriate locations to reach all facility components; (3) spray and fog nozzles attached to the steam system; (4) an injection foam system placed around the storage tank areas; (5) hydrants and portable fire extinguishers located around the plant; and (6) one or more fire trucks. In addition, approximately half of the raw water storage tank's reservoir will be available at all times.

The naphtha storage tanks are protected from fire or explosion in the following manner: (1) earth dikes sufficient to hold 110% of the contents of the largest tank has been constructed around the naphtha storage area; (2) hydrants are located throughout the naphtha storage area; (3) a fire foam generator facility is located adjacent to the storage tank area; each tank has several foam nozzles for fire-fighting inside or outside the tanks; (4) fire and smoke detectors are located throughout the storage area; (5) there is a drainage system to draw off naphtha should this become necessary during firefighting.

In addition, there is a safety relief and flare system. The safety relief valves release process contents to the flare system. There are a sufficient number of vent valves to relieve the process operations and equipment to the flare system. The flare system consists of piping, low and high level flares, and knock-out pots to collect liquids included in the relieved or vented process streams.

6.3 Air Quality

The SNG facility has been designed to control the impact on the ambient air quality. Design items incorporated into this plant to mitigate environmental impacts include the following:

- All process vents and emergency relief valves are piped to the flare system; thus, many of the hydrocarbon emissions which would otherwise be vented to the atmosphere will be burned in the flare. The design capacity of flare is adequate to handle the volume of gases that would result during an upset condition.
- The steam boilers will fire low sulfur oil, 0.5 percent, and are equipped with mechanical collectors to control particulate emissions.
- Off-gases from the hydrodesulfurization system are vented to a Stretford unit for sulfur recovery, thus minimizing the emission of sulfides and sulfur oxides from the process.
- Heights of stacks and vents have been selected to reduce contributions from the SNG facility, to ground-level concentrations of air contaminants.

6.4 Water Quality

An SNG facility will create wastewater as a result of its operations. This wastewater includes oily water originating from the various equipment, wastewater from the boiler feedwater treatment process containing inorganic salts, normal sanitary effluent and storm water runoff. In order to mitigate the impact of these wastewater effluents, the following measures have been incorporated into the design of the plant:

- Neutralization of the non-oily plant wastes (approximately 51,920 gpd);
- Oil-water separation of the oily plant wastes (approximately 5,700 gpd);
- Stabilization of the treated oily and non-oily wastewater effluent before discharge to the Baltimore Harbor (approximately 57,600 gpd);
- Drummed off-site disposal of spent Stretford solution; and
- Sanitary wastes to the city sewage treatment system (approximately 600 gpd).

These measures have been sufficient to comply with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit.

6.5 Noise

Major sources for contributing to community sound levels are the fans on the air coolers and the steam boilers. The fan housings and boilers have been designed to hold noise levels at a given distance within current OSHA standards. Since this SNG facility is located in an area that already has high background noise levels, the noise characteristics associated with the plant will be masked. Further mitigating measures that could be taken to reduce SNG facility associated noise would be to plant trees and shrubs to attentuate noise levels. This measure would also reduce visual impacts of the SNG facility.

6.6 Soils

Since areas of the site have been used for spoils and other areas have had the surface covering removed, the potential for erosion exists. The planting of grasses, shrubs and trees would reduce this potential.

The U. S. Soil Conservation Service Handbook entitled, Standards and Specifications for Soil Erosion and Sediment Control in Urbanized Areas is the official guide for erosion sediment control measures and their applications.

6.7 Mitigating Measures Beyond the Control of Baltimore Gas & Electric Company

Levels of air contaminants in the Baltimore metropolitan area are high. On Sollers Point, concentrations of particulates have exceeded standards, and the operation of the SNG facility will contribute more contaminants to this area. However, in order to improve air quality, an overall planning effort is required to control emissions from industrial, commerical, residential and vehicular sources. Such planning is currently underway on the state and local level.

Another activity which will affect air quality is the possible conversion from oil to coal firing of three power plants in the metropolitan Baltimore area. The Federal Energy Administration is now considering the overall effect of having those facilities switch fuels.

Since the shoreline of the Patapsco River is industrialized and the Outer Harbor Crossing will increase accessibility to the area, pressures may exist for further commercialization of the East and West Turners neighborhoods. These neighborhoods have historically been very stable, and efforts are being made by the Baltimore County planning agency to maintain and improve the residential areas. Residential and industrial use can coexist; however, attention is required to maintain the quality of life. Transportation planning has resulted in an access road to the Outer Harbor Crossing which will keep the major traffic flow from Main Street. This appears to be a positive step toward ensuring the stability of the neighborhood.

7. ADVERSE IMPACTS WHICH CANNOT BE AVOIDED IF THE ACTION IS TAKEN

Approval of the request for naphtha allocation of Baltimore Gas & Electric Company will enable the Sollers Point SNG facility (SNG facility) to operate on a commercial basis. The SNG facility will interact with and therefore modify the surrounding environment to some degree. However, significant environmental impacts can be eliminated or minimized to acceptable levels by adhering to applicable federal, state and county regulations, and by following good engineering practices.

The major alteration of the environment is through the discharge of air contaminants and wastewater effluents. Operation of the SNG facility will cause air contaminants to be emitted. The hourly emission rates and the total quantity emitted during 180 days of operation are as follows:

SO_2	290 lbs/hr	1,252,800 lbs/operating period
NO_2	78 lbs/hr	336,960 lbs/operating period
Particulates	10 lbs/hr	43,200 lbs/operating period

In comparison, the total emissions of these contaminants in Baltimore County in 1975 was as follows:

SO_x	135,914,000 lbs/yr
NO_x	172,502,000 lbs/yr
Particulates	39,034,000 lbs/yr

The emissions from the SNG facility will contribute to the ambient concentrations of air contaminants. However, it is expected that dispersion of the releases will make their total contribution to ambient air quality small so that there will be negligible interference with the attainment or maintenance of air quality standards.

The SNG facility will discharge wastewaters to Baltimore Harbor as described in Section 5.5. All waste streams will be conveyed to an equalization basin before discharge where settling and pH control can take place. Concentrations of aluminum in the effluent may be above the limit identified by the National Academy of Science as hazardous.[1] However, it is expected that dilutions in the harbor will dilute the concentrations to safe levels. It is also expected that aquatic organisms which are in the immediate vicinity of the discharge will not survive if they cannot move from that area. These organisms are not considered environmentally significant.

REFERENCES FOR CHAPTER 7

1. National Academy of Sciences, March 1973. Water Quality Criteria, United States Environmental Protection Agency, Washington, D.C.

8. THE RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT VERSUS LONG-TERM PRODUCTIVITY

The purpose of the proposed action is to allow those people who are dependent upon natural gas to receive their fuel requirements on a continual basis. As a result of the FEA's action, the Sollers Point SNG facility will be able to operate commercially when it is needed, and the impacts presented in Section 5 of this report will occur.

The long-term effect of the FEA's action is dependent upon both the level of impacts produced by the SNG facility and the environmental productivity of the site and surrounding area. Since the site area has been greatly influenced by industrial and urban activities, it is believed that the long-term productivity that would occur if the action were not taken would be limited.

The site has been planned for heavy manufacturing use; the zoning, the adjacent power plant and the nearby Outer Harbor Crossing would probably keep the site devoted to industrial use even if the SNG plant did not exist.

The SNG facility will provide economic stability to the Baltimore metropolitan area by insuring a gas supply and by providing taxes to Baltimore County. The SNG facility will also remove the necessity for firm customers of BG&E in FPC categories 1, 2 and 3 to redesign businesses, industries and residences to accommodate other fuels. If other fuels such as No. 2 oil could be used to offset gas deficiencies, the availability of the SNG plant would prevent the release of about 3,791,200 lbs of SO_2, 2,554,000 lbs of NO_2 and 715,200 lbs of particulates per year. (This is based on gas deficiency of 7,300,000 mcf being offset by No. 2 oil). If the project complies with federal, state and local rules and regulations, it is not expected that the project would have an adverse effect on long-term productivity.

9. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The proposed action by the FEA would commit the use of approximately 2,186,000 barrels of naphtha per year for SNG manufacture at the Sollers Point SNG facility (SNG facility). It is considered that the operation of the SNG facility, which is dependent upon the FEA action, would not irretrievably or irreversibly commit resources of the area.

The site has been designated and allocated to manufacturing usage. It does not have a high potential for being developed as a park or ecologically valuable area. Manufacturing development on the site will not place pressure on adjacent areas to become industrialized because of the separation by a buffer zone on the site and a major road at the site boundary. The operation of the SNG facility will not remove, alter or obstruct access to sites of historical, cultural, archeological or scenic significance.

Operation of the facility will require manpower which will be an irreversible commitment of resources.

The air contaminants released by the project will be a commitment of the air resources for the period of the operating life of the plant. As the project contributes to the ambient levels of air quality additional sources of air contaminants or normal urban growth and development may have to be restricted in efforts to maintain air quality standards.

Effluents from the project will use the water resources to dilute the concentrations to levels which are non-hazardous. This effect is not irreversible or irretrievable since the chemicals being discharged are those normally found in the harbor water and the quantity and concentrations are within the assimilative capacity of the waters.

The project will commit areas that could be used to develop terrestrial and aquatic life. The existence of the project removes 24 acres of land from being developed for wildlife. This may be considered to be irreversible and irretrievable since the dedication of land to industrial use would effectively keep it from being utilized to enhance terrestrial ecology. Even though the plant could be razed in future years and the site vacated, its allocation to industrial use would probably be continued. The area of Baltimore Harbor which will be influenced by the discharge could also revert to supporting a productive aquatic ecology if the SNG facility were removed. However, the industrial trend would probably continue, resulting in similar or more significant impacts.

10. ALTERNATIVES TO THE PROPOSED ACTION

10.1 Introduction

Alternatives to the proposed action may be divided into three broad categories: administrative alternatives, design alternatives and conservation. Administrative alternatives include actions that FEA can take, such as denial or reduction of allocation, and actions that other federal or state agencies can take, such as deregulating the cost of natural gas or modifying the rate structure for gas sales to end users. Design alternatives include such elements as flue gas and wastewater treatment systems. Conservation involves the use of various techniques and/or devices to decrease gas consumption. This section describes these alternatives and their environmental impacts.

In order to understand the implications of various alternatives, the sources of gas available to BG&E and its customer requirements must first be examined.

10.1.1 Sources of Gas Available to BG&E

BG&E has two external sources of gas for distribution to its customers: (1) Columbia Gas Transmission Corporation, which supplies natural gas and (2) Columbia LNG Corporation, which supplies SNG. In addition, BG&E has its own propane-air and LNG facilities, which are used for "needle peaking" purposes. Descriptions of each of these sources follow.

Columbia Gas Transmission Corporation

BG&E purchases all of its natural gas from the Columbia Gas Transmission Corporation (CGT). Maximum winter tariff volume (November 1 - March 31) as established by the Federal Power Commission is 60,236,000 mcf. In 1970, CGT began to limit its sales due to shortages of natural gas. Various levels of curtailments have occurred since 1972. Prior to the start of the 1976-1977 winter, BG&E was notified that its allocation would be 46,859,000 mcf of gas, or about 22.2% less than its tariff volume. Because of the colder than normal weather during the early part of the winter, BG&E's seasonal allocation was further reduced to

46,331,000 mcf, effective January 1, 1977. A month and a half later, BG&E's allocation was restored to its original level of 46,859,000 mcf. This was due to the warmer than normal weather during the latter half of the winter coupled with emergency gas purchases by CGT. Effective February 24, 1977, BG&E allocation was increased to 47,619,000 mcf, or nearly 21% less than their tariff volume.[1]

BG&E's actual gas useage from CGT last winter was 44,894,000 mcf or 2,725,000 mcf less than its allocation (47,619,000 mcf). The increase in the seasonal allocation, coupled with the warmer than normal weather in the service area beginning in mid-February, made it impossible for BG&E to utilize its full allocation from CGT.[2]

Columbia LNG Corporation

BG&E purchases SNG from Columbia LNG Corporation's Green Springs, Ohio SNG plant. BG&E's winter contract volume for this source of gas is 3,391,491 mcf. As a result of operating and feedstock problems, Columbia LNG delivered 2,754,000 mcf of Green Springs SNG to BG&E during the winter of 1976-77[3], or 19% less than BG&E's contract volume.

Baltimore Gas & Electric Company

BG&E owns and operates a propane air facility and a LNG plant. These two facilities have limited storage capacity and provide supplemental gas for extremely cold days only. These "needle peaking" facilities cannot be relied upon to provide supplemental gas for any extended period of time during a winter season. Instead, they are used to make up daily deficiencies in gas supplies.

The propane air plant can produce 90,000 mcf/day of gas. This plant uses propane to create a gas equivalent in heat content to that of natural gas. In producing the maximum daily quantity of gas, 1,080,000 gallons of propane are consumed. BG&E has a propane storage capacity of 12,000,000 gallons, which allows for 11 days of continuous operation for a total output of about 1,000,000 mcf. Additional output is dependent upon the time it takes to acquire additional volumes of propane which is a regulated fuel.[4]

BG&E's liquified natural gas plant liquifies pipeline natural gas during the summer months and stores it for peak purposes during the winter when supply is short. This facility has a maximum storage capacity of 1,000,000 mcf, with a daily sendout maximum of 187,500 mcf, equivalent to approximately five days of continuous operation.[5]

Last winter, BG&E used 492,800 mcf of its propane air and 220,500 mcf of its LNG.[6]

Summary of Gas Supplies

The various gas supplies available to BG&E are summarized below. Two categories of gas supplies are noted, base supplies and supplementary or peaking supplies. The allocation and delivery data are for last winter (1976-77).

Base Supply	Tariff or Contract Volume (mcf)	Allocation (mcf)	Actual Delivery (mcf)
1. Natural Gas from CGT	60,236,000	47,619,000	44,894,000
2. SNG from Green Springs	3,392,000	2,754,000	2,754,000

Supplementary/Peaking Supply	Plant Capacity[a] (mcf)	Actual Useage (mcf)
3. Propane Air (BG&E)	1,000,000	492,800
4. LNG (BG&E)	1,000,000	220,500

[a]Assumes continuous operations

10.1.2 BG&E Customer Demand

"Normal" winters for the Baltimore metropolitan area are based on the average number of degree days* for the time period November through March since the winter of 1950-51. The average number of degree days is about 3,979. During a normal winter, BG&E's 512,072 residential, commercial and industrial customers in FPC Priority of Service Categories 1, 2 and 3 (hereafter referred to as "firm" customers) require 46,026,000 mcf of gas.[7]

*A degree day is the difference between the average daily temperature and 65°F and is an index of how cold a day is.

The approximate distribution of these gas requirements by general end use categories is as follows:[8]

Residential	68%	(By Volume)
Commercial	20%	(By Volume)
Industrial	12%	(By Volume)
	100%	

BG&E's "design" winter has 4,894 degree days. Last winter's degree days totaled 4,273.[9] It should be noted that the design winter degree-days are 14.5% greater than for the 1976-1977 winter and 23% greater than for the average winter. During a design winter, there is an approximately 17.5% increase in firm sendout above normal winter requirements. Thus, the total firm gas requirements during a design winter is 54,089,000 mcf.[10]

10.1.3 Future Gas Supply and Demand Conditions

Table 10.1-1 shows alternative gas supply and demand conditions for BG&E's service area. Two winter seasons are presented, 1977-1978 and 1980-1981. Three sets of future gas supply projections have been assessed. Case I represents CGT and Columbia LNG Corporation's most recent set of projections for BG&E. Case II is based on an interpretation of CGT system-wide estimates recently prepared by National Economic Research Associates (NERA) for the Associated Gas Distributors.[11] Case III is premised upon a gas curtailment assumption presented by BG&E in its Application for Assignment.[12] A more detailed discussion of the underlying assumptions related to each of the three alternative projections and their ramifications with regards to future supply and demand conditions are discussed below.

Case I

In June 1977 CGT issued five-year projections for BG&E. According to these projections, BG&E will receive 48,055,000 mcf of gas during the winter of 1977-1978 and 49,221,000 mcf during the winter of 1980-1981.[13] These CGT projections include LNG from Columbia LNG Corporation's Cove Point facility, since this latter source has been recently reclassified by the FPC from a supplemental supply into CGT's base supply.[14] Columbia also projects that BG&E will receive 2,924,000 mcf of SNG from Green Springs during the winter of 1977-1978 and the full contract

TABLE 10.1-1

ALTERNATIVE GAS SUPPLY AND DEMAND CONDITIONS

(MMCF)

	Winter 1977-1978			Winter 1980-1981		
	Case I (CGT)	Case II (NERA)	Case III (BG&E)	Case I (CGT)	Case II (NERA)	Case III (BG&E)
Columbia Gas Transmission Co./Columbia LNG Corp	50,979	48,543	47,499	52,613	42,916	38,931
Natural Gas[1]	48,055	45,619	44,575	49,221	39,524	35,539
SNG Green Springs	2,924	2,924	2,924	3,392	3,392	3,392
Baltimore Gas and Electric Co.	2,000	2,000	2,000	2,000	2,000	2,000
Propane Air	1,000	1,000	1,000	1,000	1,000	1,000
LNG	1,000	1,000	1,000	1,000	1,000	1,000
Total Winter Gas Supplies (absent Sollers Point SNG)	52,979	50,543	49,499	54,613	44,916	40,931
Total Firm Gas Requirements (Normal Winter)	46,026	46,026	46,026	46,026	46,026	46,026
Total Firm Gas Requirements (Design Winter)	54,089	54,089	54,089	54,089	54,089	54,089
Total Gas Surplus (Shortfall)						
Normal Winter	6,953	4,517	3,473	8,587	(1,110)	(5,095)
Design Winter	(1,110)	(3,546)	(4,590)	(524)	(9,173)	(13,158)
Sollers Point SNG Requirements						
Normal Winter	0	0	0	0	1,110	5,095
Design Winter	1,110	3,546	4,590	524	9,173	13,158

[1] Cove Point LNG rolled into base supply of CGT pursuant to FPC ruling in Case RP71-68 (January 21, 1977).

volume of 3,392,000 mcf during the winter of 1980-1981.[15] Thus, according to the Columbia projections, BG&E should receive a total of 50,979,000 mcf of gas during the winter of 1977-1978 and 52,613,000 during the winter of 1980-1981. In addition to these external supply sources, BG&E has two additional supply sources, the company's propane air and LNG facilities. These two supply sources are not for base load usage but rather are reserved for peak shaving purposes. For the sake of developing a conservative analysis, it is assumed that these two peaking facilities could contribute their respective plant capacities to the winter supply. Although BG&E operating procedures dictate that between 50-75% of these two gas supplies could be utilized in this manner (during the heating season)[16], the analysis assumes a 100% supply contribution or a total of 2,000,000 mcf each winter. FEA considers the propane-air capability as reserved for peaking purposes and not as base supply gas.

On the basis of the winter gas supply estimates of Case I, BG&E's firm gas requirements would be less than the available supply under normal winter conditions. Under normal design requirements the gas surplus would range between 15% during the winter of 1977-1978 and approximately 19% during the winter of 1980-1981. However, under design winter conditions, there would be a small deficit, ranging from 1,110,000 mcf (2%) during the winter of 1977-1978 to 524,000 mcf (1%) during the winter of 1980-1981. Subsequently, under the assumptions of Case I, there would only be a need for SNG from the Sollers Point facility if winter temperatures approach a design winter. If normal winter temperatures prevail, there may not be a need for SNG.

Case II

The previous gas supply scenario was largely premised upon a recent set of CGT projections. Gas supply projections are inherently difficult to determine. A comparison of two sets of CGT projections prepared less than a year apart suggest the potential degree of uncertainty involved. The supply projections below were prepared for BG&E by CGT in July 1976 and June 1977. These projections include natural gas from CGT as well as LNG from Cove Point and SNG from Green Springs.[17]

Columbia Gas Transmission Corporation Supply
Projections for BG&E (MMcf)

Winter Period	July 1976	June 1977	Differences
1977-78	52,700	50,979	-1,721
1978-79	56,185	52,173	-4,012
1979-80	55,521	52,773	-2,788
1980-81	58,444	52,613	-5,831

A comparison of the two sets of projections for the next four winter periods prove to be significant. There is a 3 to 10% difference in the two sets of projections for a given winter period. In general, the more recent projections reflect, for the same winter periods, a lower gas supply than the previous projections, which were developed 11 months earlier. According to CGT, the earlier set of projections assumed that Alaskan gas from Prudhoe Bay would be available and that there would be an immediate deregulation of natural gas prices.[18] Since neither of these situations materialized, the June 1977 projections reflect a less optimistic gas supply condition. In addition, the downward revision of the 1976 forecast reflects the FPC ruling in Case RP71-68 (January 21, 1977), that allowed CGT to roll-in the LNG from Cove Point, thus making the gas from Cove Point part of CGT's base supply. For BG&E, this action, coupled with CGT's end use curtailment plan, results in less gas than would have been available if Cove Point were classified under the incremental approach assumed in the original 1976 forecast.[19]

A July 1977 report prepared by NERA for the Associated Gas Distributors suggests a potentially less optimistic gas supply picture for CGT. The NERA report, entitled "The Short-Term (1980) Outlook for Pipelines Supplying the AGD Service Territory", projects 1980 CGT gas supplies to be 17% below actual 1976 deliveries.[20] It should be noted that the NERA forecasts are for the entire Columbia system and represent annual as opposed to seasonal supply estimates. The basic assumptions made by NERA in developing these forecasts include the following:[21]

1. 50% of CGT's 1976 flowing supplies are assumed to be available in 1980 as part of CGT's base supply, and

2. Additional on and offshore gas supplies are assumed to be available through CGT's commitment under the FPC's advance payment program.

In addition, the NERA forecast assumes that CGT will receive LNG from El Paso I* during the forecast period. (Note: Cove Point is part of the larger El Paso I project) If this latter supply source does not materialize as scheduled, NERA estimates that the 1980 CGT system-wide shortfall would increase from 17% to about 28%.[22]

Although it is not possible to accurately interpret the NERA forecasts in terms of its implications for BG&E, some potentially meaningful comparisons can be made if certain simplifying assumptions are presented. These assumptions would be as follows:

1. The seasonal gas shortfalls in the Columbia system would be the same percentage as the projected annual shortfall, and
2. Each recipient of gas from CGT would be equally affected by a gas shortfall in the CGT system.

Under the above assumptions, a comparison between CGT's projections for BG&E, as described in Case I, may be in conflict with the NERA forecasts. If SNG from Green Springs is subtracted from the CGT supply (the NERA forecast excludes this supply source[23]), CGT's 1980 projections for BG&E show about a 3% increase in gas supplies above CGT's 1976 allocation to BG&E (49,221,000 mcf in 1980 vs. 47,619,000 mcf in 1976). In view of the potential conflict between the NERA projections and those of CGT, Case II was developed. Under this scenario, the following assumptions were made:

1. 1980 CGT natural gas deliveries decline by 17% over the 1976 winter allocation of 47,619,000 mcf.
2. 1977 CGT natural gas deliveries decline by 4.2% over the 1976 winter allocation. (4.2% is the interpolated decrease based upon the 1980 projected deficit of 17%.)

*El Paso I is a large LNG project currently being developed by El Paso Natural Gas Company. LNG will be imported from Algeria and stored at two terminals, Cove Point, Maryland and Savannah, Georgia.

3. SNG from Green Springs and BG&E supplemental supplies (absent SNG from Sollers Point) remain the same as in Case I.

On the basis of the winter gas supply estimates of Case II, BG&E's firm gas requirements would be approximately 9% less than the available supply this winter if seasonal temperatures are normal. On the other hand, if the 1977-1978 winter approaches a design winter, there is likely to be a gas shortfall of about 3,546,000 mcf. During the winter of 1980-1981, Case II projects a deficit regardless of the condition. If a normal winter prevails a 2.4% shortfall would occur. If it were a design winter, the shortfall would be approximately 17% or 9,173,000 mcf. Subsequently, under the assumptions of Case II, there would likely be no need for SNG from the Sollers Point facility during the coming winter unless it were a design winter, in which case approximately 3,500,000 mcf of SNG would be needed. During the 1980-1981 winter there would be a need for SNG from the Sollers Point facility regardless of whether a normal or design winter occurred. A normal winter would necessitate the provision of approximately 1,100,000 mcf of SNG while a design winter would require nearly 9,200,000 mcf of SNG from the Sollers Point facility (five month design capacity nearly 9,000,000 mcf).

Case III

Case III is the least optimistic of the three scenarios and is basically patterned around an assumption made by the BG&E in their gas supply projection prepared as part of the company's Application for Assignment (1975). Appendix III for the Application for Assignment contains design winter projections regarding BG&E's supply and demand position for the winter periods 1976 through 1979. In developing their Columbia supply estimates, BG&E assumed that future curtailments of their tariff volums (60,236,000 mcf) would increase by 5% each year.[24] This same 5% statistic was also used by BG&E in developing gas supply estimates contained in later addendums to their Application for Assignment.[25] Case III thus assumes that natural gas curtailments from CGT increase each year by 5%. During the 1976-1977 winter period, BG&E's allocation from CGT was 47,619,000 mcf or 21% less than the tariff volume. The

1977-1978 projected winter curtailment under Case III would be 26% and the 1980-1981 curtailment 41%. SNG from Green Springs and the availability of BG&E's own peaking gas derived from its propane air and LNG facilities would be the same in Case III as was specified in the previous two scenarios.

On the basis of the winter gas supply estimates of Case III, BG&E's firm gas requirements would be 7.5% less than the projected available supply this winter if temperatures are normal. On the other hand, if the 1977-1978 winter approaches a design winter, there is likely to be a gas shortfall of nearly 4,590,000 mcf. During the winter of 1980-1981, Case III (like Case II) projects a gas deficit regardless of the winter condition. If normal temperatures occur, the shortfall would be approximately 5,000,000 mcf, whereas if it were a design winter, the subsequent gas deficit could be as high as 13,158,000 mcf.

The alternative scenarios described above each result in different supply conditions. Case I represents the most optimistic gas supply situation, whereas Case III constitutes the worst case. The projections associated with Case II fall somewhere in between. Each of these cases have different implications regarding the need for SNG from the Sollers Point facility. None of the three alternative scenarios shows a need for this SNG during the coming winter provided that winter temperatures are normal. All three cases show varying levels of need for SNG if the 1977-1978 winter approaches a design winter. Case I indicates a need for 1,110,000 mcf of SNG while Cases II and III project a need for 3,546,000 mcf and 4,590,000 mcf of SNG respectively. During the 1980-1981 winter season, Cases II and III predicted a need for the SNG facility under both normal and design winter conditions. Case II indicates a need for SNG ranging from 1,110,000 mcf (normal winter) to 9,173,000 mcf (design winter). Case III shows an even greater level of need, with SNG requirements ranging between 5,095,000 mcf to 13,158,000 mcf. Case I, on the other hand, indicates a need for SNG only during a design winter in which case 524,000 mcf of SNG would be required.

Composite Case

If a composite condition were developed through averaging the results of the three alternative scenarios, the projected balance or imbalance between winter gas and supply and demand would be as follows:

		1977 - 1978	1980 - 1981
Total Gas Surplus (Shortfall)			
	Normal Winter	4,981,000 mcf	794,000 mcf
	Design Winter	(3,082,000 mcf)	(7,269,000 mcf)
Sollers Point SNG Required			
	Normal Winter	0	0
	Design Winter	3,082,000 mcf	7,269,000 mcf

A complete description of the composite average is shown in Table 10.1-2. This composite case would indicate that under normal winter conditions, there would be no need for SNG from the Sollers Point facility, for winter gas supplies would be in excess of "firm" customer requirements by a margin of nearly 11% during the winter of 1977-1978 and by nearly 2% during the winter of 1980-1981. On the other hand, if these two winter periods approach a design winter, the need for SNG from the Sollers Point facility would range from about 3,100,000 mcf during the winter of 1977-1978 to approximately 7,300,000 mcf during the winter of 1980-1981.

Representatives of BG&E have stated that the Riverside SNG plant will only be operated to make up deficiencies of gas to firm customers. The plant will not be operated when customers with alternate fuel capability are receiving gas.

10.2 Administrative Alternatives

10.2.1 Alternative of Denying the Requested Naphtha Allocation

If the FEA were to deny a naphtha allocation to BG&E, that company would not be able to produce its own supply of SNG. Under this circumstance, the environmental impacts presented in Section 5 of this report would not occur. However, other effects could possibly occur within the BG&E service area should the SNG plant not operate.

The major impacts resulting from this administrative alternative would be related to the potential economic disruption and change in ambient air quality which could take place within the service area of BG&E. Although this alternative would create other environmental impacts, the identification and assessment of these other effects are

TABLE 10.1-2

COMPOSITE ESTIMATE OF GAS SUPPLY AND DEMAND CONDITIONS
(MMCF)

	Winter 1977-1978	Winter 1980-1981
Columbia Gas Transmission Co./Columbia LNG Corp.	49,007	44,820
Natural Gas	46,083	41,428
SNG Green Springs	2,924	3,392
Baltimore Gas and Electric Co.	2,000	2,000
Propane Air	1,000	1,000
LNG	1,000	1,000
Total Winter Gas Supplies (absent Sollers Point SNG)	51,007	46,820
Total Firm Gas Requirements (Normal Winter)	46,026	46,026
Total Firm Gas Requirements (Design Winter)	54,089	54,089
Total Gas Surplus (Shortfall)		
Normal Winter	4,981	794
Design Winter	(3,082)	(7,269)
Sollers Point SNG Requirements		
Normal Winter	0	0
Design Winter	3,082	7,269

primarily dependent upon such unknown factors as which specific customer in FPC Categories 2 and 3 would be affected, where each such customer is located and the environmental conditions around their respective locations and the manner in which each customer responded to the potential consequences of the alternative with regard to adjusting to the ensuing problem of potential gas deficits. Given these limitations, it is not possible to generalize as to the potential impacts associated with such environmental areas as land use, water quality, noise or ecology. National impacts related to the availability of naphtha are beyond the scope of this report and have been addressed by the FEA in its Programmatic Environmental Impact Statement.[26]

Economic Effects - Employment and Income Loss

Section 10.1.3 illustrated the potential effects of three alternative gas supply scenarios, Cases I, II and III. Under the assumptions of each scenario, BG&E would require anywhere between 0 and 4,600,000 mcf of SNG from its Sollers Point plant during the winter of 1977-1978 and 0 to 13,200,000 mcf during the winter of 1980-1981 (design capacity for five months is nearly 9,000,000 mcf). A composite average of the three alternative cases indicates that BG&E may require up to 3,100,000 mcf of SNG during the coming winter and up to 7,300,000 mcf during the winter of 1980-1981.

On the basis of the composite average, the denial of the requested naphtha allocation could result in a gas shortfall of up to 3,100,000 mcf during the winter of 1977-1978 and 7,300,000 mcf during the winter of 1980-1981.

A 3,100,000 mcf shortfall during a design winter would lead to a full curtailment of customers in FPC Priority of Service Category 3 and about a 45% curtailment of customers in FPC Priority of Service Category 2. Residential customers in FPC Priority of Service Category 1 would not be directly affected. A 7,300,000 mcf shortfall during a design winter would result in a full curtailment of FPC Priority of Service Category 2 and 3 customers, plus a 0.8% curtailment of FPC Priority of Service Category 1 customers.

The employment and associated income loss due to gas deficits are difficult to assess since they are dependent upon which firms are curtailed and by how much; ability of industries and commercial establishments in FPC Categories 2 and 3 to purchase emergency gas supplies from other sources or to accommodate periods of lower production due to gas shortages; their ability to modify processes and physical settings to allow for the use of an alternate fuel and their financial situation in terms of the economic feasibility of fuel switching.

Because the situation is difficult to define, three separate approaches were used to evaluate the range of economic impacts expected. These included (1) a survey conducted by BG&E, (2) a general statistical method and (3) interviews with state agencies. These approaches and their results are discussed below.

BG&E Survey

During the Spring of 1977, BG&E conducted a survey of its "firm" commercial and industrial customers regarding alternative fuel capabilities and the potential economic impacts of gas curtailments. Questionnaires were sent to the 20 largest customers of BG&E in addition to 108 other, randomly selected commercial and industrial users.

The results of the survey are summarized in Table 10.2-1. The data are separately displayed for each of the two sets of respondents: firm large volume users (i.e., the 16 largest users who responded to the questionnaire); and other firm customers (i.e., the 75 randomly-selected users who responded to the questionnaire). The data generally indicated that, with the exception of some of the largest users, "firm" industrial and commercial customers of BG&E do not have an alternative fuel capability in place. Approximately 20% of the large volume respondents indicated that they already had the necessary equipment to use an alternative fuel, whereas none of the other, randomly-selected customers had such a capability already in place. Propane and distillate oil were found to be the primary alternative fuels used by those with an alternative fuel capability. The survey results also indicate that gas curtailments can have a severe and detrimental effect on employment, wages and production. Increasing levels of gas curtailments result in increasing numbers of jobs lost, employees placed on short time (i.e., fewer hours per week worked) and hours of lost production. These effects subsequently result in a substantial loss of income to employees and a signficant loss of production value to employers.

TABLE 10.2-1

BG&E SURVEY, SPRING 1977

	Firm Large Volume Users	Other Firm Customers
Sample Size (#)	20	108
Respondents (#)	16	75
Rate of Return (%)	80	69
1976-77 Winter Gas Use (mcf)		
Total Use	2,131,065	147,881
Number of Respondents	16	75
Average Use	133,192	1,972
Gas End Uses		
Space Heat (% of Responses)	81	92
Process Fuel (% of Responses)	88	36
Alternative Fuel Capability		
In Place (% of Responses)	19	0
Not In Place (% of Responses)	81	100
Alternative Fuel Used If Capability In Place		
Propane (% of Responses)	67	NA
Butane (% of Responses)	0	NA
Distillate Fuel Oil (% of Responses)	100	NA
Residual Fuel Oil (% of Responses)	0	NA
Other (% of Responses)	0	NA
Impact of 10% Curtailment		
Employees Laid Off (#)	246	59
No. of Responses	7	10
Average	123	6
Employees on Short Time (#)	4,236	30
No. of Responses	2	6
Average	2,110	5
Hours per Week on Short Time (#)	40	84
No. of Responses	2	6
Average	20	14
Weekly Employee Loss of Wages ($)	$57,977	$13,943
No. of Responses	6	10
Average	$9,663	$1,394
Weekly Production Hours Lost (#)	246	106
No. of Responses	7	14
Average	35	8
Weekly Value of Lost Production ($)	$193,177	$102,829
No. of Responses	3	13
Average	$64,392	$7,910

TABLE 10.2-1 (Continued)

	Firm Large Volume Users	Other Firm Customers
Impact Of 25% Curtailment		
Employees Laid Off (#)	4,349	499
No. of Responses	7	20
Average	621	25
Employees on Short Time (#)	4,653	1,037
No. of Responses	3	11
Average	1,551	94
Hours per Week on Short Time (#)	70	202
No. of Responses	3	9
Average	23	22
Weekly Employee Loss of Wages ($)	$80,611	$233,911
No. of Responses	6	20
Average	$13,435	$11,696
Weekly Production Hours Lost (#)	473	560
No. of Responses	9	23
Average	53	24
Weekly Value of Lost Production ($)	$632,943	$771,573
No. of Responses	4	21
Average	$158,236	$36,742
Impact Of 50% Curtailment		
Employees Laid Off (#)	9,186	2,602
No. of Responses	9	35
Average	1,021	74
Employees on Short Time (#)	4,620	380
No. of Responses	2	13
Average	2,310	29
Hours per Week on Short Time (#)	40	391
No. of Responses	2	12
Average	20	33
Weekly Employee Loss of Wages ($)	$299,021	$579,041
No. of Responses	7	30
Average	$42,717	$19,301
Weekly Production Hours Lost (#)	927	1,582
No. of Responses	11	36
Average	84	44
Weekly Value of Lost Production ($)	$1,716,036	$2,438,546
No. of Responses	4	26
Average	$429,009	$93,790

TABLE 10.2-1 (Continued)

	Firm Large Volume Users	Other Firm Customers
Impact Of 100% Curtailment		
Employees Laid Off (#)	28,000	3,668
No. of Responses	14	48
Average	2,000	76
Employees on Short Time (#)	No Response	14
No. of Responses		2
Average		7
Hours per Week on Short Time (#)		64
No. of Responses		2
Average		32
Weekly Employee Loss of Wages ($)	$420,123	$1,440,158
No. of Responses	8	32
Average	$52,515	$45,005
Weekly Production Hours Lost (#)	1,683	2,829
No. of Responses	4	39
Average	120	73
Weekly Value of Lost Production ($)	$3,304,071	$4,610,191
No. of Responses	5	28
Average	$660,814	$164,650

Source: Tabulations based on survey summary prepared by Baltimore Gas and Electric Company, March, 1977.

In order to assess the economic consequences of various levels of gas curtailments on the entire BG&E service area, the data from the random sample were extrapolated to the universe of BG&E customers in FPC Priority of Service Categories 2 and 3. According to BG&E, there are 3,658 such customers in the service area.[27] The extrapolations were based on the per respondent averages noted in the second column of Table 10.2-1. It was previously estimated that the gas shortfall during the winter of 1977-1978 could be as high as 3,100,000 mcf, if no SNG were available from the Sollers Point facility, and up to 7,100,000 mcf during the winter of 1980-1981. These projected deficits are equivalent to a 45% and 100% curtailment of FPC Priority of Service Catagory 2 and 3 customer requirements, respectively. (In reality, the 7,100,000 mcf shortfall estimate represents nearly a 103% curtailment. However, for the purposes of this evaluation, a 100% curtailment is used.) The economic consequences of these two curtailment levels are shown on Table 10.2-2 along with the effects of a 10%, 25%, and 50% curtailment. The economic impacts of the 45% curtailment was derived through the interpolation of the data concerning the consequences of a 25% and 50% curtailment.

A 3,100,000 mcf curtailment or gas shortfall would directly affect approximately 236,000 employees through layoffs. The weekly value of lost wages is estimated to be approximately $65 million with the weekly value of lost production estimated to be more than $300 million. The economic consequences of a 7,100,000 mcf gas deficit are even more substantial. Nearly 280,000 employees would be laid off. Subsequent weekly wage losses are estimated to be in the vicinity of $165 million, while the value of lost production is estimated to be in excess of $600 million.

The estimates noted on Table 10.2-2 provide a general indication of the potential economic consequences of gas curtailments. It is believed that the data shown in Table 10.2-2 represent at least an order of magnitude estimate of the economic consequences of gas curtailments. In an effort to ascertain the "reasonableness" of these estimates, two other approaches were used. The results of each are discussed below.

TABLE 10.2-2

ESTIMATES OF ECONOMIC IMPACT OF GAS CURTAILMENTS

Level of Gas Curtailment[1] (%)	Quantity of Gas Curtailed[2] (mcf)	Employees Laid Off (#)	Weekly Value Of Lost Wages ($ million)	Weekly Value Of Lost Production ($ million)
10	690,176	21,582	5	29
25	1,725,439	91,084	43	134
45*	3,100,000	235,648	65	301
50	3,450,878	271,789	71	343
100**	6,901,757	279,471	165	602

(1) Curtailments are relative to BG&E customer demand for those in FPC Priority of Service Categories 2 and 3.

(2) Quantities of gas are relative to design winter requirements of BG&E customers in FPC Priority of Service Categories 2 and 3 where 100% = 6,901,757 mcf.

* Projected curtailment during winter of 1977 - 1978.

** Projected curtailment during winter of 1980 - 1981.

Source: Based on economic survey performed by Baltimore Gas and Electric Company, Spring 1977.

General Statistical Method

A general statistical method of evaluating economic impacts was also used in an effort to judge the degree to which the previously described survey results represent reasonable, order-of-magnitude estimates of the economic consequences of gas curtailments. Average gas consumption statistics were used, along with data on the average size of a manufacturing firm in the BG&E service area, to estimate the potential direct loss of jobs through gas curtailments. Average manufacturing annual wage figures were then used to translate these job losses into income loss estimates.

According to BG&E, there are approximately 3,658 customers in FPC Priority of Service Categories 2 and 3.[28] These "firm" customers require a total of 6,901,757 mcf of gas during a design winter,[29] or 1,887 mcf of gas per "firm" customer. Based on this average consumption statistic, the curtailment of 3,100,000 mcf of gas during a design winter would be equivalent to the potential elimination of 1,643 companies. The curtailment of 7,100,000 mcf of gas could result in the closing of a minimum of 3,658 companies.

The most recently available state statistics indicate that in 1975 the average manufacturing firm within the BG&E service area employs 112 persons,[30] with the average annual wage being $12,251 or about $236 per week.[31] Thus, the dislocation of 1,643 companies could result in the direct furloughing of 184,016 employees whose aggregate weekly wage amounts to an estimated $43 million. The dislocation of all 3,658 companies could result in the direct loss of 409,696 jobs with an aggregate wage value of nearly $97 million per week.

These estimates of the potential economic impacts of gas curtailments are not totally comparable to the more comprehensive data derived from the BG&E survey. However, a comparison of the two sets of statistics concerning estimates of jobs lost through curtailments indicates that the general statistical method estimate is 22% below the extrapolated estimate from the BG&E survey data when a 3,100,000 mcf curtailment is evaluated and 47% above the extrapolated survey estimate when a 100%

gas curtailment is assessed. While this comparison by no means validates the estimates previously presented in Table 10.2-2, it does lend support to these former estimates. Even if the economic impacts of a 3,100,000 mcf and a 7,100,000 mcf gas curtailment were as much as half of those derived from the survey data, the implications would still be substantial. Under this assumption, the total value of lost income and production would be approximately $183 million per week if there were a 3,100,000 mcf shortfall and $383 million if there were a 7,300,000 mcf gas deficit.

Interview with Agencies

A number of state and regional agencies and organizations were also contacted in an effort to obtain additional or supporting information on the economic implications of gas curtailments. The following agencies and organizations were approached:[32]

- Baltimore City Chamber of Commerce
- Baltimore County Chamber of Commerce
- Baltimore Regional Planning Council
- Howard County Chamber of Commerce
- Maryland State Chamber of Commerce
- Maryland Department of Economic and Community Development
- Maryland Department of Employment Security
- Maryland Department of Labor and Industry
- Maryland Department of Planning
- Maryland Energy Policy Office
- Maryland Public Service Commission

None of the agencies contacted had any useable information on the economic consequences of gas curtailments in the Baltimore region.

Economic Effects - Energy Costs

An evaluation has been prepared to show a comparison of fuel costs when other energy sources are used to offset the projected gas deficits. It is important to realize that these comparisons are based on the assumption that BG&E's "firm" customers are physically able to use fuels other than natural gas or SNG.

The cost comparisons consider the use of propane, No. 2 fuel oil and electricity as alternatives to the use of natural gas and SNG. The actual financial comparisons are based on recent prices of these fuels in the Baltimore metropolitan area. These prices represent average current prices to commercial and industrial customers. Hence, certain of the prices are lower than what the average residential user would pay. The cost analysis considers two alternative gas shortfalls, 3,100,000 mcf and 7,300,000 mcf.

The results of the cost evaluation are shown in Table 10.2-3. The data indicate that if a 3,100,000 mcf gas shortfall were to be offset by the use of an alternative fuel, it would be most economical to purchase No. 2 fuel oil followed by propane. Electricity would be the only fuel source more expensive than SNG under this deficit condition. On the other hand, if a 7,300,000 mcf gas shortfall were to occur, propane and electricity would both be more expensive than SNG. No. 2 fuel oil would still continue to be more economical than SNG.

The above cost comparison only takes into account the delivered fuel price to the consumer. User costs associated with the purchase, installation and maintenance of a new energy system are not considered, nor are the user costs considered for modifying operations and processes, adding additional fuel storage or becoming part of a new distributional system. Furthermore, the cost comparison does not address the potential costs to the fuel distributors, expenses which could be significant. New storage facilities and transportation equipment may be required. In certain cases, it may be necessary to construct a new refinery. In order to arrive at a full comparison with the costs of SNG, all of these additional costs would have to be defined and considered. The inclusion

TABLE 10.2-3

COMPARISON OF ALTERNATIVE ENERGY SOURCES

	Winter 1977-1978	Winter 1980-1981
Gas Supply Estimates Used[1]		
Design Winter Requirements for Firm Customers	54,089,000 mcf	54,089,000 mcf
Estimate of Gas Supply (Absent Sollers Point SNG)	51,007,000 mcf	46,820,000 mcf
Estimate of Gas Deficiency	3,082,000 mcf	7,269,000 mcf
Cost Comparison of Using Alternative Sources of Energy to Offset Estimated Gas Deficiency[2] (Rounded to Nearest $100,000)		
Cost of Natural Gas and SNG	$162,300,000	$162,300,000
Cost of Natural Gas and Propane	$158,300,000	$169,000,000
Cost of Natural Gas and No. 2 Fuel Oil	$150,600,000	$150,900,000
Cost of Natural Gas and Electricity	$170,500,000	$197,900,000

[1]Gas supply estimates from Table 10.1-2.

[2]Cost factors used:

Average Price of Natural Gas and SNG per 10^6 Btu (rolled in price)	$3.00
Average Cost of Natural Gas per 10^6 Btu	$2.78
Average Cost of Propane per 10^6 Btu	$5.35
Average Cost of No. 2 Fuel Oil per 10^6 Btu	$2.86
Average Cost of Electricity per 10^6 Btu	$9.32

of these latter costs could not be directly accomplished without detailed engineering studies of each customer that switches to an alternative fuel. In addition, detailed studies of alternative fuel supplies and production capabilities would have to be undertaken. Some indirect and generalized capital cost estimates have been developed, however. These estimates are based on the approximate cost of converting a home heating system that currently uses natural gas to one that uses No. 2 fuel oil or propane. It should be noted that if fuel switching were to occur, commerce and industry represent the most likely candidate for pursuing such an action as they would be the first to be curtailed in the event of a gas shortage. However, it is difficult to assess the capital costs associated with fuel switching for these two sectors since physical conditions and plant processes differ significantly between companies. As a result, the capital cost analysis focuses on the residential sector where data is more readily available and physical conditions more generalizable. In short, the residential sector has been used as a surrogate for the commercial and industrial sectors. Although there are obvious differences between industrial and residential customers, the use of the latter sector as a focal point for analysis should provide at least an order of magnitude estimate of what commerce and industry would have to invest if they were to switch fuels.

There are approximately 546,054 residential dwelling units served by BG&E.[33] On the basis of data obtained from a BG&E appliance saturation survey conducted in December 1975, coupled with BG&E estimates of residential space heating requirements during a design winter,[34] it is estimated that there are approximately 344,810 dwelling units in the service area that use gas for space heating. These residential units require about 26,328,424 mcf of gas for space heating during a design winter, or 76.36 mcf per user.[35] On the basis of this average consumption statistic, a 3,100,000 mcf gas shortfall could be offset through the conversion of approximately 40,600 residential heating systems. Likewise, a 7,300,000 mcf shortfall could be offset through the conversion of approximately 95,600 residential heating systems.

The National Oil Jobbers Council estimates that the cost of converting a gas-fueled heating system to one that burns oil can range between $800 and $1250 depending on the type of heating system that is currently in place. The conversion of a forced hot air system would require an expenditure between $800 and $1050, while the costs of converting a steam system would run between $1000 and $1250.[36] Assuming an average conversion cost of $1000 per unit, the capital cost of switching to oil from gas would total around $40.6 million if a 3,100,000 mcf gas deficit were to be offset and $95.6 million if a 7,300,000 mcf gas deficit were to be offset. If these capital costs were amortized over a 10-year period at an interest rate of 10%, the annual constant payment would be approximately $6.4 million on a $40.6 million debt and $15.2 million on an $95.6 million debt. Taking these annual costs into consideration, along with the annual fuel cost savings that can be realized if oil were used instead of gas, the net result is that it would be more economical to switch to oil if a 3,100,000 mcf gas deficit were to be offset through conversions. Under this condition, the annual customer savings would total approximately $5.3 million. However, if a 7,300,000 mcf gas deficit were to be offset in a similar fashion, the subsequent conversion would result in a net annual loss of approximately $3.8 million.

A similar capital cost analysis was also performed in terms of a household converting its gas-fueled heating system to one that burns propane. Capital cost estimates were obtained from several Baltimore propane dealers.[37] It was generally agreed that the necessary equipment changes and furnace modifications would cost between $100 and $200 per unit. Assuming an average conversion cost of $150, the capital cost of switching to propane from gas would total around $6.1 million if a 3,100,000 mcf gas deficit were to be offset and $14.3 million if a 7,300,000 mcf gas deficit were to be offset. Amortizing these costs over a 10-year period at an interest rate of 10% would result in the annual constant payments being approximately $1.0 million on a $6.1 million debt and $2.3 million on a $14.3 million debt. Again, taking these annual costs into consideration along with the annual fuel cost savings that can be realized if propane were used instead of gas, the net result is that it would be somewhat more economical to switch fuels. The net annual savings would amount to approximately $3.0 million if a 3,100,000 mcf gas deficit were to be offset by residential fuel switching to propane. On the other hand, there would be a net annual loss of $4.7 million if the gas deficit to be made up were 7,300,000 mcf.

Although the energy cost comparison generally indicates that a residential customer could achieve a net cost savings through fuel switching to either No. 2 oil or propane, there are certain additional factors which may constrain the feasibility of fuel switching. In order to achieve the desired gas savings, between 41,000 and nearly 100,000 residential space heating customers would have to switch fuels. (The relative availability of oil and propane is discussed in the Final Programatic EIS on the Allocation of SNG Feedstocks, August 1977.) Regardless of the long-term cost savings that may be achieved, it may prove difficult (and expensive) to persuade such large numbers of households to make the necessary investment. Although fewer commercial and industrial customers would have to switch fuels in order to offset the projected gas shortfall, there would likely be a similar logistical problem associated with implementation.

Another problem related to fuel switching is the fact that propane is a regulated fuel. If a 3,100,000 mcf gas deficit were to be offset by propane in equivalent quantities to compensate for the difference in heat content, approximately 33.8 million gallons of propane would be required each winter. This sum would increase to 79.6 million gallons if a 7,300,000 mcf gas deficit were to be offset by propane.

The switching from gas to No. 2 fuel oil will also create externalities; for example, air emissions would increase not only due to the characteristics of the fuel itself but also due to the increased truck traffic that would be generated in order to deliver the oil to the customers. The air quality effects of fuel switching are analyzed below.

Air Quality Effects

If SNG is not available to offset natural gas shortages, other fuels would have to be used to the extent the capability exists. Factors limiting these capabilities would include the feasibility for the individual customer to switch to an alternate fuel and the availability of the alternate fuels. In order to estimate the impact of fuel switching on air quality, emissions of air contaminants resulting from the use of alternate fuels were calculated for the BG&E service area.

As previously indicated, design winter gas shortfalls could range from 3,100,000 mcf in 1977 and 1978 to 7,300,000 mcf in 1980 and 1981.

An evaluation of the change in air contaminant emissions was performed using (1) propane to offset gas shortfalls, and (2) No. 2 fuel oil to offset gas shortfalls. Propane and No. 2 oil are considered to be the fuels more likely to be used if gas heating and process systems were to be retrofitted. While customers could use propane to offset short-term gas deficiencies, No. 2 oil would be the most likely fuel for the longer term in most cases. The ability of customers to switch to these fuels may be restricted in certain cases by physical factors such as space requirements for the storage and handling of alternate fuels or by financial considerations associated with the installation of new boilers and process equipment.

The calculated change in air contaminant emissions due to fuel switching in response to natural gas shortfalls of 3,100,000 mcf and 7,300,000 mcf are shown in Tables 10.2-4 and 10.2-5, respectively. The change in emissions presented in these tables represents the calculated difference between the amount of air contaminant emissions produced through combustion of the deficit amount of natural gas and those emissions produced through the combustion of the equivalent amount of alternate fuel. Air pollutant emission factors and assumed fuel characteristics used in this analysis are presented in Tables 10.2-6 and 10.2-7.

It is difficult to directly relate a change in the quantity of air contaminant emissions shown in Tables 10.2-4 and 10.2-5 to a change in air quality. Many factors such as characteristics of the flue gases, amount of emissions from each source, topography, arrangement of nearby buildings and localized atmospheric dispersion characteristics influence the way in which emissions affect air quality. However, in general, an increase in emissions of air contaminants will tend to cause air quality to deteriorate. As shown in Tables 10.2-4 and 10.2-5, emissions from the combustion of natural gas and propane are virtually the same. No significant changes in air quality would be brought about by using propane as an alternate fuel. If No. 2 oil were used to replace the gas curtailments, sulfur emissions within the service area in 1980-1981 would be approximately 1.5% greater than 1975 emission levels. The maximum changes in particulates and nitrogen oxides emissions are 0.9% and 0.7%,

TABLE 10.2-4

CHANGE IN AIR CONTAMINANT EMISSIONS WITHIN THE BG&E SERVICE AREA DUE TO FUEL SWITCHING BASED ON A PROJECTED GAS DEFICIT OF 3,100,000 mcf

Change in Emissions When No. 2 Fuel Oil is Used to Offset Gas Deficit

	Change in Emissions in Tons/Year					Percent Change in Emissions*				
	Particulates	Sulfur Dioxide	Nitrogen Oxides	Carbon Monoxide	Hydrocarbons	Particulates	Sulfur Dioxide	Nitrogen Oxides	Carbon Monoxide	Hydrocarbons
BG&E Service Area	152.0	805.2	542.5	12.2	21.6	0.4	0.6	0.3	< 0.1	< 0.1

Change in Emissions When Propane is Used to Offset Gas Deficit

	Change in Emissions in Tons/Year					Percent Change in Emissions*				
	Particulates	Sulfur Dioxide	Nitrogen Oxides	Carbon Monoxide	Hydrocarbons	Particulates	Sulfur Dioxide	Nitrogen Oxides	Carbon Monoxide	Hydrocarbons
BG&E Service Area	13.5	2.3	65.3	-5.5	-7.3	< 0.1	< 0.1	< 0.1	<-0.1	<-0.1

*Percent changes in Emissions are based on the 1975 Emissions Inventory Report, Bureau of Air Quality and Noise Control, Division of Program Planning and Evaluation, State of Maryland Department of Health and Mental Hygiene

TABLE 10.2-5

CHANGE IN AIR CONTAMINANT EMISSIONS WITHIN THE BG&E SERVICE AREA DUE TO FUEL SWITCHING BASED ON A PROJECTED GAS DEFICIT OF 7,300,000 mcf

Change in Emissions When No. 2 Fuel Oil is Used to Offset Gas Deficit

	Change in Emissions in Tons/Year					Percent Change in Emissions*				
	Particulates	Sulfur Dioxide	Nitrogen Oxides	Carbon Monoxide	Hydrocarbons	Particulates	Sulfur Dioxide	Nitrogen Oxides	Carbon Monoxide	Hydrocarbons
BG&E Service Area	357.6	1,895.6	1,277.6	29.6	51.2	0.9	1.5	0.7	< 0.1	< 0.1

Change in Emissions When Propane is Used to Offset Gas Deficit

	Change in Emissions in Tons/Year					Percent Change in Emissions*				
	Particulates	Sulfur Dioxide	Nitrogen Oxides	Carbon Monoxide	Hydrocarbons	Particulates	Sulfur Dioxide	Nitrogen Oxides	Carbon Monoxide	Hydrocarbons
BG&E Service Area	31.3	5.6	153.3	-13.1	-17.4	0.1	< 0.1	0.1	<-0.1	<-0.1

*Percent changes in emissions are based on the 1975 Emissions Inventory Report, Bureau of Air Quality and Noise Control, Division of Program Planning and Evaluation, State of Maryland Department of Health and Mental Hygiene.

TABLE 10.2-6

AIR EMISSIONS FROM COMBUSTION OF NATURAL GAS AND ALTERNATIVE FULES

Fuel User and Fuel	Pounds of Emissions per 10^6 Btu of Fuel: Particulates	SO_2	CO	NO_x	Hydrocarbons
Residential					
Natural gas	0.005-0.015	0.0006	0.020	0.080	0.008
Distillate Oil	0.108	0.52	0.028	0.28-0.58	0.022
Commercial					
Natural gas	0.005-0.015	0.0006	0.020	0.120	0.008
Distillate Oil	0.108	0.52	0.028	0.28-0.58	0.022
Industrial					
Natural gas (firm)	0.005-0.015	0.0006	0.017	0.12-0.24	0.003
Natural gas (interruptible)	0.005-0.015	0.0006	0.017	0.70	0.003
Distillate Oil	0.108	0.52	0.028	0.28-0.58	0.022
Propane (firm)	0.0186	0.0022	0.0164	0.122	0.0032
Coal (controled/uncontrolled)	0.580/5.80	0.36/3.6	0.072	0.536	0.036
Electric Utilities					
Natural gas (boilers)	0.005-0.015	0.0006	0.017	0.70	0.001
Natural gas (turbines)	0.014	0.0052	0.116	0.42	0.042
Distillate Oil (boilers)	0.058	0.56	0.022	0.76	0.0142
Residual Oil (boilers)	0.054	3.2	0.020	0.70	0.0134
Coal (controlled/uncontrolled)	0.72/7.2	0.36/3.6	0.036	0.64	0.0108
Propane	0.0186	0.0022	0.0164	0.122	0.0032

TABLE 10.2-7

FUEL CHARACTERISTICS ASSUMED IN THE ANALYSIS

Fuel	Characteristics	Source (See Below)
Fuel oil for industrial use	No. 2 distillate with 0.5%S and 140,000 Btu/gal.	1
Fuel oil for residential use	No. 2 distillate with 0.5%S and 140,000 Btu/gal.	1
Fuel oil for electric utilities	No. 6 residual with 3%S and 150,000 Btu/gal.	1
Natural gas	S content of 2,000 grains/10^6 ft^3 and 1,000 Btu/ft^3	2
Natural gas used in gas turbines	S content of 2,000 grains/10^6 ft^3 and 1,000 Btu/ft^3	3
Propane	S content of 0.20 lb/10^3 gal., and 91,500 Btu/gal.	3
Coal	Pulverized, 12.53 wt % ash, 2.59 wt % S, and 14,000 Btu/lb. Assume controls reduce emissions by 90 percent	4

Sources: 1. Environmental Protection Agency, Compilation of Air Pollution Emission Factors, Second Edition, AP-42, April 1973.

2. Supplement No. 3 to Reference 1, June 1974.

3. Supplement No. 4 to Reference 1, January 1975.

4. University of Oklahoma, Energy Alternatives, A Comparative Analysis. May 1975.

respectively. The change in emissions is of more concern in Baltimore City than in other areas, since concentrations of suspended particulates and sulfur dioxide have exceeded air quality standards at locations within the city. (Baltimore City is a nonattainment area for particulates but an attainment area for SO_2.) Therefore, any increase in particulates and sulfur dioxide emissions may be of concern.

The estimates of changes in emissions are based on the assumption that gas deficits would be offset by other fuels. It is also likely that some industrial and commercial customers would totally switch to an alternate fuel. Thus, it is possible that the actual increase in air contaminants would be higher.

It should be noted that indirect effects on air quality may also result from the use of alternate fuels. Although no attempt has been made to quantify these impacts, it is likely that increased truck traffic would be required to deliver propane and/or oil to customers. This would contribute additional air contaminants to the atmosphere.

10.2.2 Alternative of Reducing the Requested Naphtha Allocation

Instead of denying the naphtha allocation, FEA can elect to approve a quantity of naphtha which is less than that requested by BG&E. This action may be taken if FEA determines that the requested allocation would not be in keeping with the regulatory policies as enumerated in 10 CFR 211.29.

BG&E's Application for Assignment requests that the company be allocated 1,000,000 barrels of naphtha per year until the spring of 1978 when the allocation would be increased to 2,186,000 barrels each year. On the basis of this feedstock request, 4,940,000 mcf of SNG could be produced during the winter of 1977-1978 and 9,000,000 mcf during the winter of 1980-1981. (10,800,000 mcf of SNG could be produced with a 2,186,000 barrel naphtha allocation over a six-month period. However, during the five-month winter period, the design capacity of the plant will only enable 9,000,000 mcf of SNG to be produced.)[38] Based on a composite average of the three sets of supply projections previously discussed in Section 10.1.2, the amount of naphtha requested by BG&E

could provide more than enough SNG to offset the projected gas shortfalls during a design winter. The surplus would amount to approximately 1,840,000 mcf during the winter of 1977-1978 and 1,699,035 mcf during the winter of 1980-1981. Thus, approximately 3% of both the planned 1977-1978 and 1980-1981 output would represent surplus gas. If the composite gas supply projection is relatively correct and if firm gas requirements remain unchanged, a 63% allocation during the winter of 1977-1978 and a 68% allocation during the winter of 1980-1981 would place gas supplies and firm gas requirements during a design winter in equilibrium. The reduction of naphtha allocations to these levels would not create any additional impacts beyond those discussed previously in Chapter 5. The gas supply situation under various allocation levels is presented in Table 10.2-8. The data indicate that if the allocation were to fall below the equilibrium levels noted above, gas shortfalls could occur. Under this latter condition, most of the site specific impacts discussed in Chapter 5 would still occur. Impacts within the service area would be a function of such factors as the degree of gas deficiencies that would exist; the specific customers in FPC categories 2 and 3 that may be affected by such deficiencies; where each such customer is located and the environmental conditions around their respective locations; and the manner in which each customer responds in an effort to offset gas deficiencies. Since most of these factors are not known, it is not possible to generalize as to the potential service area impacts associated with such environmental areas as land use, water quality, noise or ecology. Instead, the analysis focuses on more general considerations relating to economic and air quality effects.

Economic Effects

Reduced allocation of naphtha and thus reduced availability of SNG affects the curtailments of gas to customers in FPC categories 1, 2 and 3. If the feedstock allocation is less than 63% in 1977-1978 and less than 68% in 1980-1981, curtailments to customers would occur. A 50% allocation of naphtha would allow the SNG facility to produce about 2,470,000 mcf of synthetic natural gas in 1977-1978 and 5,399,420 mcf in 1980-1981. This would result in a gas deficiency to customers in FPC categories 1, 2 and 3 of about 630,000 mcf during the winter of

TABLE 10.2-8

ESTIMATES OF GAS SURPLUS OR DEFICIT
UNDER ALTERNATIVE NAPHTHA ALLOCATIONS

	BG&E Design Winter 1977-1978	BG&E Design Winter 1980-1981
Projected Gas Shortfall Without Sollers Point SNG Facility	3,100,000 mcf	7,300,000 mcf
SNG Produced Under Various Naphtha Allocations		
100% Allocation	4,940,000 mcf	8,999,035 mcf
75% Allocation	3,705,000 mcf	8,099,130 mcf
50% Allocation	2,470,000 mcf	5,399,420 mcf
25% Allocation	1,235,000 mcf	2,699,710 mcf
Residual Gas Surplus (Shortfall)		
100% Allocation	1,840,000 mcf	1,699,035 mcf
75% Allocation	605,000 mcf	799,130 mcf
50% Allocation	(630,000 mcf)	(1,900,580 mcf)
25% Allocation	(1,865,000 mcf)	(4,600,290 mcf)

1977-1978 and a 1,900,580 mcf deficiency in 1980-1981. A 25% allocation of naphtha would allow the SNG facility to produce about 1,235,000 mcf in 1977-1978 and 2,699,710 mcf in 1980-1981. This would result in a gas deficiency of about 1,865,000 mcf in 1977-1978 and 4,600,290 mcf in 1980-1981.

The economic impact of these levels of gas deficiencies is difficult to define since the impact would be dependent upon how the curtailment would be spread across the customers. Customers in FPC category 3 would be curtailed first followed by curtailments into FPC category 2. Furthermore, the impacts will be dependent upon the ability of industrial and commercial establishments in FPC categories 2 and 3 to accommodate periods of lower production due to gas shortages; their ability to modify process and physical settings to allow for the use of an alternative fuel; and their financial situation in terms of the economic feasibility of fuel switching. In spite of these constraints, some perspective on the range of economic impact that may potentially be created as a result of reduced allocations of naphtha are provided in Table 10.2-9. These estimates were derived through the interpolation of data presented earlier on Table 10.2-2.

The estimates contained on Table 10.2-9 indicate that a 50% allocation of naphtha would result in a gas curtailment of up to 630,000 mcf during the winter of 1977-1978. If this were to occur, it is estimated that over 36,200 employees would be directly affected through either layoffs or the placement of persons on short time. The weekly value of wages lost is estimated to be $5 million with the value of lost production estimated to be approximately $26 million per week. A 25% naphtha allocation in 1977-1978 would have an even more substantial economic impact. More than 430,000 employees would be either laid off or placed on short time. Subsequent weekly wage losses are estimated to be in the vicinity of $45 million while the weekly value of lost production is estimated to be in excess of $151 million.

Table 10.2-9 also presents similarly derived estimates of the economic consequences of reduced naphtha allocations during the winter of 1980-1981. Based on BG&E's request for this period along with estimates of the gas supply during that winter period, it is expected that a 50% allocation would result in a gas deficit of up to 1,900,580 mcf. If such a gas shortfall were to occur, more than 430,000 jobs

TABLE 10.2-9

ECONOMIC IMPACT OF REDUCED ALLOCATIONS

WINTER 1977 - 1978

Level of Naphtha Allocation	Estimated Gas Deficiency (mcf)	Estimate of No. of Employees Laid Off	Estimate of No. of Employees on Short Time	Estimate of Weekly Value of Wages Lost	Estimate of Weekly Value of Lost Production
63%	0	0	0	0	0
50%	630,000	19,640	16,644	$ 5 million	$ 26 million
25%	1,865,000	105,540	325,898	$45 million	$151 million

ECONOMIC IMPACT OF REDUCED ALLOCATIONS

WINTER 1980 - 1981

Level of Naphtha Allocation	Estimated Gas Deficiency (mcf)	Estimate of No. of Employees Laid Off	Estimate of No. of Employees on Short Time	Estimate of Weekly Value of Wages Lost	Estimate of Weekly Value of Lost Production
68%	0	0	0	0	0
50%	1,900,580	109,135	321,135	$ 46 million	$155 million
25%	4,600,290	274,335	79,691	$102 million	$429 million

would be in jeopardy. These jobs currently have an aggregate weekly wage value of $46 million. The weekly value of production lost as a result of a 1,900,580 mcf gas deficit is estimated to be in excess of $155 million. A 25% naphtha allocation in 1980-1981 would result in over 354,000 employees affected through either layoffs or the placement of persons on short time. The weekly value of wages lost is estimated to be about $102 million while the weekly value of lost production is estimated to be nearly $430 million.

Some of the negative economic implications of reduced naphtha allocations could be partially offset through fuel switching on the part of those who may face gas curtailments which may occur if the naphtha allocation was reduced below 63% during the winter of 1977-1978 and below 68% during the winter of 1980-1981. Fuel switching would have other ramifications, however. Current users of gas would have to bear certain capital costs in order to modify or change existing heating and process equipment. Assuming that this would be financially and physically feasible, the use of certain alternative fuels, particularly No. 2 oil, would result in increased air emissions.

Air Quality Effects

Reduced allocation of naphtha would cause the proposed SNG plant to reduce its periods of operation. This would reduce the longer term average ambient concentrations of contaminants contributed by the SNG plant. It would not, however, affect the level of short-term (24-hour, 3-hour or 1-hour) concentrations presented in Section 5.4. As the amount of naphtha is reduced, the total quantity of emissions from the plant would be reduced. These quantities are shown in Table 10.2-10.

The more far-reaching effect is the use of propane or oil by industries affected by gas deficiencies. In order to show the overall effect, it was assumed that shortages in gas resulting from reduced naphtha allocation would be made up by the use of propane or No. 2 fuel oil. The resulting emissions from the use of these alternate fuels were discussed in detail in Section 10.2. In summary, propane as an alternate fuel, if available and feasible for the industrial uses, would have little effect upon air quality levels. The emissions from the combustion of propane are similar to those of natural gas. No. 2 oil, however,

TABLE 10.2-10

AIR CONTAMINANT EMISSIONS FROM THE SOLLERS POINT
SNG FACILITY AS THEY RELATE TO VARIOUS NAPHTHA ALLOCATIONS

	Pollution Emissions (lbs/year)			
	Sulfur Oxides*	Nitrogen Oxides	Hydrocarbons and Carbon Monoxide	Particulate Matter
<u>Winter 1977 - 1978</u>				
Full Allocation**	570,720	153,504	25,584	19,680
75% Allocation	431,520	116,064	19,344	14,880
50% Allocation	285,360	76,752	12,792	9,840
25% Allocation	146,160	39,312	6,552	5,040
<u>Winter 1980 - 1981</u>				
Full Allocation**	1,252,800	336,960	56,160	43,200
75% Allocation	939,600	252,720	42,120	32,400
50% Allocation	626,400	168,480	28,080	21,600
25% Allocation	313,200	84,240	14,040	10,800

*SNG facility emissions based on those described in Section 3.4

**Normal operations during 1977-1978 is based on 82 days of operation
Normal operations during 1980-1981 is based on 180 days of operation

would cause an increased effect if used as an energy replacement for natural gas, since air contaminant emissions from the combustion of oil are markedly higher. Therefore, as the gas deficit increases and oil were used as an alternative, air quality deterioration would increase. Truck traffic required to deliver propane and oil would contribute an additional air contaminant burden.

10.2.3 Alternative of Controlling Gas Usage by Changing Pricing Policies

The use of new pricing policies is being considered by agencies of the federal government as a means of changing existing patterns of fuel consumption. Rate structures have been suggested which involve the charging of a flat rate for each mcf of gas used; increasing the cost of gas when consumption extends above a designated threshold level; or increasing the cost of gas as usage increases. These schemes all represent potential methods for creating economic incentives for industrial and commercial customers to switch from gas to other forms of energy or to conserve gas use.

However, customers in FPC Categories 1, 2 and 3 represent individuals and firms who do not have the capability to burn an alternate fuel on a continuing basis. Therefore, a modification of pricing policies would probably not be fully effective in altering the fuel use patterns of these customers. Since these customers are the ones who will be served by the Sollers Point SNG facility, a modification in pricing policies would probably not eliminate the need for the SNG facility.

It is still expected, however, that given the proper incentive, whether it be a penalty for high gas use or financial assistance for making modifications to existing energy systems, some of BG&E's industrial customers in FPC Categories 2 and 3 would switch to different forms of energy.

If BG&E customers were to switch from gas to oil or electricity produced by burning coal, the fuels used would create an even greater potential for significant environmental impacts to occur. Natural gas or synthetic gas is the cleanest, most environmentally acceptable fuel. For example, typical air emission rates for natural gas, No. 2 fuel oil and coal used in boilers and heaters are as follows.

	SO_2 lb/10^6 Btu	NO lb/10^6 Btu	Particulates lb/10^6 Btu
Natural Gas	0.0006	0.2	0.015
No. 2 Fuel Oil	0.52	0.3	0.1
Coal	1.2	0.7	0.1

These emission factors are based on performance standards and expected operating characteristics associated with each of the three fuels. This table shows that on a basis of heat input, natural gas results in significantly lower quantities of air contaminants. Since gas can also be burned more efficiently, more heat would have to be generated by the alternative fuels in order to achieve the same thermal results. Furthermore, the substitution of electricity (either nuclear or fossil fueled) for energy supplied by gas creates its own unique set of environmental impacts. Therefore, based on these generalized considerations, changing pricing policies may not reduce the need for the FEA's action and could result in the creation of increased environmental impacts.

10.3 Design Alternatives

10.3.1 Alternative of Moving the Sollers Point SNG Facility to a Different Site

The SNG facility was constructed on Sollers Point prior to the requirement of an Environmental Impact Statement. Impacts associated with preparation of the site and construction of the facility have already occurred. No further consideration has been given to the environmental effects of using a different site for the SNG facility because use of another site would require unnecessary repetition of environmental impacts that have already occurred. It is also believed that there would be no significant environmental benefit gained if the Sollers Point site abandoned.

Prior to selection of the Sollers Point site, BG&E did evaluate their needs for a proper site for the SNG facility. The main criteria of location on a navigable body of water for naphtha shipments, industrial zoning and within the service area narrowed the choices to the Baltimore metropolitan area. The Sollers Point site was judged to be suitable for the SNG facility because of its availability, industrial zoning, presence of a large unloading facility, presence of utilities, adequacy of size to construct the facility and provide a buffer zone, potential for a gas line to pass through the site and the environmental insensitivity of the area.

10.3.2 Alternative of Additional Air Pollution Control Systems

The gases and particulate emissions that are associated with an SNG plant have been limited by the control systems incorporated into the plant design. The use of the flare system, low sulfur fuel, particulate collectors, sulfur recovery system and stack height has limited gas and particulate emissions to a relatively small environmental impact. There are additional air pollution control systems that are available which could be incorporated into the design of the SNG facility. These include such items as:

- electrostatic precipitators, wet collectors or baghouses for particulate control;
- flue gas desulfurization processes for sulfur dioxide control;
- a carbonyl sulfide hydrolysis step to remove this gas from the Stretford unit;
- the addition and/or substitution of a Claus recovery system; and
- the consumption of alternative fuels in the direct and indirect heaters.

The use of an alternative particulate collection system on the flue gases from the boilers and superheaters could further reduce the indicated particulate emissions. Such a system could increase the particulate collection efficiency to approximately 90%. The environmental impact due to the addition of such a system would be to reduce the contribution to the ambient air quality from approximately 14% to 3% of the more stringent nondeterioration regulations. This reduction in environmental impact would require a significant increase in capital outlay for equipment and increase in operating cost due to the required power and additional maintenance for wet collectors and baghouses at a substantial cost. In addition, scrubbers present the problems associated with wastewater treatment and disposal. Since the particulate emissions and resultant air quality concentrations will comply with the most stringent standards, the economic penalty of further control does not seem warranted.

Various flue gas desulfurization processes, which could reduce the sulfur dioxide emissions from the oil-fired boilers, are available. Since these boiler units will be burning a low sulfur fuel oil, the associated sulfur dioxide emissions will be relatively low (approximately 300 ppm). Even with this low flue gas concentration, additional removal of approximately 90% of the sulfur dioxide can be achieved with a flue gas desulfurization system. A similar reduction could also be expected in the resulting contribution to the ambient air quality. Such a reduction would reduce a minimal impact (significantly below the more stringent nondeterioration regulations) to an insignificant impact. The cost of such a control system is conservatively estimated at $650,000 (to control two boiler units) or approximately 43% of the cost of the boiler units. The most popular flue gas desulfurization process is the throwaway type, which results in a spent absorbant and scrubbing slurry sludge that must be disposed of in an environmentally acceptable manner. The concept presently considered most environmentally acceptable is to filter and chemically fix the slurry sludge, landfill the dewatered solids and treat the recovered wastewater prior to recycling and/or discharge. These secondary control measures would impose additional costs, land use and auxiliary control system requirements on the SNG plant resulting in additional environmental impact. In view of the predicted compliance with even the most stringent regulations, the imposition of additional controls for sulfur dioxide seems unwarranted. It is possible that a carbonyl sulfide hydrolysis step could be added to the Stretford desulfurization unit. Carbonyl sulfide is not affected by the Stretford unit and tends to pass through. As indicated in the Description of the Proposed Action in Section 3.3, the carbonyl sulfide concentrations are expected to be insignificant. Therefore, additional control equipment for carbonyl sulfide is not necessary.

Another type of sulfur recovery process that can be used either with or in place of the Stretford process is the Claus process. In order to be effective and practical, the Claus process is generally not used for hydrogen sulfide concentrations below 10%. Since the gas stream to the Stretford unit will contain about 10% hydrogen sulfide, the process is of marginal value for application of a Claus process. As an additional system, the Claus process could be expected to provide minimal benefit, and as a substitute system the Claus process would barely be effective or practical.

The steam boilers could alternatively be fired with a No. 6 residual fuel oil with a lower sulfur content than that of the proposed fuel or a distillate fuel oil. The impact on particulate emission levels would not be affected significantly due to the low ash content of the proposed fuel; however, sulfur dioxide levels could be reduced significantly. These fuels are not only higher in cost, but are also in high demand for commercial and residential space heating. Therefore, the utilization of such low sulfur fuels in an industrial process is not considered their most economic use, and additionally, the overall environmental impact is essentially minimized by conserving such fuels and allocating them for space heating facilities where air quality controls are least apt to be available. Use of either naphtha or product gas in the boilers is also seen as a less acceptable alternative. The process heaters are so designed that they must be fired by either gas or light fraction hydrocarbons, such as naphtha, hence, residual or distillate fuels are not alternative fuels.

10.3.3 Alternative Additional Water Pollution Control Systems

The liquid wastes associated with the BG&E SNG facility will generally be of low flow, both intermittent and continuous. The plant is designed to treat the liquid wastes containing inorganic salts or oil by a neutralization tank and an oil-water separator, respectively. Subsequent to treatment, these wastes will be transported to an equilization pond for eventual discharge to the Baltimore Harbor. The equilization pond is used to negate the shock impact that could result due to the intermittent nature of the liquid discharges. Since the resulting liquid discharges are low in flow (the expected average daily flow of 57,600 gallons meet the requirements for a NPDES permit and will be limited primarily to dissolved solids), further control design was not included.

The only additional control design that could be included would be to eliminate even this relatively small liquid discharge. Design schemes to eliminate essentially dissolved solids could include:

- evaporation,
- distillation,
- reverse osmosis and
- electrodialysis.

Evaporation and distillation would result in the evaporation of the liquid and solid waste residue to dispose in an acceptable manner. Reverse osmosis and electrodialysis would involve cation-anion exchange resins to separate the dissolved solids from the waste stream, which could then be returned for use in the SNG process. Evaporation could be accomplished with greatly expanded ponding capabilities. Large land areas to establish evaporation ponds are not available within Baltimore County; however, the use of distillation, reverse osmosis, or electrodialysis techniques would require significant additional power use and equipment. Since the purpose of this SNG facility is to supplement existing energy requirements, it is not reasonable to impose additional energy requirements on the plant, especially for the amount and type of discharge involved.

10.4 Conservation of Natural Gas

Conservation is evaluated in order to determine the feasibility of this approach as an alternative to the operation of the Sollers Point SNG facility.

The analysis of the conservation alternative is based on a literature review and is divided into three basic subsections. The first part develops estimates of potential gas savings within the BG&E service area that could be realized by residential, industrial and commercial customers designated as being within FPC Priority of Service Categories 1, 2 and 3. (The specific definitions of these three FPC categories are contained in Appendix A.) These estimates represent achievable gas savings assuming the proper incentives were available and that the various end users were sufficiently motivated to conserve. Estimates of the possible direct costs to the consumer to realize such savings, exclusive of possible implementation costs to BG&E, follow.

The second part of this section focuses on the feasibility of achieving the estimated potential gas savings within the service area. This latter evaluation reviews various mechanisms that have been suggested to achieve energy conservation.

The third part of this section briefly discusses the feasibility of gas conservation being used to offset the need for the SNG facility and how environmental impacts in the BG&E service area would change if conservation measures were implemented.

10.4.1 Potential Gas Savings for Residential Customers

During a normal winter of 3,979 degree days, BG&E's firm residential customers require 31,465,827 mcf of gas.[39] During a design winter of 4,894 degree days, BG&E's residential customers require about 36,975,240 mcf of gas.[40] Based on statistics prepared by BG&E, it has been estimated that the distribution of gas consumption by residential end use during a normal winter is as follows:[41]

End Use	%	Normal Winter (mcf)
Space Heating	69.4	21,843,746
Water Heating	18.4	5,773,289
Cooking	6.1	1,924,396
Clothes Drying	1.2	384,859
Other	4.9	1,539,537
Total	100.0	31,465,827

Although no end use gas consumption data is available for a design winter, gas consumption other than for space heating and to a lesser extent water heating remains essentially unchanged, regardless of outside temperature. If it is assumed that 90% of the 5,509,413 mcf increase in design winter gas consumption is attributable to space heating requirements and the remaining 10% to water heating, then the distribution of gas requirements for residential purposes during a design winter would be as follows:

End Use	%	Design Winter (mcf)
Space Heating	72.5	26,802,218
Water Heating	17.1	6,324,230
Cooking	5.2	1,924,396
Clothes Drying	1.0	384,859
Other	4.2	1,539,537
Total	100.0	36,975,240

On the basis of the above statistics regarding residential end uses, it is clear that the majority of the gas consumed by the residential sector is devoted to space and water heating, which together account for nearly 90% of the total gas requirements of this customer group. If substantial gas savings are to be achieved in the near term ($\sim$ 1980), attention must be given to the areas of space and water heating, since these two end uses have the largest absolute potential for significant gas savings. Although the literature reveals a variety of techniques available for reducing gas used for space and water heating, the following seven measures are considered to be the most cost-effective.

Space Heating Conservation Techniques

1) daytime thermostat setback from 72°F to 68°F;

2) nighttime thermostat setback from 68°F to 63°F;

3) caulk and weatherstrip windows and doors;

4) insulation of attic space and

5) installation of storm windows.

Water Heater Conservation Techniques

6) reduction of hot water temperature from 150°F to 110°F and

7) insulation of water heater.

The following subsections discuss each of the above listed conservation measures and provides estimates of how much gas could be potentially saved each year if each measure was implemented throughout the BG&E service area by all of its residential customers. The direct cost to the customer for undertaking these conservation measures is also estimated. These latter calculations do not reflect the potential cost to BG&E for implementation (i.e., the costs of conducting a program to motivate its customers to actually implement each measure). Where possible, the direct cost to the residential customer is based upon the least cost method of achievement, which in most cases implies a do-it-yourself home project. The use of outside contractors could easily double or triple the cost estimate provided herein.

Table 10.4-1 provides a summary of the residential conservation potential analysis. The data shows the individual and cumulative effect of each of the seven conservation measures considered on gas savings and direct costs to the consumer. Assuming that each of the seven measures were undertaken by all BG&E residential customers, where appropriate, it has been estimated that the annual gas savings potentially achievable is 11,618,309 mcf or 31% of a design winter's total residential gas requirements. The associated direct, one-time customer costs for achieving these savings is estimated to be approximately $105.2 million. The derivation of these estimates along with the assumptions used are discussed below.

Space Heating Gas Conservation

There are approximately 546,054 residential dwelling units served by BG&E.[42] On the basis of data obtained from a BG&E appliance saturation survey, conducted in December, 1975, it is estimated that each dwelling unit which uses gas for space heating consumes about 63.35 mcf per heating season.[43] Assuming this consumption factor reflects an average winter pattern, there are approximately 344,810 dwelling units in the service area which are heated by gas (21,843,746 mcf normal winter space heating gas requirements/63.35 mcf per dwelling). Thus, approximately 63% of all residential dwellings served by BG&E use gas for space heating. The remaining 37% use gas for other purposes such as hot water and cooking only.

It was previously estimated that BG&E's residential customers require 26,802,218 mcf of gas for space heating purposes during a design winter. There are five practical measures which a residential customer

TABLE 10.4-1

RESIDENTIAL CONSERVATION POTENTIAL SUMMARY

Conservation Measure	Estimated Annual Gas Savings (mcf)	Estimated Direct Cost to the Consumer ($)
Space Heating Measures	9,108,324	$ 95.3 million
1. Daytime thermostat reduction (72°F to 68°F)	3,216,266	No cost
2. Nighttime thermostat setback (68°F to 63°F)	1,651,017	$ 14.6 million
3. Caulking and weatherstripping	2,193,494	$ 31.0 million
4. Attic insulation	1,808,837	$ 39.4 million
5. Storm windows	236,710	$ 10.3 million
Hot Water Heating Measures	2,511,985	$ 9.9 million
6. Insulation of water heater	1,992,133	$ 9.9 million
7. Temperature reduction (150°F to 110°F)	519,852	No cost
Total (Measures 1-7)	11,618,309	$105.2 million

could implement in order to gain a significant reduction in space heating gas consumption. Each of these measures is described below.

The first step that can be taken is to reduce daytime interior home temperatures from 72°F to 68°F. This effort would produce a savings of about 3% per degree setback, for a total savings of about 12% if thermostats were turned back a full 4 degrees.[44] There is no direct cost to the consumer to achieve this gas savings. Implementing this measure throughout the BG&E service area could yield a total gas savings of 3,216,266 mcf each year. This would leave a total gas usage for space heating purposes of 23,585,952 mcf (26,802,218 less 3,216,266 mcf), a residual amount that could be further reduced through implementing other conservation measures.

The second step that can be taken is to further setback household thermostats by 5 degrees during sleeping hours (i.e., from 68°F to 63°F), a measure which could save about 7% of gas usage.[45] If this conservation measure were undertaken throughout the service area, the total gas savings would amount to an additional 1,651,017 mcf (7% of 23,585,952 mcf). The cost of implementing a nighttime thermostat setback could be zero if done manually or about $80 to $90 if an automatic device is purchased and installed.[46] If it is assumed that 50% of the residential users purchase an automatic device while the remaining 50% choose to implement the nighttime temperature setback manually, the total direct cost for implementing this measure would be about $14.6 million (172,405 dwellings x $85).

The third conservation step involves the caulking and weatherstripping of homes in order to prevent the infiltration of cold air. It has been estimated that this measure could save about 10% in gas usage with an average do-it-yourself cost of approximately $90.[47] If all residential households were to implement this measure, the total gas savings would be 2,193,494 mcf (10% of 21,934,935 mcf), leaving a residual of 19,741,441 mcf if all space heated homeowners caulked and weatherstripped their dwelling as well as implemented the two previously described thermostat reduction procedures. The aggregate consumer cost for caulking and weatherstripping is estimated to be around $31 million (344,810 dwellings x $90).

Further reductions in gas usage for space heat can be obtained through the installation of attic insulation and storm windows. Estimates of the quantities of gas that could be saved through the implementation of these two measures require service area specific data on dwelling unit size and construction as well as information on the extent to which insulation and storm windows are already in place. Since this data is not presently available for the BG&E service area, an order of magnitude estimate can be derived through the use of Indiana Gas Company (IGC) customer survey data and FEA model home statistics.[48]

IGC conducted a sample survey of its residential customers in 1975. This survey found that approximately 26% of all homes had little to no ceiling insulation; 38% had up to four inches; and 36% had five or more inches.[49] Adding six inches of ceiling insulation to the FEA model home would save 22% of the fuel used for heating.[50] If 26% of all BG&E residential units have little to no ceiling insulation and if this group of dwellings consume 26% of all gas used for residential space heating purposes, the addition of six inches of insulation to these homes could save a total of 1,026,555 mcf annually (19,741,441 mcf x 0.26 x 0.22). Adding two inches of insulation to homes already having up to four inches would save about 11% of the fuel used for heating.[51] If 38% of all 8G&E homes had four inches of insulation already, and if this group of dwellings consume 38% of the gas used for space heating, the addition of two more inches of insulation could save a total of 782,282 mcf (18,714,886 mcf x 0.38 x 0.11). Residential customers already having five or more inches of insulation probably would not add any further insulation, so no savings has been attributed to this group of customers. Thus, the total quantities of gas in the BG&E service area which could be saved through the installation of attic insulation is estimated to be 1,870,342 mcf. The cost of adding six inches of ceiling insulation to a 1,250 square foot attic on a do-it-yourself basis would be around $220, while the cost of adding two to four inches would be approximately $150.[52] Thus, the total direct cost to the consumer for achieving the 1,808,837 mcf gas savings through the addition of attic insulation would be approximately $39.4 million [(344,810 units x 0.26 x $200) + (344,810 units x 0.38 x $150)].

The final space heating conservation measure is the installation of storm windows in order to help prevent air infiltration and reduce heat transmission. The implementation of this measure can achieve gas savings of about 11%.[53] The IGC survey indicated that about 88% of its residential customers already had storm windows and doors, and that the remaining 12% either do not have storm windows or did not respond to the survey. If it is assumed that this latter 12% do not have storm windows and if it is further assumed that a similar proportion of BG&E's residential customers are likewise without storm windows, then this group of customers could achieve a total gas savings of around 236,710 mcf (17,932,604 mcf x 0.12 x 0.11). If each residential customer without storm windows had ten triple-track windows installed, at a cost of $25 each,[54] the total investment would be approximately $10.3 million (344,810 units x 0.12 x 10 x $25).

The cumulative effect of implementing all of the preceding five measures would be the achievement of an annual gas savings of around 9,106,324 mcf or approximately 34% of the gas currently used for residential space heating. The total cost to the consumer for achieving this 9 million mcf gas savings is estimated to be a one-time expenditure of approximately $95 million.

Water Heating Gas Conservation

On the basis of the previously described BG&E appliance saturation survey, it was found that each dwelling unit which uses gas for the purpose of heating water consumes about 12.97 mcf per heating season.[55] Assuming that this consumption factor reflects an average winter pattern, there are approximately 442,042 dwelling units in the service area with gas hot water heaters (5,733,289 mcf normal winter water heating requirements/12.97 mcf per heater).

It was previously estimated that BG&E's residential customers require 6,324,230 mcf of gas for hot water heating during a design winter. There are two practical measures which a residential customer can implement in order to achieve a reduction in gas consumed for hot water heating. Each of these measures is described below.

Insulating a water heater with seven inches of insulation can save an average of 35% of the fuel used to heat the water.[56] This applies to water heaters that are placed in portions of a house that are not used, in which case heat given off by the water heater is normally lost. If it is assumed that 90% of all hot water heaters are situated so that their waste heat is not usable, then those residences can benefit from a 35% fuel savings on fuel for water heating. Based on a total gas use of 6,324,230 mcf for BG&E residential water heating requirements, the savings could be about 1,992,133 mcf (6,324,230 mcf x 0.90 x 0.35). This savings would cost the consumer about $25 per water heater.[57] Based on this estimate and the fact that an estimated 442,042 residential customers have gas hot water heaters, the total cost to insulate 90% of these heaters would be about $9.9 million.

Further gas savings of about 15% can be achieved if the temperature of the hot water is reduced to 110°F.[58] This temperature is generally satisfactory for most uses as opposed to the usual setting of 140° to 150°F. (The higher temperatures are needed for automatic dishwashers and very ill persons susceptible to infection.) Since only about 20% of the people in the Baltimore metropolitan area have automatic dishwashers, it has been estimated that 80% of all BG&E residential hot water customers can achieve additional savings through lowering water temperatures.[59] Since the total gas used for water heating in the service area would be about 4,332,097 mcf after heater insulation is installed, the extra 15% savings would amount to 519,852 mcf (4,332,097 mcf x 0.80 x 0.15). There would be no cost to the consumer.

The implementation of the above two measures would yield a total gas savings of about 2,511,985 mcf annually or nearly 40% of the gas currently used for hot water. The one-time cost to the consumer for implementation is estimated to be approximately $9.9 million.

Other Measures

Several additional conservation techniques include the following:

- flue gas heat exchanger, which extracts heat from flue gases before they pass up the chimney;
- total wall insulation;
- crawl space and foundation insulation;
- installation of automatic ignitions on furnaces, which turns on the pilot light only when it is needed;

- automatic flue gas damper, which prevents warm air from going up the chimney when the furnace is idle;
- purchase of new, more efficient gas ranges and
- installing solar heaters.

Most of these conservation measures, while feasible, would be implemented only after the other steps have been taken. Longer payback periods, higher capital cost and possible hazards would prevent these steps from being considered first-choice conservation steps.

10.4.2 Potential Gas Savings for Industrial and Commercial Customers

During a design winter, BG&E's firm commercial and industrial customers require 17,113,760 mcf of gas. The approximate distribution of these gas requirements by sector is as follows:[60]

Industrial	6,558,561 mcf
Commercial	10,555,199
Total	17,113,760 mcf

A more detailed breakdown of the above sector requirements is presented on Table 10.4-2. The data provide estimates of design winter gas requirements by industrial and commercial activity. These estimates are based upon the use of information contained in FEA Form G-101-A-2.[61] Table 10.4-2 shows that the major consumptive industries within BG&E's service area are manufacturers of primary metals (3.3 million mcf) and stone, clay, glass and concrete products (0.8 million mcf). The major identifiable commercial end use is health services (3.9 million mcf).

Although no data are available on the specific uses of gas by function for BG&E's industrial and commercial customers, the literature suggests that approximately 40% of all energy use by industry is devoted to the provision of process steam. Other uses include electric drive (20%), direct heat (27%) and other (13%). In comparison, 45% of commercial energy consumption is dedicated to space heating. Other commercial end uses include lighting (25%); air conditioning (13); other (11%) and refrigeration (6%).[62]

TABLE 10.4-2

ESTIMATED DESIGN WINTER GAS REQUIREMENTS: FIRM INDUSTRIAL AND COMMERCIAL END USERS

	S.I.C. Code	Estimated Design Winter Gas Requirements (mcf)
Total Firm Industrial and Commercial		17,113,760
Firm Industrial Customers		6,558,561
Food and Kindred Products	20	85,261
Printing and Publishing	27	45,910
Chemical and Allied Products	28	288,577
Stone, Clay, Glass and Concrete	32	760,793
Primary Metals	33	3,272,722
Fabricated Metals	34	288,577
Electrical Machinery	36	275,460
Transportation Equipment	37	242,667
Other Industrial	Various	1,298,594
Firm Commercial Customers		10,555,199
Health Services	80	3,873,758
Education	82	2,902,680
Government	91	1,847,160
Other Commercial	Various	1,931,601

Source: ERT Computations based on data presented by BG&E on FEA Form G-101-A-2.

Current Conservation Efforts by BG&E End Users

A telephone survey of six of the largest industrial users of gas in the BG&E service area was conducted. The specific companies contacted include the following:[63]

- Bethlehem Steel Corporation;
- General Electric Company;
- Carr-Lowry Glass Company;
- Locke Insulators, Incorporated;
- General Refractories Company and
- Glidden Company, Pemco Division.

On the basis of discussions with company representatives, it is apparent that industry has initiated numerous conservation measures already. However, these efforts appear to be primarily oriented towards low or no cost measures such as keeping furnace temperatures down when not in use; replacing windows; and adding insulation to furnaces and structures. The informal survey also found that a few companies have initiated some high cost conservation measures, such as the purchase of sophisticated monitoring and control equipment and the installation of equipment to recover and recycle waste heat.

The survey companies were also asked to provide estimates of how much gas could be saved if low or no cost conservation measures were implemented and how much could be achieved if more costly measures were implemented. Most companies interviewed were unable to provide such estimates. One company did estimate that they were currently achieving a 15 to 20% reduction in gas use per unit of production.

Additional interviews were conducted with the Maryland Energy Policy Office, the Public Service Commission of Maryland, the Maryland Department of Economic and Community Development, the Maryland State Chamber of Commerce, and the Baltimore Regional Planning Council.[64] Although none of the agencies have conducted any recent studies on energy conservation, officials from the Maryland Energy Policy Office and the Public Service Commission were of the opinion that industry has been extremely responsive to the need to conserve gas and has been conserving energy to the fullest extent possible when it is economically feasible to do so. One official believed that industry has already conserved to the point that only another 10 to 15% could be saved given today's technology.

Estimates of Potential Gas Savings

Estimating the potential amount of gas which could be saved by "firm" industrial and commercial customers of BG&E is difficult because of the wide variety of industries and processes. Therefore, estimates of gas conservation potential have primarily been based upon the use of data contained in the FEA's "Final Industrial Efficiency Improvement Targets." This document was recently published in the Federal Register[65] in accordance with the requirements of the Energy Policy and Conservation Act [Pub. L. 94-163 (EPCA), 42 U.S.C 6341-6345]. The FEA established voluntary energy efficiency targets for the 10 most energy consumptive industries in the United States. These efficiency targets are presented in Table 10.4-3. According to the FEA:

> ...each energy efficiency improvement target is based on the best available information and is established at the level which represents the maximum feasible improvement in energy efficiency that each industry can achieve by January 1, 1980, taking into account considerations of the technological feasibility and economic practicability of utilizing alternative operating procedures and more energy efficient technologies. . . Each target represents the percentage reduction in energy consumed per unit of output or activity that can be achieved between calendar year 1972 and January 1, 1980.[66]

The FEA efficiency targets also consider the future need for additional energy or industries having special circumstances not under the discretionary control of the plant operator. These special circumstances include such requirements and conditions as "government environmental, health and safety regulations, as well as various other changes beyond the control of industry, such as declining quality of ore grade and alterations in product mix or changes in product characteristics."[67]

Comparable energy reduction targets were obtained for activities that occur in the BG&E service area, but are not covered under the

Industrial Energy Conservation Program. FEA's Office of Conservation and Environment suggested that a reasonable estimate for nontargeted industrial activities would be a 10% reduction per unit of production and 5% for the commercial sector.[68] Table 10.4-3 summarizes the energy targets for the various end uses found within the BG&E service area and the amount of gas the federal governments expects might be saved, given current technology and economic feasibility.

A major problem associated with the application of these efficiency targets to BG&E data is the absence of past and future customer production statistics. These latter figures are important in that the efficiency targets are expressed in terms of percentage reductions in gas consumption per unit of production. To circumvent this methodological problem, an important assumption was made: that production output would remain constant from 1973 to 1980. Although this is an unrealistic assumption, it does serve to develop a conservative (i.e., maximum achievable) estimate of gas conservation potential. Thus, the gas reduction estimates given in Table 10.4-3 must be considered within the context of this "no growth" assumption.

On the basis of the FEA efficiency targets, it estimated that "firm" industrial and commercial customers could achieve a total annual gas savings of a little more than 1.2 million mcf, or about 7% of its design winter requirements of 17.1 million mcf. The majority of the estimated potential gas savings would be attributable to the industrial sector; about a 528,000 mcf savings is likely to be attainable by the commercial sector (i.e., approximately 42% of the total potential savings).

Since the base case's "no growth" assumption places an unrealistic condition on the estimation of potential gas savings, three alternative cases were also evaluated. The results of this latter analysis are presented in Table 10.4-4. This table shows estimates of 1980 gas requirements, based upon the following assumptions:

- Case 1: Achievement of FEA efficiency targets (see Table 10.4-3) by 1980 combined with an annual rate of production growth of 3.5% during the period 1973 to 1980. This growth factor roughly corresponds with a moderate rate of increase in the Gross National Product (GNP).

TABLE 10.4-3

ESTIMATED POTENTIAL GAS SAVINGS BY SECTOR
UNDER THE NO GROWTH SCENARIO
(Base Case)

S.I.C. Code No.	Sector	(a) Estimated Gas Consumption (mcf)	(b) Target (%)	Estimated Potential Gas Savings (mcf)
	Industrial	6,558,561		736,985
	Target Industries	4,938,597		574,989
28	Chemicals	288,577	14	40,401
33	Primary Metals	3,272,722	9	294,545
29	Petroleum	0	12	0
32	Stone, Clay and Glass	760,793	16	121,727
26	Paper	0	20	0
20	Food	85,261	12	10,231
34	Febricated Metals	288,577	24	69,258
37	Transportation Equipment	242,667	16	38,827
35	Nonelectric Machinery	0	15	0
22	Textile Mill	0	22	0
	Nontarget Industries	1,619,964	10	161,996
	Commercial	10,555,199	5	527,760
	Total	17,113,760		1,264,745

Source: (a): FEA Report G-101-A-2, prepared by BG&E for the Federal Energy Administration, 1977.

(b): Federal Energy Administration, Final Efficiency Targets, Federal Register 42 June 9, 1977.

- Case 2: Achievement of an across-the-board efficiency improvement target of 25% combined with no growth in production output during the period 1973 to 1980.

- Case 3: Achievement of an across-the-board efficiency target of 25% combined with a 3.5% annual rate of growth in production output during the period 1973 to 1980.

Note that the average FEA target reduction in the base case and in Case 1 is about 16%.

The data contained in Table 11-4 show that each of the three alternative cases result in different conditions. Under Case 1, total gas requirements of BG&E's "firm" industrial and commercial customers increase by 18.4% over design winter requirements, from 17.1 million mcf to 20.3 million mcf. In contrast, Case 2 shows a 25% reduction in gas requirements, and Case 3 leads to a 4.6% reduction in 1980 gas useage over design winter requirements.

The above analysis basically shows the sensitivity of nonresidential gas requirements to changes in economic conditions. The achievement of even a substantial level of improved efficiency in terms of gas consumption per unit of production results in only a marginal change in total gas consumption under any realistic growth scenario. A 25% improvement in gas use efficiency would generally require a high cost conservation investment. Yet, even if such an investment were made by all nonresidential end users, only a 4.6% total gas savings would result under a 3.5% growth rate scenario (Case 3). If a low cost conservation investment were made, resulting in say a 5% to 10% improvement in efficiency, total 1980 gas usage would be between 15% and 21% above the design winter requirements, assuming, of course, a 3.5% rate of growth in production during the analysis period 1973 to 1980.

On the basis of these considerations and on the fact that industrial end users generally appear reluctant to make high cost conservation investments, it would appear that a reasonable efficiency target would lie somewhere between 5% and 25%. If a 15% target were chosen and if a 3.5% growth rate scenario were to occur, the net result would be that there would be no aggregate gas savings over design winter requirements

TABLE 10.4-4

COMPARISON OF ALTERNATIVE GAS REQUIREMENTS SCENARIOS

Sector	Design Winter Gas Requirements (mcf)	Estimated 1980 Gas Requirements (mcf): FEA Efficiency Targets: No Growth (Base Case)	FEA Efficiency Targets: Moderate Growth (Case 1)	25% Efficiency Target: No Growth (Case 2)	25% Efficiency Target: Moderate Growth (Case 3)
Industrial	6,558,561	5,821,576	7,502,071	4,918,921	6,256,867
Commercial	10,555,199	10,027,439	12,754,902	7,916,399	10,069,659
Total Gas Use	17,113,760	15,849,015	20,256,973	12,835,320	16,326,526
Change Over Base		(1,264,745)	3,143,213	(4,278,440)	(787,234)
Percentage Change		(7.4)	18.4	(25.0)	(4.6)

Note: Parentheses indicate decrease.

but rather an 8% increase in overall gas usage by 1980 (17.1 million mcf to about 18.5 million mcf).

Alternatively, if the projected 1980 shortfall of 7.3 million mcf or 43% of the design winter requirements were to be offset entirely through conservation efforts on the part of BG&E's nonresidential sector, all commercial and industrial end users would have to each achieve an average 55% reduction in gas consumption per unit of output under a moderate growth scenario. Such a large improvement in energy efficiency is unlikely to be achieved anytime in the near future given present technology and the substantial monies required.

It is difficult to estimate the potential monetary costs associated with achieving various levels of conservation, particularly for the industrial-commercial sector where there is likely to be a wide variation in costs dependent upon a complex set of engineering considerations unique to each firm. Although there are substantial constraints in developing cost estimates, some reasonable judgments can be made as to the likely range of potential costs involved. Gross estimates of the initial conservation investment costs associated with an annual savings of 3,100,000 and 7,300,000 mcf of gas, respectively, are shown below:

Annual Gas Savings (mcf)	Initial Conservation Investment Cost
3,100,000	$34,472,000
7,300,000	81,176,000

In developing these estimates, the following assumptions were made: (1) straight line depreciation of the initial investment over a 10-year period; (2) an annual rate of return on the initial investment of 15%; and (3) annual savings being equivalent to the cost of saved gas (i.e., $2.78 per mcf times the number of mcf's saved).

The formula used to calculate the initial conservation investment costs (I) required to conserve X mcf of gas annually follows:

$$I = \left(\frac{S - DC}{ROI}\right) 100$$

where

I is investment

S is annual fuel savings (X mcf x $2.78/mcf)

DC is depreciation charge (DC = I/10)

ROI is return on investment (%)

Summary

As was indicated in Section 10.1, a 1980 design winter shortfall of about 7.3 million mcf could be expected if the proposed SNG plant is not constructed and if projected gas curtailments occur. The previous section analyzed the various methods available to the residential, commercial and industrial sectors to conserve gas, including estimates of gas savings potential and associated costs. If the various conservation measures were to be combined into a representative cost-effective program for achieving the desired 7.3 million mcf reduction in gas useage, the total cost to the consumer of achieving that reduction goal would be nearly $36.0 million. The specific techniques that would be used in this representative program and their associated costs are summarized in Table 10.4-5.

10.4.3 Implementing Natural Gas Conservation

The previous discussions developed estimates of the amount of natural gas that could be saved annually by "firm" customers of BG&E. These estimates reflect potential gas savings only. Whether or not these potential savings are realized will depend on the end user's motivation to conserve gas. Thus, incentives are a major issue in any conservation program, particularly economic incentives. To provide sufficient incentive, consideration must be given to the fact that each end user may react differently to a particular situation, depending upon individual perceptions of the magnitude of the gas supply problem and individual budget constraints. In general, most people will conserve if it is to their economic advantage, if it does not cause any great inconvenience, or if it is mandatory. Therefore, most programs that promote conservation are based upon one or more of the following elements:

1) economic incentives;

2) conservation services (i.e., educational and technical service assistance); and/or

3) national and state mandates.

TABLE 10.4-5

A REPRESENTATIVE COST-EFFECTIVE CONSERVATION PROGRAM

Conservation Measure	Estimated Gas Savings (mcf)	Estimated Cost [2]	Cumulative Totals: Estimated Gas Savings (mcf)	Cumulative Totals: Estimated Cost
Lower Thermostats (Day)	3,216,266	0	3,216,266	0
Reduce Water Temperature	519,852	0	3,736,118	0
Nighttime Temperature Setback	1,651,017	$14.6 million	5,387,135	$14.6 million
Commercial and Industrial Housekeeping	1,912,865 [1]	$21.3 million	7,300,000	$35.9 million

(1) Pro-rated in order to achieve the 1,912,865 mcf reduction.

(2) Cost to consumer only; does not include implementation costs to BG&E.

The following discussion presents a number of measures considered to encourage conservation, including those of BG&E and other utilities.

Economic Incentives for Conservation

Within the service area of BG&E, the rising cost of gas already provides some incentive for undertaking conservative measures. To make conservation more economically attractive, the cost of gas can be increased, and/or rewards for adopting conservation techniques can be provided. Some of the proposed incentives are presented below. A more detailed discussion of many of these proposals is contained in the Final Programmatic EIS on the Allocation of SNG Feedstock, August, 1977.

Changing Rate Structure

There are several variations of utility rate structures. Most widely used is the "declining-block" method where each successive group of units used costs less per unit. This rate structure tends to encourage increased gas consumption by charging lower prices for additional use. Some of the proposed alternatives to this pricing scheme include "flat-rate," in which a unit of gas has a constant cost, regardless of amount consumed; "inverted-block", which charges more per unit for each successive block of units consumed; and the "demand/commodity" strategy, which first charges customers for the portion of the equipment used during the utility system's peak usage time (demand) and second for the actual gas consumed (commodity). A fourth option would be penalty pricing which would establish allocations for customers. When a customer exceeds their allocation, the cost for each additional unit of gas would be substantially higher.

In addition to these general rate structures, there are several approaches to the pricing of a supplemental supply of SNG, each of which differs in the way the higher-cost, supplemental gas is passed on to the customers. While passing on higher costs to one sector of customers may promote conservation, the equity issue must also be considered. Incremental pricing of supplemental gas passes the costs directly to the customer, charging the residential user less than the commercial.

Rolled-in pricing charges a uniform rate to all customers, with the cost of supplemental gas averaged in with the cheaper gas from traditional sources. A two-tiered system charges the low (rolled-in) price for a quota of gas and then imposes the higher incremental price to cover the cost of the supplemental fuel.

Changes in state or federal laws would not be necessary for rate restructuring,[69] but it would take approximately two to three years to satisfy the requirements for the necessary studies and hearings.[70] The U. S. government is now considering whether or not to make rate restructuring mandatory. It appears, however, that any action at the federal level would be directed more towards electric utilities than to gas companies.

No definitive studies are available to estimate levels of conservation that would occur if any of the alternatives to the traditional declining block rate were to be implemented. If rates for gas are adjusted merely to be equitable rather than to increase the incentives for conservation, fuel bills of some customers would decrease while others would of course increase. This makes it difficult to generalize about conservation effects of rate restructuring. When the Michigan Consolidated Gas Company switched to a flat rate structure from a declining block rate in 1975 no improvement in gas conservation was observed.[71] (That rate structure change was motivated primarily towards equitable treatment of all customers.)

BG&E currently has a two tier rate schedule. As of August 1, 1977, the company's residential and interruptible customers pay a service charge plus a flat rate for gas consumption. In contrast, BG&E's commercial customers are on a declining block schedule.[72]

Gas Price Deregulation

Since 1954, the Federal Power Commission has controlled the price of natural gas by setting the maximum price that producers may charge pipeline companies for gas designated for interstate trade. State public service commissions subsequently control the retail prices and rates of return for the gas distributors. As a result, energy costs to the consumer have not risen as sharply as the combination of increased production costs, decreased availability and the monopolization of crude oil prices by the OPEC cartel would indicate. Thus, there has been little incentive to increase natural gas supplies due to the artificially low prices. This, in turn, has caused demand to exceed supply and the resulting substantial gas curtailment has increased pressures to increase the price of new natural gas.

If passed by Congress, deregulation would increase the cost of gas and more intrastate gas would quickly become available in the interstate markets.[73] It has been estimated that by 1985, an additional 4.4 billion cubic feet of domestic gas would be produced on the national level.[74] This measure would benefit the BG&E service area. As the price of gas increases, the incentive to conserve will presumably become stronger.

Energy Taxes

The proposed federal Oil and Natural Gas Tax assumes a $1.00/MM Btu tariff on all imported oil and natural gas and a $1.00/MM Btu tax on all domestic oil and gas production, applied at the point of supply. It is estimated that this tax would reduce oil consumption 7.9% and natural gas 10.4% below the deregulation level. Concomitant with that, however, would be a 12.2% increase in coal consumption.[75]

The Depletable Energy Resources Tax would assign a $1.00/MM Btu tariff on all imported fuels and on all depletable domestic fuels (including oil, natural gas, coal and uranium), at the point of supply. With this tax, it is estimated that oil consumption would be 5.4% below the deregulation level, natural gas 5.8% below and coal 1.3% below.[76] Thus, the consumption of oil and natural gas would be somewhat higher than under the Oil and Natural Gas Tax but consumption of coal would be less.

A surcharge can be imposed by taxing all or selected users for gas consumption beyond some base level. For example, industries with the potential to use alternative fuels could be taxed at a fairly high rate;

the commercial sector, which in many instances is not able to use other fuels, would be taxed at a lower rate and residences would have the lowest rate. Such a national surcharge program would reduce national energy consumption by 830 bcf during the first winter heating season.[77]

The introduction of these or any taxes would increase consumer costs and thus increase the incentives to conserve. Some form of rebate to under-users within the surcharge program, however, would tend to offset this negative economic impact. Enactment of these taxes would involve some time in the various lawmaking bodies but once passed, enforcement would be a fairly simple administrative process.

Other Tax Credits and Incentives

A residential tax credit has been proposed for homeowners for installation of storm windows, ceiling insulation, weather stripping and caulking. This program would provide a 30% credit on the first $500 of investment. The FEA has estimated that implementation of this measure would reduce natural gas consumption by 0.09%.[78]

Under the Energy Conservation and Production Act (P.L. 94-385), FEA will provide low income people with grants for the purchase of weatherization material for their homes. If 1.2 million such homes were weatherized by 1980, it is estimated that there would be a natural gas consumption savings of about 0.2% by 1985. If 6 million homes were weatherized, the national reduction would be 0.8%.[79]

The Act also established a State Energy Conservation Program under which states will receive federal aid for the development and implementation of conservation plans if they provide for specific measures including mandatory energy-efficiency and thermal-efficiency standards. There is also funding for state-level public education and energy audit programs. There are four FEA-sponsored conservation programs: (1) Project Conserve, which involves disseminating information on residential conservation measures; (2) Institutional Workshops, which distributes information on conservation to public institutions; (3) Waste Oil Program, through which used oil is recovered from automobiles and industry and (4) Commercial and Industrial Workshops, which distributes technical information to industries and commercial firms. It is expected that these programs would save nearly 0.1% of the natural gas supply in 1985.[80] In the Project Conserve pilot study conducted in the 1976-77 winter about 500,000 questionnaires were sent out in the state of Massachusetts. Of these, approximately 12,000 were returned. The Services for Energy Conservation Architecture, who conducted this mailing, has estimated that about 3,000 homes (0.6%) did implement some conservation measures; perhaps 300 were extensive.[81]

Both the Senate and House have passed bills which establish conservation incentives for residential users. The House version of the National Energy Act, H.R. 8444, for instance, establishes a conservation program, which requires utilities to engage in intensive programs to promote conservation by residential users, provides financial assistance to residential users and offers tax credits for installation of residential conservation measures.[82] The Senate has also recently passed a residential energy conservation bill, which establishes mandatory utility conservation programs and financial assistance to residential energy consumers.[83]

Obligation Guarantee Program

This program would assign $7 billion of federal funds each year as a guarantee for business and institutional retrofit conservation investment obligations incurred between 1978 and 1985. No more than 90% of the private investment costs would be guaranteed by the federal government. If adopted, this measure is estimated to create a 1985 natural gas savings of 0.4 quadrillion Btu[84], or 2%.

Conservation Services

Conservation services cover a wide range of activities that can help consumers understand the advantages of conservation and help them adopt conservation measures. Some of the proposed and ongoing programs are discussed below.

Education

Making the consumer aware of the economic advantages of conservation and knowledgeable about the cost effective measures available is a major ingredient of almost all conservation programs. Most federal agencies and several state agencies provide information to the public and hold seminars for specific user groups. The U. S. Department of Commerce, Federal Energy Administration and the Energy Research and Development Administration have all been very active in disseminating conservation information. Most gas companies are conducting conservation advertising programs, including BG&E.

Since the early 1970's, BG&E has encouraged its customers to use all forms of energy wisely. The customer education program has been expanded through the use of a special bill-insert program. A speakers bureau of specially trained employees has made presentations to community and civic organizations. Single family home-owners have been offered in-home advisory services consisting of inspection by a trained representative to acquaint customers with specific ways to conserve natural gas wiscly. BG&E representatives have conducted periodic seminars for large industrial and commercial accounts on energy management, including the use of natural gas. Panelists have been supplied for several "town meetings" on energy sponsored by the Maryland Energy Policy Office. Surveys have been conducted of large gas customers to secure data on actual gas use and alternate fuel capability. BG&E's Energy Services Department also conducted a seminar entitled "Managing Energy Problems" attended by approximately 500 representatives of commercial and industrial firms. Increased television and radio news media coverage has been used to emphasize conservation in a variety of ways.[85]

Insulation Service Programs

Gas companies have been involved in home insulation programs to varying degrees. Under such programs , the utilities themselves might form wholly-owned subsidiaries that would supervise and finance the installation of residential conservation measures. Independent contractors would undertake the installation under contract with the subsidiary. If such a program were implemented nationally over a seven-year period, one analysis by FEA estimates that 1.2 tcf of conservation gas would be made available per year. Existing customers could have lower heating bills and new customers could be served.[86]

The National Energy Plan presented by President Carter on April 29, 1977 contained a proposal that would mandate utilities to provide complete insulation service.

The Michigan Consolidated Gas Company has proposed to the Michigan Public Service Company that it be allowed to adopt an insulation service. Michigan Consolidated developed a limited attic insulation program for residential customers in 1973. Their service granted loans that could be repaid over a 36-month period and reviewed contractors' estimates. Since the start of that program, approximately 150,000 of their 500,000 residential customers have insulated their attics.[87] Gas savings have amounted to approximately 4,100,000 mcf (or ~30 mcf per home) although some portion of this may be attributable to other factors.[88] Michigan Consolidated Gas Company does not consider the lowering of thermostats to have any long term impact. The company also believes that a 20% gas savings can be achieved through furnace improvements and 17% from ceiling insulation.[89]

In September 1975, Public Service of Colorado began an attic insulation program that included an 8.75% interest loan. They inspected 50,000 homes and insulated 21,600. These latter homes experienced a 12% gas savings.[90] This process, however, exhausted most of the locally available insulating materials; therefore, the utility considers it impossible to insulate all homes in their service area by 1985.[91]

Public Service Electric and Gas of New Jersey has had energy conservation information centers and home surveys to complement their advertising. While there is no specific estimate of overall savings, sales of gas have been decreasing. However, PSE&G officials have not been able to determine whether such reductions are due to conservation or to the effects of recent economic recessions.[92] PSE&G officials argue that it is preferable to achieve conservation through public relations and educational methods rather than through the imposition of a "penalty" pricing system. This latter method is believed to be less desirable since it may place an undue hardship on certain consumer groups.[93] PSE&G's conservation program is oriented toward the promotion of insulation. The utility estimates that all homes in the service area capable of being insulated could be properly retrofitted within five years.[94] PSE&G notes that one of the constraints associated with their insulation program is that manufacturers' supplies have been running low.[95]

Southern California Gas Company conducted an insulation program from August 1974 to June 1977. They hired local contractors and financed the process by a three-year loan at 15% to 18.75% interest under separate billing. During that time 37,215 homes were insulated. The utility estimates that it would take eight years to insulate all homes and again noted insulation supply problems.

BG&E also has an insulation service program in which the company will hire a contractor with the costs financed through an individual's monthly bill.[96]

National and State Mandates

Government bodies can regulate gas usage through enacting a variety of mandates. The following section describes some of the laws that have been proposed, as well as those that have been instituted.

Moratorium

One measure of conserving gas would be to issue a moratorium on new gas hook-ups to residential and small commercial users. On a national basis, this method would reduce gas consumption by 4 to 6 bcf during the first heating season and 60 bcf per year during each of the following heating seasons for as long as the moratorium continued.[97] Use of other, less clean, energy sources would increase proportionally. This in turn would raise the cost of home heating. Implementation would require a congressional mandate.[98] However, once enacted it could take effect quickly and cease almost immediately.

Consumer Product Efficiency Standards

Under the Energy Policy and Conservation Act (P.L. 94-163), the FEA has been directed to set energy efficiency improvement targets for consumer products. By 1980, improvements in 10 out of 13 categories of appliances must be no less than 20%. While most of the energy savings will be in electricity, it is estimated that compliance with these standards can reasonably be expected to reduce gas consumption by 0.5%.[99] The improvements rendered by this program, however, may eventually shift some portion of the appliance market from oil and electricity to gas.[100] The National Energy Plan had a provision that standards be set for 6 to 13 major appliances.

Building Standards

Under the Energy Conservation and Production Act, the Department of Housing and Urban Development will work with FEA, the U. S. Department of Commerce and the National Bureau of Standards to develop energy efficiency standards for all new residential and commercial buildings. If these standards are as strict as those developed by the American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc. (ASHRAE 90-75) and were adopted uniformly by 1981 commercial gas consumption would probably be reduced by 9% in 1985.[101] Comparable estimates for the residential sector have not been made. It is believed that as a result of these standards, construction costs can be expected to rise, with the consumer absorbing the ultimate financial impact.

Federal Energy Management Program

The Federal Energy Management Program is a continuation of current conservation programs oriented toward saving energy through federal government operational improvements. The gas savings through improved efficiencies in operations are estimated to approximate 0.03 quadrillion Btu.[102] or 0.1%. If, however, capital improvements are undertaken to improve the fuel efficiency of existing federal buildings, vehicles and equipment by 50%, 0.04 quadrillion Btu could be saved.[103] The National Energy Plan included a provision that all federal buildings will conserve energy.

10.4.4 Feasibility and Environmental Effects of the Alternative of Gas Conservation

Feasibility of Conservation

The analysis of potential gas savings within the BG&E service area indicates that the projected 1980 shortfall of approximately 7.3 million mcf could be offset through a concerted conservation effort on the part of the company's "firm" residential, commercial and industrial end users. This conclusion is based on estimates of potential gas savings and does not consider the question of whether there are sufficient incentives available to motivate BG&E end users to actually achieve such reductions in gas use.

A review of the literature on proposed programs designed to promote energy conservation indicates that there is a substantial gap between conservation potential and the realities of implementation. There are significant institutional, economic and motivational barriers that together or in part may severely constrain the near term (1980) achievement of the gas savings potentially available through conservation investments. For instance, some of the proposed implementation schemes would first necessitate changes in current state and federal regulations, a process that could take several years. Examples of measures requiring such regulatory action would be certain utility sponsored insulation programs as well as those proposals that call for a restructuring of utility rate schedules.

The economics of conservation are equally uncertain. While it was estimated that the direct costs to the consumer for achieving the 7.3 million mcf gas savings per year would be a one time cost of approximately $25 million, consideration must also be given to implementation costs, particularly in cases where the implementation program is based upon voluntary actions. This latter fact is particularly relevant to the assessment of the representative cost effective conservation program analyzed in Section 10.4.2. Approximately 87% of the 7.3 million mcf gas savings potential was based upon the use of measures that would potentially affect the "comfort" of the individual (i.e., the lowering of thermostats and hot water temperatures). Although the direct cost to the homeowners for undertaking these comfort-related measures would be about $14.6 million, the actual implementation and enforcement costs could be quite high.

The issue of voluntary versus mandatory measures is also of significance in the assessment of the conservation alternative. While many advocate a voluntary approach, there are no assurances that consumers are sufficiently motivated to conserve their fair share. A stringent, mandatory approach, on the other hand, presents additional problems regarding equity and efficiency. Unless suitable measures such as rebates are incorporated into a comprehensive mandatory program, a financial burden may be placed upon low income people. (The implementation of a rebate program would also require legislative changes.) A mandatory program may also induce fuel switching, particularly on the part of commercial and industrial end users. While fuel switching may help to ease the natural gas problem, it may also lead to increased use of other fuels as well as create undesirable environmental effects.

Several utilities who have undertaken residential conservation programs were also interviewed. These utilities were primarily involved with programs to promote insulation. Public Service of Colorado and Public Service Electric & Gas of New Jersey both noted that their progress in achieving conservation was partially hindered by problems of insulation supply. Thus, Public Service of Colorado did not believe that it would be possible to insulate all homes in its service area until 1985. (Its program began in 1975.) Similarly, Public Service Electric & Gas estimated that all homes capable of being insulated could be retrofitted in about five years. As a result of these considerations, the successful completion of any insulation program could be delayed by several years.

In effect, there are numerous constraints to achieving energy conservation. Since the effects of conservation are dependent upon the specific policies and implementation procedures used, it is difficult to assess the feasibility of the conservation alternative. This is particularly true in the near term ($\sim$1980). In spite of the abundance of literature on the subject of conservation, two unanswered questions still remain:

1) How much gas can actually be saved in what time frame, and

2) What are the direct and indirect costs of achieving these savings?

In the near term, the feasibility of conservation as a means to offset projected 1980 gas shortfalls in the BG&E service area is uncertain. The long-term benefits of conservation are undeniable although its economic implications are yet to be clearly defined. Conservation can be made a more attractive and reliable option when combined with other alternatives such as conversion from gas to coal or electricity. While conservation should be encouraged, it cannot be considered sufficiently reliable to be a complete and viable alternative in and of itself.

Environmental Effects of Conservation

The use of conservation as an alternative to the production of SNG may have both positive and negative effects on local and regional environmental quality. If conservation were used to entirely offset projected 1980 gas deficiencies, the site specific impacts described in Section 5 of the DEIS would not occur. Moreover, if less gas is burned in 1980 in comparison to current firm gas requirements, fewer air contaminants would be emitted. On the other hand, conservation could also have several negative ramifications. There are economic costs associated with implementation. There may also be economic costs to the end user in terms of installing necessary devices and undertaking requisite measures. While some of these costs will be eventually offset by annual gas savings, it is equally possible that conservation may still represent an uneconomical investment to some user groups, for rates of return and length of payback periods are both integral parts of the investment decision. Thus, mandatory conservation requirements may induce certain end users to switch fuels. If this were to occur, additional environmental impacts are likely to result. The magnitude of these impacts are dependent upon the extent to which fuel switching occurs and the specific alternative fuels used.

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APPENDIX A

FEDERAL POWER COMMISSION AND
FEDERAL ENERGY ADMINISTRATION DEFINITIONS
REGARDING PRIORITY OF SERVICE AND
ALTERNATIVE FUEL CAPABILITIES

FPC Definitions of Priority of Service Categories

The Federal Power Commission defines the nine priority-of-service categories as follows:

(1) Residential, small commercial (less than 50 mcf on a peak day).

(2) Large commercial requirements (50 mcf or more on a peak day), firm industrial requirements for plant protection, feedstock and process needs and pipeline customer storage injection requirements.

(3) All industrial requirements not specified in (2), (4), (5), (6), (7), (8) or (9).

(4) Firm industrial requirements for boiler fuel use at less than 3,000 mcf per day, but more than 1,500 mcf per day, where alternate fuel capabilities can meet such requirements.

(5) Firm industrial requirements for large volume (3,000 mcf or more per day) boiler fuel use where alternate fuel capabilities can meet such requirements.

(6) Interruptible requirements of more than 300 mcf per day, but less than 1,500 mcf per day, where alternate fuel capabilities can meet such requirements.

(7) Interruptible requirements of intermediate volumes (from 1,500 mcf per day through 3,000 mcf per day), where alternate fuel capabilities can meet such requirements.

(8) Interruptable requirements of more than 3,000 mcf per day, but less than 10,000 mcf per day, where alternate fuel capabilities can meet such requirements.

(9) Interruptable requirements of more than 10,000 mcf per day, where alternate fuel capabilities can meet such requirements.

Fuel Definition of Alternative Fuel Capability

According to FPC Order 467C (April 4, 1974), having an alternate fuel capability implies a situation

> where an alternate fuel could have been utilized whether or not the facilities for such use have actually been installed; provided, however, where the use of natural gas is for plant protection, feedstock, or process uses, and the only alternate fuel is propane or other gaseous fuel, then the consumer will be treated as if he had no alternate fuel capability.

FEA Definition of Alternative Fuel Capability

The FEA definition as specified in its Order, dated December 12, 1975, is as follows:

> "for the purpose of this assignment, alternate fuel capabilities on a continuing basis means having the facilities (such as burners, storage and associated equipment) in place to allow the firm in question to continue its normal operation for an indefinite period consistent with its fuel supplier's ability to deliver."

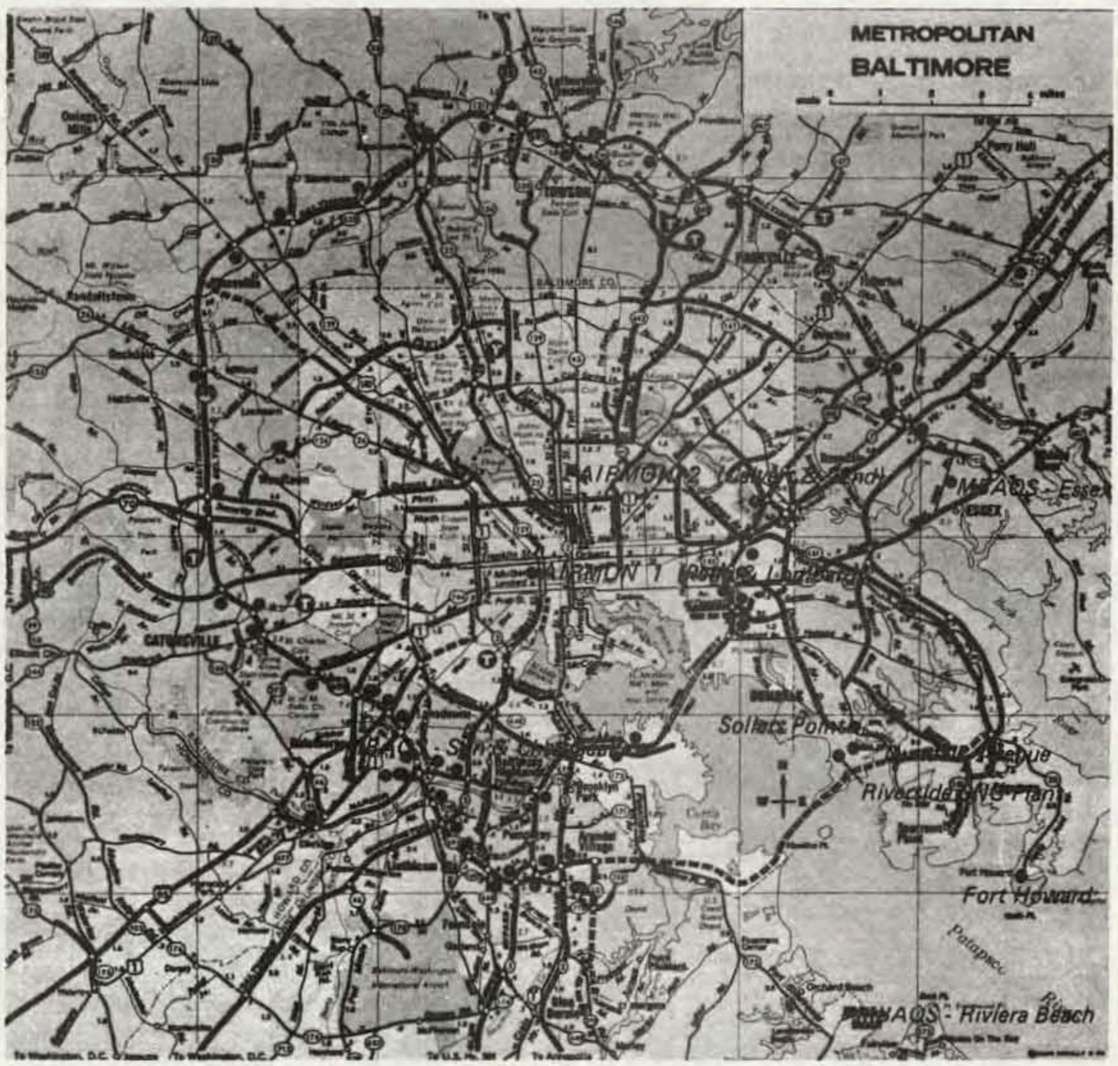
APPENDIX B

MEASUREMENTS OF AMBIENT AIR QUALITY

The brief discussion of ambient air quality presented in Section 4.4 of this report is based on air quality measurements made by the state and local agencies and private companies. These monitors are identified in Table B-1 and their locations are shown in Figure B-1.

The air quality standards which federal, state and local agencies are trying to achieve and maintain are presented in Table B-2. It is against these standards that ambient air quality measurements are compared to determine if ambient air quality levels are satisfactory. The primary national ambient air quality standards have been set to protect the public health while the secondary air quality standards have been set to protect the public welfare from any known or anticipated adverse affects of a contaminant. The State of Maryland has specified two levels of air quality as serious and more adverse in a manner similar to those in the federal level.

Tables B-3 through B-9 compare the contaminant levels at each of the air quality monitors shown in Figure B-1.



METROPOLITAN
BALTIMORE
Sollers Point
Fort Howard
Patapsco
Riviera Beach

TABLE B-1

SELECTED AIR QUALITY MONITORING SITE IN THE VICINITY OF THE SOLLERS POINT SNG FACILITY

Site Name	Site Address	Location	Pollutant Monitored	Monitor Type*	Wind Direction from SNG Plant Site	Downwind Distance (km)	State, Locally or BG&E Operated
Sollers Point	Dundalk Vocational High School	Baltimore County	TSP SO_2 NO_2	H B B	23	1.3	State
			Settleable Particulate Matter	G G			
Dundalk Ave.	Riverside SNG Plant Site	Baltimore County	TSP	H	71.5	0.5	BG&E
Fort Howard	Fort Howard Veterans Hospital	Baltimore County	TSP SO_2, NO_2	H B	120	6.9	State
			Settleable Particulate Matter	G			
NBAQS-Essex	Woodward and Dorsey Streets	Baltimore County	CO, HC SO_2 O_x	F P C	23.5	9.1	Local
NBAQS-Riviera Beach	Riviera Beach Elementary School	Anne Arundel County	TSP Settleable Particulate Matter	H G	180	8.1	Local
NBAQS-Sun & Chesapeake	Sun & Chesapeake Avenues	Baltimore City	SO_2 CO O_x	P N C	273	6.1	Local
AIRMON 1	Penn & Lombard Streets	Baltimore City	NO_2 HC O_x CO	S F C N	300.5	11.3	State
AIRMON 2	Calvert & 22nd Streets	Baltimore City	NO_2 HC O_x CO	S E C N	315	12.4	State

*Monitor Type
H - High volume sampler (periodic)
B - West Gaeke, 24-hour gas bubbler (periodic)
F - Flame ionization (continuous)
P - Flame photometry (continuous)
N - Non-dispersive infrared (continuous)
C - Chemiluminescence (continuous)
S - Saltzman (continuous)
G - Bucket

TABLE B-2

AMBIENT AIR QUALITY STANDARDS

	National		State*	
	Primary	Secondary	Serious	More Adverse
Sulfur Oxides				
Annual Arithmetic Mean, $\mu g/m^3$	80		79	60 (39)
24-hour Maximum[b], $\mu g/m^3$	365		262	(131)
Su 3-hour maximum[b], $\mu g/m^3$		1,300		
1-hour Maximum[c], $\mu g/m^3$			920 (525)	(262)
Particulate Matter				
Suspended				
Annual Mean, $\mu g/m^3$	75[a]	60[e,a]	75	65
24-hour Maximum[b], $\mu g/m^3$	260	150	160	140
Settleable				
Annual Average mg/cm^2/month			0.5	0.35
Monthly Maximum			1.0	0.7
Carbon Monoxide				
8-hour Maximum[b], mg/m^3	10		10[d]	
1-hour Maximum[b], mg/m^3	40		40	
Hydrocarbons (non-methane)				
3-hour (6-9 AM) Maximum[b], $\mu g/m^3$	160[e]		160[e]	
Nitrogen Dioxide				
Annual Arithemtic Mean, $\mu g/m^3$	100		100	
Photochemical Oxidants				
1-hour Maximum[b], $\mu g/m^3$	160		160	

[a] annual geometric mean

[b] not to be exceeded more than once per year

[c] not to be exceeded more than once per month

[d] applies in areas representing generalized atmospheric levels; 20 ppm applies in any other place where members of the public congregate for extended periods of time

[e] guideline

*parenthesis indicate standard in 1974 if other than the 1975 standard

TABLE B-3

SULFUR DIOXIDE CONCENTRATIONS IN THE VICINITY OF THE SOLLERS POINT FACILITY

Site	Year	Number of Observations	Annual Arithmetic Mean ($\mu g/m^3$)	Maximum Values ($\mu g/m^3$)			Number of Hours ($\mu g/m^3$) Greater Than				Number of Days ($\mu g/m^3$) Greater Than			
				24-hr	3-hr	1-hr	(260)*	(525)*	920	(131)*	(260)*	(360)*	262	365
Sollers Point	1974	108	32	169	-	-	-	-	-	3	0	0	-	-
	1975	61	33	116	-	-	-	-	-	-	-	-	0	0
MBAQS-Fort Howard	1974	109	17	76	-	-	-	-	-	0	0	0	-	-
	1975	58	16	99	-	-	-	-	-	-	-	-	0	0
MBAQS-Essex	1974	4,803	61	236	401	576	75	1	-	14	0	0	-	-
	1975	4,791	57	192	314	445	-	-	0	-	-	-	0	0
MBAQS-Sun & Chesa-peake	1974	4,578	61	182	602	943	89	13	-	10	0	0	-	-
	1975	3,809	47	166	541	1,257	-	-	1	-	-	-	0	0

*Parentheses indicates standards in 1974

TABLE B-4

TOTAL SUSPENDED PARTICULATE CONCENTRATIONS IN THE VICINITY OF THE SOLLERS POINT SNG FACILITY

Site	Year	Number of Observations	Annual Geometric Mean (µg/m³)	Annual Arithmetic Mean (µg/m³)	24-hr Maximum (µg/m³)	Number of Observations Greater Than (µg/m³) 140	150	160	260
Sollers	1974	108	75	84	203	8	8	5	0
Point	1975	60	75	81	199	2	1	1	0
Dundalk	1974	56	92	103	226	15	11	5	0
Avenue	1975	60	98	107	270	13	10	9	1
Fort	1974	114	49	55	182	3	2	1	0
Howard	1975	54	50	54	105	0	0	0	0
MBAQS-									
Riviera	1974	106	60	64	163	1	1	1	0
Beach	1975	43	53	76	406	3	3	3	3

TABLE B-5

SETTLEABLE PARTICULATES CONCENTRATION IN THE VICINITY OF THE SOLLERS POINT SNG FACILITY

Site	Year	Number of Observations	Annual Arithmetic Mean mg/cm^3/30 days	Maximum Monthly Value mg/cm^3/30 days	Number of Months Exceeding	
					0.7 mg cm^3/30 days	1.0 mg cm^3/30 days
Sollers Point	1974	12	.41	.63	0	0
	1975	11	.31	.52	0	0
Fort Howard	1974	12	.22	.54	0	0
	1975	12	.13	.28	0	0
MBAQS-Riviera Beach	1974	11	.32	.90	1	0
	1975	11	.20	.34	0	0

TABLE B-6

CARBON MONOXIDE CONCENTRATION IN THE VICINITY OF THE SOLLERS POINT SNG FACILITY

Site	Year	Observations	Mean mg/m^3	Maximum Values mg/m^3 1-hr	Maximum Values mg/m^3 8-hr	Number of 1-hr Observations Greater than 40 mg/m^3	Number of 8-hr Observations Greater than 10 mg/m^3	Number of Days with 8-hr Averages Greater than 10 mg/m^3
MBAQS-Sun & Chesapeake	1974	-	-	-	-	-	-	-
	1975	5,664	2	16	14	0	3	3
MBAQS-Essex	1974	4,336	1	35	17	0	6	5
	1975	4,824	1	21	14	0	1	1
AIRMON 1 (Penn & Lombard St)	1974	5,400	1	23	17	0	4	4
	1975	2,949	1	24	12	0	1	1
AIRMON 2 (Calvert & 22nd)	1974	5,568	1	22	15	0	1	1
	1975	5,736	1	27	17	0	9	7

TABLE B-7

NITROGEN DIOXIDE CONCENTRATIONS IN THE VICINITY OF THE SOLLERS POINT SNG FACILITY

Site	Year	Number of Observations	Annual Arithmetic Mean ($\mu g/m^3$)
AIRMON I	1974	3,249	122
(Green & Penn)	1975	2,632	85
AIRMON 2	1974	4,223	114
(Calvert & 22nd)	1975	3,374	91
Sollers Point	1974	108	54
	1975	62	46
Fort Howard	1974	109	37
	1975	58	34

TABLE B-8

PHOTOCHEMICAL OXIDANT CONCENTRATION IN THE VICINITY OF THE SOLLERS POINT SNG FACILITY

Site	Year	Number of Observations	1-hr Average Maximum μg/m³	No. 1-hr Averages Greater than 16 μg/m³	No. of Days with Maximum Greater than (μg/m³)		
					160	195	295
MBAQS-Essex	1974	4,815	373	232	49	30	4
	1975	5,280	510	275	50	36	10
AIRMON 1 (Green & Penn)	1974	3,352	294	57	19	11	0
	1975	3,926	392	45	13	11	2
AIRMON 2 (Calvert & 22nd)	1974	3,384	294	26	10	5	0
	1975	2,998	412	96	22	15	3
MBAQS-Sun & Chesapeake	1974	-	-	-	-	-	-
	1975	2,697	255	20	5	4	0

TABLE B-9

NON-METHANE HYDROCARBON CONCENTRATION IN THE VICINITY OF THE SOLLERS POINT SNG FACILITY

Site	Year	Observations	Maximum 6 to 9 AM $\mu g/m^3$	Number of days with 6 to 9 AM Average 160 $\mu g/m^3$
AIRMON 1	1974	2,387	2,157	66
(Green & Penn)	1975	125	1,373	3
AIRMON 2	1974	2,689	1,874	75
(Calvert & 22nd)	1975	894	1,503	22
MBAQS-	1974	4,404	3,204	118
Essex	1975	4,063	2,484	78

APPENDIX C

LISTS OF REPTILES, AMPHIBIANS, BIRDS AND MAMMALS COMMON TO THE BALTIMORE AREA

TABLE C-1

POTENTIAL REPTILE AND AMPHIBIAN SPECIES
TO OCCUR ON THE BALTIMORE GAS & ELECTRIC, SOLLERS POINT SNG FACILITY SITE

Common Snapping Turtle - Chelydra serpentina
Bog Turtle - Clemmys muhlenbergi*
Wood Turtle - Clemmys unsculpta
Spotted Turtle - Clemmys quttata
Stinkpot - Sternotherus odoratus
Eastern Mud Turtle - Kinosternon subrubrum
Map Turtle - Graptys geographica*
Northern Diamondback Terrapin - Malaclemys terrapin
Northern Fence Lizard - Sceloporus undulatus
Ground Skink - Leiolopisma laterale
Five-Lined Skink - Eumeces fasciatus
Broad-Headed Skink - Eumeces laticeps
Southeastern Five-Lined Skink - Eumeces inexpectatus*
Racerunner-Sixlined - Cnemidophorus sexlineatus
Northern Water Snake - Natrix siphendon
Queen Snake - Natrix septemvittata
Eastern Garter Snake - Thamnophis sirtalis
Eastern Ribbon Snake - Thamnophis sauritus
Eastern Smooth Earth Snake - Virginia valeriae
Northern Red-Bellied Snake - Storeria occipitomaculata
Northern Brown Snake - Storeria dekayi
Eastern Hognose Snake - Heterodon platyrhinos
Eastern Worm Snake - Carphophis amoenus
Northern Ringneck Snake - Diadophis punctatus
Rough Green Snake - Opheodrys aestivus
Rainbow Snake - Farancia erytrogramma*
Northern Black Racer - Colober constrictor
Black Rat Snake - Elaphe obsoleta
Corn Snake - Elaphe quttata
Northern Scarlet Snake - Cemophora coccinea
Eastern Milk Snake - Lampropeltis triangulum triangulum
Scarlet Kingsnake - Lampropeltis triangulum elapsoides

TABLE C-1 (Continued)

Kingsnake - *Lampropeltis calligaster*

Eastern Kingsnake - *Lampropeltis getolus*

Northern Copperhead - *Agkistrodon contortrix*

Hellbender - *Cryptobranchus alleganiensis*

Red-Spotted Newt - *Notophthalmus viridescens*

Eastern Tiger Salamander - *Ambystoma tigrinum*

Spotted Salamander - *Ambystoma maculatum*

Marbled Salamander - *Ambystoma opacum*

Northern Dusky Salamander - *Desmograthus fuscus*

Red Salamander - *Pseudotriton ruber*

Eastern Mud Salamander - *Pseudotriton montanus*

Slimy Salamander - *Plethodon glutinosus**

Red-Backed Salamander - *Plethodon cinereus*

Four-Toed Salamander - *Hermidactyllium scutatum*

Northern Two-Lined Salamander - *Eurycea bislineata*

Long-Tailed Salamander - *Eurycea longicauda**

Eastern Spadefoot Toad - *Scaphiopus holbrooki*

American Toad - *Bufo americanus*

Fowler's Toad - *Bufo woodhousei*

Northern Spring Peeper - *Hyla crucifer*

Green Treefrog - *Hyla cinerea*

Gray Treefrog - *Hyla vericolor*
Hyla chrysoscelis

Upland Chorus Frog - *Pseudacris triseriata*

Northern Cricket Frog - *Acris crepitans*

Green Frog - *Rana clamitans*

Bullfrog - *Rana catesbeiana*

Southern Leopard Frog - *Rana ultricularia*

Pickeral Frog - *Rana palustris*

Wood Frog - *Rana sylvatica*

*potential - inhabit periphery of site and may have habitat simliar to those conditions within the site.

Source: Conant, Roger, "A Field Guide to Reptile and Amphibians of Eastern and Central North America" Houghton-Mifflin Company, Boston, 1975, 429 pp.

TABLE C-2

POTENTIAL BIRD SPECIES TO OCCUR ON THE BALTIMORE GAS & ELECTRIC, SOLLERS POINT SNG FACILITY SITE AND SEASONAL OCCURRENCE

	Sp	S	F	W
Common Loon - Gavia Immer	C		C	UC
Red-throated Loon - G. stellata				R
Horned Grebe - Podiceps auritus	C		C	C
Red-billed Grebe - Podilymbus podiceps	C	R	C	UC
Double-Crested Cormorant - Phalacrocorax auritus	C		C	UC
Great Blue Heron - Ardea herodias	C	C	C	UC
Great Egret - Casmerodius albus	R	R	C	R
Snowy Egret - Egretta thula	C	Ab	Ab	Oc
Cattle Egret - Bubulcus ibis		UC	UC	
Little Blue Heron - Florida caerulea		C	C	R
Louisiana Heron - Hydranassa tricolor	U	C	U	
Green Heron - Butorides virescens	C	C	C	
Black-crowned Night Heron - Nycticorax nycticorax	UC		UC	UC
Yellow-crowned Night Heron - Nyctanassa violacea	UC		UC	UC
American Bittern - Botaurus lentiginosus	C	UC	C	UC
Least Bittern - Ixobrychus exilis	UC	UC	UC	R
Glossy Ibis - Plegadis falcinellus	C	C	UC	R
Mute Swan - Cygnus olor	UC	UC	UC	R
Whistling Swan - Olor columbianus	C		C	C
Canada Goose - Branta canadensis	Ab		Ab	Ab
Brant - Branta bernicla	R			R
Snow Goose - Chen hyperborea	R		R	R
Blue Goose - Chen hyperborea	R		R	R
Mallard - Anas platyrhynchos	C	C	C	C
Black Duck - Anas rubripes	C	C	C	C
Gadwall - Anas strepera	UC	C	C	UC
American Widgeon - Anas americana	C		C	C
Pintail - Anas acuta	C		C	C
Green-winged Teal - Anas carolinensis	C		C	UC
Blue-winged Teal - Anas discors	C	UC	C	R
Shoveler - Anas clypeata	UC		UC	R

TABLE C-2 (Continued)

	Sp	S	F	W
Wood Duck - *Aix sponsa*	C	C	C	UC
Redhead - *Aythya collaris*	C		C	C
Ring-necked Duck - *Aythya collaris*	UC		UC	UC
Canvas-back - *Aythya valisineria*	C		C	C
Greater Scaup Duck - *Aythya marila*	C		C	C
Lesser Scaup Duck - *Aythya affinis*	C		C	C
Common Golden Eye - *Bucephala dangula*	C		C	C
Buffle-head - *Bucephala albeola*	C		C	C
Old Squaw - *Clangula hyemalis*	C		C	C
Common Eider - *Somateria mollissima*				R
White-winged Scoter - *Melanitta deglandi*	C		C	C
Surf Scoter - *Melanitta perspicillata*	UC		UC	UC
Black Scoter - *Melanitta nigra*	C		C	UC
Ruddy Duck - *Oxyura jamaicensis*	C		C	C
Hooded Merganser - *Lophedytes cucullatus*	C		C	C
Common Merganser - *Mergus merganser*	C		C	C
Red-breasted Merganser - *Mergus serrator*	C		C	
Turkey Vulture - *Cathartes aura*	C	C	C	C
Black Vulture - *Coragyps atratus*	UC	UC	UC	UC
Sharp-skinned Hawk - *Accipiter striatus*	C		C	UC
Cooper's Hawk - *accipiter cooperii*	C		C	UC
Red-tailed Hawk - *Buteo jamaicensis*	C	C	C	C
Red-shouldered Hawk - *Buteo lineatus*	C	C	C	C
Broad-winged Hawk - *Buteo platypterus*	C	UC	C	
Rough-legged Hawk - *Buteo lagopus*	UC		UC	UC
Golden Eagle - *Aquila chrysaetos*	R		R	R
Bald Eagle - *Haliaeetus* Levcocephalus	C	UC	C	UC
Marsh Hawk - *Circus cyaneus*	C		C	C
Osprey - *Pandion haliaetus*	C	C	C	
Peregrine Falcon - *Falco peregrinus*	UC		UC	R
Merlin - *Falco columbarius*	UC		UC	R
Kestrel - *Falco sparveris*	C	C	C	C
Bob White - *Colinus virginianus*	C	C	C	C
Ring-necked Pheasant - *Phasianus colchicus*	UC	UC	UC	UC
King Rail - *Rallus elegans*	UC	UC	UC	UC

TABLE C-2 (Continued)

	Sp	S	F	W
Clapper Rail - Rallus longirostris	UC	UC	UC	
Virginia Rail - Rallus limicola	C	C	C	C
Sora - Porzana carolina	C		C	R
Common Gallinule - Gallinula chloropus	UC	UC	UC	
American Coot - Fulica americana	C		C	C
Semipaluated Plover - Charadrius semipalmatus	UC		UC	
Piping Plover - C. melodus	C	C	C	
Wilson's Plover - C. wilsonia	R	R	R	
Killdeer - Charadrius vociferus	C	C	C	UC
American Golden Plover - Pluvialis dominica			R	
Black-bellied Plover - Pluvialis squatarola	UC		UC	R
American Woodcock - Philohela minor	UC	UC	UC	UC
Common Snupe - Capella gallinago	UC		UC	UC
Spotted Sandpiper - Actitis macularia	C	UC	C	
Solitary Sandpiper - Tringa solitaria	UC		UC	
Willet - Catoptrophorus semipalmatus	UC		UC	
Greater Yellow-legs - Tringa melanoleucus	C	R	C	UC
Lesser Yellow-legs - Tringa flavipes	C		C	R
Pectoral Sandpiper - Calioris melanotos	UC		UC	
Least Sandpiper - Calioris minutilla	C		C	R
Dunlin - Calioris alpina	C		C	UC
Sanderling - Calioris alba	UC		UC	
Great Black-backed Gull - Larus marinus	C	UC	C	C
Herring Gull - Larus argentatus	C	UC	C	C
Ring-billed Gull - Larus delawarensis	Ab	UC	Ab	C
Laughing Gull - Larus atricilla	C	UC	C	R
Bonaparte's Gull - Larus philadelphia	UC		UC	UC
Gull-billed Term - Gelochelidon nilonca	R	R		
Forester's Tern - Sterna forsteri	R	OC	C	
Common Tern - Sterna hirundo	UC		UC	
Least Tern - Sterna albifrons	UC	UC	UC	
Royal Tern - Thalasseus maximus	UC		UC	
Caspian Tern - Hydroprogne caspia	UC		UC	
Black Tern - Chlidonias niger	UC		UC	

TABLE C-2 (Continued)

	Sp	S	F	W
Black Skimmer - Rynchops nigra	UC	UC	UC	R
Mourning Dove - Zenaida macroura	C	C	C	C
Yellow-billed Cuckoo - Coccyzus americanus	UC	UC	UC	
Black-billed Cuckoo - Coccyzus erythropthalmus	UC		UC	
Barn Owl - Tyto alba	UC	UC	UC	UC
Screech Owl - Otus asio	UC	UC	UC	UC
Great Horned Owl - Bubo virginianus	UC	UC	UC	UC
Barred Owl - Strix varia	C	C	C	C
Short-eared Owl - Asio flammeus	UC		UC	UC
Saw-whet Owl - Aegolius acadicus			UC	UC
Chuck-willis-widow - Caprimulgus carolinensis	UC	R	UC	
Whip-poor-will - Caprimulgus vociferus	C	C	C	
Ruby-throated Hummingbird - Archilochus colobris	UC	UC	UC	
Belted Kingfisher - Megaceryle alcyon	UC	UC	UC	UC
Common Flicker - Colaptes auratus	C	C	C	UC
Red-bellied Woodpecker - Centurus carolinus	C	C	C	C
Red-headed Woodpecker - Melanerpes erythrocephalus	R	R	R	R
Yellow-bellied Sapsucker - Sphyrapicus varius	UC		UC	UC
Hairy Woodpecker - Dendrocopos villosus	UC	UC	UC	UC
Downy Woodpecker - Dendrocopos pubescens	C	C	C	C
Eastern Kingbird - Tyrannus tyrannus	C	UC	C	
Great Crested Flycatcher - Myiarchus crinitus	UC	C	UC	
Eastern Phoebe - Sayornis phoebe	C	UC	C	UC
Yellow-bellied Flycatcher - Empidonax flaviventris	OC		OC	
Acadian Flycatcher - Empidonax virescens	UC	C	UC	
Traill's Flycatcher - Empidonax traillii			R	
Least Flycatcher - Empidonax minimus	R		R	
Eastern Wood Pewee - Contopus virens	C	C	C	
Horned Lark - Eremophila alpestris	UC	UC	UC	UC
Tree Swallow - Iridoprocne bicolor	C	R	Ab	OC
Bank Swallow - Riparia riparia	UC	UC	UC	
Rough-winged Swallow - Stelgidopteryx ruficollis	UC	UC	UC	
Barn Swallow - Hirundo rustica	Ab	C	Ab	
Cliff Swallow - Petrochelidon pyrrhonota	R		R	

TABLE C-2 (Continued)

	Sp	S	F	W
Purple Martin - *Progne subis*	UC	C	UC	
Blue Jay - *Cyanocitta cristata*	UC	UC	Oc	C
Common Crow - *Cervus brachyrhynchos*	C	C	C	C
Fish Crow - *Corvus ossifragus*	C	UC	C	UC
Black-capped Chickadee - *Parus atricapillus*				Oc
Carolina Chickadee - *Parus carolinensis*	C	C	C	C
Tufted Titmouse - *Parus bicolor*	C	C	C	C
White-breasted Nuthatch - *Sitta carolinensis*	UC	UC	UC	UC
Red-breasted Nuthatch - *Sitta canadensis*	UC		UC	UC
Brown-Headed Nuthatch - *Sitta pusilla*	R	R	R	R
Brown Creeper - *Certhia familiaris*	UC		UC	UC
House Wren - *Troglodytes aedon*	C	C	C	R
Winter Wren - *Troglodytes troglodytes*	UC		UC	UC
Carolina Wren - *Thryothorus ludovicianus*	C	C	C	C
Long-Billed March Wren - *Teluatodytes palustris*	Ab	Ab	Ab	R
Short-Billed Marsh Wren - *Cistothorus platensis*	UC	UC	UC	
Mockingbird - *Mimus polyglottos*	C	C	C	C
Catbird - *Dometella carolinensis*	C	C	C	R
Brown Thrasher - *Toxostoma rofom*	UC	UC	UC	R
Robin - *Turdus Migratorius*	Ab	C	Ab	UC
Wood Thrush - *Hylocichla Mustelina*	C	C	C	
Hernut Thrush - *Catharus guttata*	UC		UC	UC
Swainson's Thrush - *Catharus ustulata*	UC		UC	
Gray-Cheeked Thrush - *Catharus minima*	UC		UC	
Veery - *Catharus fuscescens*	UC		UC	
Eastern Bluebird - *Sialia sialis*	C	UC	C	C
Blue-Gray Gnatcatcher - *Polioptila caerulea*	C	C	C	
Golden-Crowned Kinglet - *Regulus satrapa*	C		C	C
Roby-Crowned Kinglet - *Regulus calendula*	C		C	UC
Water Pipit - *Anthus spinoletta*	UC		UC	UC
Cedar Waxwing - *Bombycilla cedrorum*	C	R	C	UC
Loggerhead Shrike - *Lanius ludovicianus*	UC		UC	UC
Starling - *Stornus vulgaris*	Ab	Ab	Ab	Ab
White-Eyed Vireo - *Vireo griseus*	C	C	C	

TABLE C-2 (Continued)

	Sp	S	F	W
Yellow-Throated Vireo - *Vireo flavifrons*	UC	UC	UC	
Solitary Vireo - *Vireo solitarius*	R		R	
Red-Eyed Vireo - *Vireo olivaceus*	C	C	C	
Philadelphia Vireo - *Vireo philadelphicus*	R		R	
Warbling Vireo - *Vireo gilvus*	R	UC	R	
Black and White Warbler - *Mniotilta varia*	C	UC	C	
Prothonotany Warbler - *Protonotaria citrea*	UC	UC	UC	
Worm-Eating Warbler - *Helmitheros vermivorus*	R	R	R	
Golden-Winged Warbler - *Vermivora chrysoptera*	R		R	
Blue-Winged Warbler - *Vermivora pinus*	UC		UC	
Tennessee Warbler - *Vermivora peregrina*	R		R	
Orange-Crowned Warbler - *Vermivora celata*			R	
Nashville Warbler - *Vermivora roficapilla*	R		R	
Northern Parula - *Parula americana*	UC	C	UC	
Yellow Warbler - *Dendroica petechia*	UC	UC	UC	
Magnolia Warbler - *Dendroica Magnolia*	UC		C	
Cape May Warbler - *Dendroica tigrina*	R		UC	
Black-Throated Blue Warbler - *Dendroica caerolescens*	UC		C	
Yellow-Rumped Warbler - *Dendroica coronata*	Ab		Ab	C
Black-Throated Green Warbler - *Dendroica virens*	UC		UC	
Corulean Warbler - *Dendroica cerolea*	R		R	
Blackbuarian Warbler - *Dendroica fusca*	R		R	
Yellow-Throated Warbler - *Dendroica dominica*	C	C	C	
Chestnut-Sided Warbler - *Dendroica pensylvanica*	UC		UC	
Bay-Breasted Warbler - *Dendroica castanea*	R		R	
Black-poll Warbler - *Dendroica striata*	UC		UC	
Pine Warbler - *Dendroica pinus*	C	C	C	R
Prairie Warbler - *Dendroica discolor*	UC	C	UC	
Palm Warbler *Dendroica palmarum*	UC		UC	R
Ovenbird - *Sieiurus avrocapillus*	UC	UC	C	
Northern Waterthrush - *Seiurus noveboracensis*	UC		UC	
Louisiana Water thrush - *Seiurus motacilla*	C	C	C	
Kentucky Warbler - *Oporornis formosus*	C	C	C	
Connecticut Warbler - *Oporornis agilis*			UC	
Mourning Warbler - *Oporornis philadelphia*	R		R	

TABLE C-2 (Continued)

	Sp	S	F	W
Northern Yellow-Throat - Geothlypis trichas	C	Ab	C	R
Yellow-Breasted Chat - Icteria virens	C	C	C	OC
Hooded Warbler - Wilsonia critrina	UC		UC	
Wilson's Warbler - Wilsonia pusilla	R		R	
Canada Warbler - Wilsonia canadensis	UC		UC	
American Redstart - Setophaga ruticilla	C		C	
House Sparrow - Passer domesticus	C	C	C	C
Bobolink - Dolichonyx oryzivorus	C		C	
Eastern Meadowlark - Sturnella magna	Ab	C	Ab	C
Red-Winged Blackbird - Agelaius phoeniceus	Ab	C	Ab	C
Orchard Oriole - Icterus spurius	C	C	C	
Northern Oriole - Icterus galbula	C	UC	C	R
Rusty Blackbird - Euphagus carolinus	UC		UC	UC
Common Grackle - Quiscalus quiscula	C	Ab	C	C
Brown-Headed Cowbird - Molothrus ater	C	UC	C	C
Scarlet Tanager - Piranga olivacea	UC	UC	UC	
Summer Tanager - Piranga rubra	OC	OC	OC	
Cardinal - Cardinalis cardinalis	C	C	C	C
Rose-Breasted brosebeak - Pheucticus ludovicianus	R		R	
Blue Grosebeak - Guiracce caerulea	UC	UC	UC	
Indigo Bonting - Passerina cyanea	C	C	C	
Evening Grosebeak - Hesperiphona vespertina	UC		UC	UC
Purple Finch - Carpodacus purpureus	UC		UC	UC
House Finch - Carpodacusmexicanus				R
Pine Siskin - Spinus pinus	UC		UC	UC
American Goldfinch - Spinus tristis	C	UC	C	C
Red Crossbill - Loxia curvirostra				R
White-Winged Crossbill - Loxia leucoptera				R
Rufous-Sided Towhee - Piplio erythrophthalmus	C	C	C	UC
Savannah Sparrow - Passerculus sandwichensis	Ab		Ab	C
Grasshopper Sparrow - Ammodramus savannarum	C	C	C	
Henslow's Sparrow - Ammodramus henslowii	UC	UC	UC	
Sharp-Tailed Sparrow - Ammospiza caudacuta	C	C	C	
Seaside Sparrow - Ammospiza maritima	UC	UC	UC	

TABLE C-2 (Continued)

	Sp	S	F	W
Vesper Sparrow - Pooecetes gramineus	C	C	C	
Dark-Eyed Junco - Junco hyemalis	Ab		Ab	Ab
Tree Sparrow - spizella arborea	UC		UC	UC
Chipping Sparrow - Spizella passerina	C	C	C	R
Field Sparrow - Spizella pusilla	C	C	C	C
White-Crowned Sparrow - Zonotrichia leucophrys	R		R	R
White-Throated Sparrow - Zonotrichia albicollis	Ab		Ab	Ab
Fox Sparrow - Passerella iliaca	UC		UC	UC
Lincoln's Sparrow - Melospiza lincolnii	R		R	R
Swamp Sparrow - Melospiza georgiana	C		C	C
Song Sparrow - Melospiza melodia	Ab	C	Ab	C
Lapland Longspur - Calcarius lapponicus				R
Snow Bunting - Plectrophenax nivalis				R

KEY: Sp - Spring; S - Summer; F - Fall; W - Winter; R - Rare; OC - Occasional; UC - Uncommon; C - Common; Ab - Abundant

Sources:

Robbins, C. S. et al, Birds of North America, Golden Press, New York 1966, 340 pp.

Peterson, R. T., A Field Guide to the Brids, Eastern Land and Water Birds, Houghton Miffun comp., Boston, 1947, 230 pp.

Avian check list of Eastern Neck Wildlife Refuge, Rock Hall, Maryland, Reference leaflet 254, February 1971.

TABLE C-3

POTENTIAL MAMMAL SPECIES TO OCCUR ON THE BALTIMORE GAS & ELECTRIC SOLLERS POINT SNG FACILITY SITE

Oppossum	Didelphis marsupialis	Common
Masked Shrew	Sorex cinereus	Common
Smoky Shrew	S. fumeus	Common
Southeastern Shrew	S. longirostris	Peripheral to Site
L ngtail Shrew	S. dispoir	Peripheral to Site
Pygmy Shrew	Microsorex lorgi	Uncommon
Least Shrew	Cryptoris parva	Common
Shorttail Shrew	Blarina brevicauda	Common
Starnose Mole	Condglura cristata	Common
Eastern Mole	Scalopus aquaficus	Common
Hairy-tail Mole	Parascalops hewiri	Peripheral
Keen Myotis	Myotis kieni	C mmon
Little Brown Myotis	M. lucifugus	Common
Small-footed Myotis	M. sutulatus	Common
Silver-haired Bat	Lasionyctius noctivagans	Uncommon
Eastern Pipistrel	Pipistrellus subfaris	Common
Big Brown Bat	Eptesicus fuscus	Common
Red Bat	Lasiurus lorealis	Common
Hoary Bat	L. cinereus	Common
Seminole Bat	L. seminolus	Uncommon
Evening Bat	Nycticeius humeralis	Uncommon
Raccoon	Procyon lator	Common
Least Weasel	Mustela rixosa	Peripheral to Site
Longtail Weasel	M. tunata	Common
Shorttail Weasel	M. erminea	Uncommon
Striped Skunk	Mephitis mephitis	Common
Red Fox	Vulpis fulva	Uncommon
Gray Fox	Vrocyon anereorgenfeus	Uncommon
Woodchuck	Marmota monax	Common
Eastern Chipmunk	Tamias striatus	Common
Eastern Gray Squirrel	Sciurus carolinensis	Common
Eastern Fox Squirrel	S. niger	Common
Red Squirrel	Tamiasciurus h dsmicus	Uncommon
Southern Flying Squirrel	Glaucomys bolans	Common
Eastern Harvest House	Reithnodontomys humulis	Uncommon
Deer Mouse	Peromyscus maniculatus	Uncommon
White-toolod House	P. leucopus	Common
Rive Rat	Oryzomys palustris	Common
Meadow Vale	Microtus pennsylvanicus	Common
Muskrat	Ondatia zibetheia	Common
Norway Rat	Rattus norwegicus	Common
Black Rat	Rattus rattus	Common
House Mouse	Mus musculus	Common
Meadow Jumping Mouse	Zapus hudsonius	Uncommon
Eastern Cottontail	Sylvilagus floridanus	Common
Atlantic Battlenose Dolphin	Tursiops truncatus	May Accompany Ships into Harbor

APPENDIX D

LISTS OF INVERTEBRATE ORGANISMS AND FISH SPECIES FOUND IN BALTIMORE HARBOR AND THE PATAPSCO RIVER

TABLE D-1

SPECIES LIST OF INVERTEBRATE ORGANISMS FOUND WITHIN THE SEMIHEALTHY AREAS OF BALTIMORE HARBOR

Coelenterata

- Fagesia lineata
- Diadumene leveolena
- Corophium locustre
- Rithropanopeus harrisi

Nemertea

- Mierwa leidyi

Annelida

- Limnodrilus sp.
- Heteromastus filiformis
- Scolecolepides viridis
- Strebloispio benedicti
- Eteone heteropoda
- Nereis succinea
- Hypaniola grayi

Arthropoda

- Neomysis americana
- Cyathura polita
- Edotea triloba
- Monoculodes edwardsi
- Gammarus sp.
- Carinogammarus mucronatus
- Melita nitida
- Dynadusa compta
- Leptochierus plumulosus

Insecta

- Chironomus attenuatus
- Procladius sp.

Mollusca

- Brachiodontes recurrius
- Congeri leucophaeta
- Mya arenaria
- Macoma balthica
- Macoma phenax
- Rangia cuneata

Source: Pfitzenmeyer, 1975

TABLE D-2

SPECIES LIST OF INVERTEBRATE ORGANISMS FOUND WITHIN THE SEMIPOLLUTED AREAS OF BALTIMORE HARBOR

Coelenterata

Fagesia lineata
Diadumene leveolena

Nemertea

Mierwa leidyi

Annelida

Limnodrilus sp.
Heteromastus filiformis
Scolecolepides viridis
Strebloispio benedicti
Eteone heteropoda
Nereis succinea
Ilypaniola grayi
Polydora ligni

Arthropoda

Balamus amphitrite
Cyathura polita
Monoculodes edwardsi
Gammarus sp.
Carinogammarus mucronatus
Melita nitida
Cymadusa compta
Liptochierus plumulosus
Corosphium lacustre
Rithropanopeus harrisi

Insecta

Chironomus attenuatus
Procladius sp.

Mollusca

Congeria leucophaeta
Macoma balthica
Macoma phenax
Pangia cuneata

Source: Pfitzenmeyer, 1975

TABLE D-3

SPECIES LIST OF INVERTEBRATE ORGANISMS FOUND WITHIN THE VERY POLLUTED AREAS OF BALTIMORE HARBOR

Nemertea

Mierwa leidyi

Annelida

Limnodrilus sp.
Heteromastus filiformis
Scolecolepides viridis
Strebloispio benedicti
Eteone heteropoda
Nereis succinea
Hypaniola grayi
Polydora ligni

Arthropoda

Neomysis americana
Cyathura polita
Gammarus sp.
Liptochierus plumulosus
Rithropanopeus harrisi

Insecta

Chironomus attenuatus
Procladius sp.

Mollusca

Macoma balthica

Source: Pfitzenmeyer, 1975

TABLE D-4

A LIST OF FISH SPECIES AND METHOD OF COLLECTION IN BALTIMORE HARBOR, 1970*

Species	Plankton Net Eggs	Plankton Net Larvae, Young & Adult	Shore Seine Young & Adult
Hogchoker, Trinectes maculatus	x		
Bay anchovy, Anchoa mitchilli	x	x	x
**White perch, Morone americana		x	x
**Atlantic silversides, Menidia menidia		x	x
Tidewater silversides, M. berylina		x	x
Alewife, Alosa pseudoharengus		x	x
Blueback herring, A. acstivalis		x	x
Gizzard shad, Dorosoma cepedianum		x	x
Pumpkinseed, Lepomis gibbosus		x	x
**Mummichog, Fundulus heteroclitus		x	x
**Banded killifish, F. diaphanus		x	x
Striped killifish, F. majalis		x	x
Naked goby, Gobiosoma bosci		x	
Striped blenny, Chasmodes bosquianus		x	
Atlantic menhaden, Brevoortia tyrannus		x	
Spottail shiner, Notropis hudsonius		x	
Striped bass, Morone saxatilis			x
Yellow perch, Perca flavescens			x
Halfbeak, Hyporhamphus unifasciatus			x
American eel, Anguilla rostrata			x
Minnow, Cyprinids			x
Catfish, Ictalurus sp.			x

*Dovel, 1975.

**Species found at Sollers Point sampling site.

TABLE D-5

ANADROMOUS FISH SPAWNING STREAMS IN THE

PATAPSCO RIVER AREA

Streams Investigated[1,2] Sub-Subbasin Name / Stream Name	Anadromous Species Recorded[3] YP	AH	BH	HE	AS[4]	HS[5]	CL	WP	SB[6]	PC
Back River								x		
Deep Creek				x				x		
Herring Run								x		
Muddy Gut				x				x		
Northeast Creek								x		
Redhouse Creek								x		
Patapsco River	x	x		x				x		
Deep Creek	x	x						x		
Herbert Run				x				x		
Rockburn Branch		x		x						
Stony Run	x	x		x				x		
Inner Baltimore Harbor										
Middle Branch										
Northwest Branch				x						
N. Drainage to Inner Baltimore Harbor										
Colgate Creek								x		
Gwynn Falls										
Outer Baltimore Harbor										
Bear Creek	x			x				x		
Bullneck Creek				x				x		
Jones Creek				x				x		
Lynch Creek				x				x		
Nabbs Creek				x				x		
Rock Creek	x			x				x		
Sloop Cove	x							x		
Stony Creek	x			x				x		
Unnamed (958, 300E-505, 400N)										
Unnamed (943, 000E-480, 000N)										
S. Drainage to Inner Baltimore Harbor										
Cabin Branch	x							x		
Curtis Creek				x						
Furnace Creek	x			x						
Marley Creek	x	x		x				x		
Sawmill Creek		x		x				x		
Tanyard Cove								x		
Bodkin Creek	x									
Back Creek								x		
Main Creek	x									
Wharf Creek	x							x		
Total Spawning Streams by Species:	13	6	0	18	0	0	0	25	0	0

Total Sampled Streams: 35

Total Spawning Streams (all Species): 31

[1]Streams arranged according to sub-subbasins.

[2]Maryland coordinates given to identify sample sites of unnamed streams.

[3]Species recordings based on egg, larvae or adult fish life stages collected.

[4]One larvae collected in Cabin Branch.

[5]Two larvae collected in Bear Creek.

[6]One adult fish in nonspawning condition collected (Marley Creek).

YP - Yellow Perch (*Perca flavescens*)
AH - Alewife (*Alosa pseudoharengus*)
BH - Blueback Herring (*A. aestivalis*)
HE - Herring (*A. pseudoharengus* or *A. aestivalis*)
HS - Hickory Shad (*A. mediocris*)
AS - American Shad (*A. sapidissima*)
CL - Clupeidae Family (Herring, Menhaden, or Shad) Species
WP - White Perch (*Morone americana*)
SB - Striped Bass (*M. saxatilis*)
PC - Perichthyidae Family (*M. americana* or *M. saxatilis*)

APPENDIX E

COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT AND RESPONSES TO THE COMMENTS

1. Introduction

This appendix addresses the comments received from federal agencies and other interested parties who submitted written statements, regarding the Draft Environmental Impact Statement (DEIS) that was issued to the public on December 12, 1977. Comments were received from the following agencies and parties:

- Petrochemical Energy Group (PEG);
- U.S. Environmental Protection Agency, Region III;
- U.S. Department of the Interior;
- National Oceanic and Atmospheric Administration, U.S. Department of Commerce; and
- Greater Dundalk Community Council.

Comments for which there is no specific response were similar to those comments for which a response has been made or were not of a substantive nature requiring a response (Baltimore Clearinghouse and Baltimore Gas and Electric Co.). In addition, comments from the Logan Village Improvement Association are not specifically addressed in this appendix because they were received too late for responses to be included. However, these comments will be considered by DOE in its evaluation process.

The comment section has been organized in a question and response format. Each substantive comment has been either reproduced in full or summarized with the appropriate response directly following. Considera tion has been given to only those comments which are directly related t the DEIS. Questions regarding ERA policy and national issues of naphth supply and demand are considered to be outside the scope of this site-specific evaluation. Such issues are discussed fully in the Final Progammatic EIS on the Allocation of SNG Feedstock, August 1977.

2. Comments Received from the Petrochemical Energy Group (PEG)

The following 14 comments were received from Bruce F. Kiely, counsel for the Petrochemical Energy Group, on January 20, 1978.

(1) The DEIS should focus on the environmental impacts of the proposed naphtha allocation. Instead, its primary emphasis is on the evaluation of a no-allocation decision. (paraphrased)

Response: We fail to recognize how your conclusion was reached regarding the primary focus of the DEIS. Chapters 5 through 9 of the report deal almost exclusively with the probable effect of the proposed naphtha allocation. Section 10.2.1 of Chapter 10 is the only part of the DEIS where the no-allocation alternative is evaluated in detail.

(2) There is little reference made in the DEIS to the impact of the proposed naphtha allocation to other users of this feedstock, particularly those that have little or no alternatives. (paraphrased)

Response: We believe adequate coverage was given to the issue of the effect of the proposed allocation of naphtha to other users of this same feedstock. As noted on page 5-13 of the DEIS,

> The allocation of naphtha to this SNG facility could not directly affect naphtha users within BG&E's service area because Amerada Hess Corporation does not supply naphtha to any class of users in BG&E's service area. It is possible, however, that the unavailability of naphtha to local users (because of its allocation to this SNG facility) would not allow industries dependent upon naphtha to expand production. It is also possible that the unavailability of naphtha to users outside the service area would indirectly affect people within the service area who use and rely on products dependent upon naphtha. However, those considerations are beyond the scope of this environmental report. The Federal Energy Administration [previously] prepared a programmatic environmental impact statement which addresses regional and national environmental issues of naptha allocations (See Final Programmatic EIS on the Allocation of SNG Feedstock, August 1979).

(3) The DEIS ignores virtually all construction-related impacts of the SNG plant. (paraphrased)

Response: Construction of the BG&E Riverside SNG plant commenced in July 1973. The regulations and policy statement (10 CFR 211.29) covering allocation of SNG feedstocks were promulgated in May 1974. BG&E, recognizing the need to initiate regulatory action, attempted to have the plant "grandfathered" but was not able to meet all the FEA criteria. A petition for a feedstock allocation was, therefore, prepared in

September 1975. In July 1976, the study leading to an environmental impact statement was begun. During the same month the plant was completed. Since the facility was essentially complete prior to the beginning of the environmental study, construction activities were not addressed.

> (4) As to BG&E's alternatives, PEG first points out that none of BG&E's suppliers forecast curtailing any high priority loads this winter. The Federal Energy Regulatory Commission (FERC) supports that conclusion.* If high priority loads do not need the gas, and if SNG production is to be only to provide gas for priority loads, where is there the need for any SNG and any adverse environmental consequences attendant to the construction and operation of the plant.*

Response: As noted on pages 10-6 and 10-7 of the DEIS, there is a substantial degree of uncertainty involved in projecting future gas supplies. Using the best available information at the time the report was prepared, the data indicated that under BG&E's design winter conditions, there would be a need for SNG during this winter (1977-1978) and during the winter of 1980-1981. This analysis focused solely on the gas requirements of BG&E's high priority customers (FERC Priority of Service Categories 1 through 3).

The estimated SNG needs of these high priority customers during a design winter ranged from 1,110 to 4,590 MMcf during the winter of 1977-1978 and 524 to 13,158 MMCF during the winter of 1980-1981. The composite case, which represented the average of three alternative gas supply scenarios, showed a need for 3,082 MMcf of SNG in 1977-1978 and 7,269 MMcf during the winter of 1980-1981.

> (5) The SNG plant should be used for standby in truly abnormal winters. There is no analysis of the environmental impact of running the plant on a standby basis. (paraphrased)

Response: NEPA does not require the evaluation of an all inclusive set of alternatives, but rather an evaluation of reasonable alternatives. In Chapter 10 of the DEIS alternatives of denial of the requested

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*East Tennessee Natural Gas Co. et al., FERC Docket No. RP77-72. mimeo. p. 2.

allocation, a partial allocation, and full allocation were discussed. A standby or low mode type of operation at a minimum capacity would fall at the lower end of a partial allocation. Any impacts associated therewith would fall between those associated with a denial of an allocation to those for a partial allocation of 75 percent. The scope and detail of impacts associated with various levels of operation are considered adequate.

(6) The DEIS improperly assumes the curtailment projections and need for gas without any apparent independent analysis or inquiry.

Response: The data upon which the DEIS was based came from a variety of sources including BG&E. To the extent possible all data were verified. Such verification included a spot check of replies made to a BG&E initiated customer survey. Natural gas supply sources were contacted to confirm supply projections. In the case analysis a composite supply average was utilized. This composite represented an average of estimates prepared by BG&E, Columbia Gas Transmission Co., and the National Economic Research Association. Data on fuel switching and industrial impacts were developed based upon past experience with other SNG plants and are considered to be reasonable.

(7) Further, this past fall, BG&E passed up an opportunity to purchase LNG at $3.88 per Mcf* which would have made the adverse environmental consequences of operating its SNG plant virtually nil. Query: why the compelling need for SNG when LNG is foresaken? From the above, it seems clear that if BG&E were granted an allocation of feedstock for its SNG plant, it would elect to run the plant whether the SNG were needed or whether cheaper, less environmentally adverse alternatives were available.

Response: BG&E was not directly offered an opportunity to purchase the LNG referred to in the Pertamina case. Furthermore, the Pertamina case involved the spot sale of four cargo loads of LNG. The spot

*Perusahaan Pertambangan Minyak Dan Gas Bumi Negara (Pertamina), Dkt. No. 77-002-LNG, DOE/ERA Decision and Order Denying Petition for Declaratory Order Authorizing Importation of Natural Gas and Request for Hearing, December 23, 1977.

market does not constitute a reliable source of supply and hence, cannot be considered as a viable alternative to the proposed action. Thus, while this alternative may initially appear to be more cost effective or more environmentally sound, ultimately it would not prove to be reliable. Without some assurance of reliability, the benefits of this alternative are substantially diminished.

As noted on page 10-11 of the DEIS, the Riverside SNG plant would not operate when customers with an alternate fuel capability are receiving gas.

(8) Perhaps the most revealing information as to the lack of need for SNG is found in the Executive Summary to the DEIS where it is stated: a propane-air plant and liquified natural gas storage can meet increased short-term demands. Expansion of these facilities would not be possible prior to the winter when BG&E estimates that the SNG facility could be needed. If the short-term needs of BG&E can be met by propane-air plants and from LNG storage, there is no reason to run the SNG plant at all or to incur any of the environmental consequences related to the SNG plant. The failure of the DEIS to weigh this unavoidable result or to assess the preferable use of propane-air plants or LNG storage make the DEIS deficient.

Response: BG&E's propane-air and LNG storage facilities are reserved for peak shaving purposes and are not intended for base load use. Nevertheless, the analysis assumed that these two sources could contribute their respective full capacities to the base gas supply. This assumption was made in order to develop a conservative analysis. In spite of this assumption, the evaluation still revealed a need for SNG during a design winter in order to fulfill high priority gas requirements.

(9) (a) As to the use of gas by BG&E's customers, the DEIS has no apparent analysis of end use considerations.

(b) There is no evidence that the SNG is needed for FPC Priority 1, 2 and 3 customers as intimated on DEIS page 2-5.

(c) Neither is there any evidence that denial of the allocation of feedstock to the SNG plant will in fact result in closing commerical and industrial firms. There are only inadequate speculative conclusory statements and no discussion of available alternate fuels. Without such information, the conclusion in the DEIS that SNG is more environmentally preferable to alternatives has no meaning.

Response: (a) End use considerations formed the basic framework of the analysis since only gas requirements of BG&E's customers in FERC Priority of Service Categories 1, 2 and 3 were considered. FERC categories are based on end uses.

(b) The issue of need was treated in Section 10.1.3 of the DEIS. The analysis showed that SNG may be needed for FERC Priority 2 and 3 customers under design winter conditions.

(c) Whether or not a commercial or industrial firm will close due to a gas deficit is difficult to determine, as was noted on pages 10-13 and 10-14 at the DEIS. Such a decision would depend on a number of considerations, the most important of which include:

- the degree to which curtailed firms are dependent upon a gaseous fuel for temperature and impurity control,
- the degree to which alternative fuel burning equipment is already in place,
- the degree to which alternative fuels are obtainable and the relative costs of these fuels, and
- the relative ability of curtailed firms to absorb the capital cost of fuel switching (for those without the necessary equipment in place) and/or the additional cost of alternative fuels.

Since it would not be feasible to contact each firm to determine how each would react to a gas deficit, the impact analysis examined two cases: (1) all curtailed firms closed down, and (2) all curtailed firms switched to an alternate fuel. Alternate fuels considered included No. 2 fuel oil, propane and electricity. Given the events of last winter, it is evident that gas deficiencies do result in the closing of some firms, with others switching to an alternate fuel. The two-case approach thus provided a range of economic impacts likely to occur as a result of a gas shortfall.

(10) The DEIS is incomplete in its comparison of the environmental impact of SNG versus alternatives.

(a) In the first place, the DEIS reveals no basis for its conclusion that, absent SNG, high priority users would receive no gas. If these customers receive gas or have alternate fuel capability installed, there will be no appreciable environmental impact of denying BG&E an allocation.

(b) Secondly, the DEIS assumes that if gas were not used, fuel oil would be used in its place. This shows that gas is not used for nonsubstitutable uses. As to the effect of using oil, the DEIS analysis fails to indicate whether any environmental safeguards on alternate fuel facilities would be used. Further, many permits may already exist permitting the use of alternate fuel or would be issued upon appropriate applications. Hence, it cannot be determined from the DEIS what the environmental impact use of fuel oil would be.

(c) Thirdly, the DEIS relies on outdated gas supply figures for one of the coldest winter periods on record to conclude that SNG may be needed.

Response: (a) The issue of need on the part of high priority users was covered in Section 10.1.3 of the DEIS. The analysis showed that the need for SNG may exist under design winter conditions. The effect of not fulfilling this need is detailed in the analyses of the no-allocation alternative (Section 10.2.1 of the DEIS). The analysis concluded that there could be appreciable impacts resulting from such an action. Even if curtailed firms had an alternate fuel capability in place, they would still incur the added costs of fuel if propane or electricity were substituted for gas. Switching to No. 2 oil would provide an economic benefit if the cost of this fuel is less than the cost of an equivalent volume of gas and SNG. On the other hand, fuel switching also results in increasing regional contaminant air emissions. This issue was also discussed and evaluated in the analysis.

(b) The analysis assumed a worst-case situation where all curtailed firms could switch to either fuel oil, propane or electricity. In all probability, not all firms would be able to use an alternate fuel, particularly those in FERC Priority of Service Category 2. Many Priority 2 customers require gas because of its precise temperature control and flame characteristics. Others require gas because of its chemical, not thermal, properties. While customers outside Priority 2 may be able to use an alternate fuel, economic constraints may make fuel conversion an unlikely proposition.

The air quality effects of fuel switching were considered in detail in Chapter 10 of the DEIS. Alternate fuels considered in the air quality analysis included fuel oil as well as propane and electricity.

ERA assumes that if fuel switching does occur, all applicable federal and state air quality regulations would have to be fulfilled.

(c) The DEIS analysis was based on a worst-case situation (a design winter).

(11) Since allocations are to be made only where the need for SNG for priority uses is shown, the gas requirements of BG&E in all likelihood are far below those listed at page 10-11. Before any decision is made as to the "need" for SNG, the volumes of gas used by commercial customers and industrial customers should be broken down and alternate fuel capability assessed. With such an analysis, the true gas requirements could be established.

Response: As noted previously in the response to PEG Comment 9(a) only gas requirements of BG&E's high priority customers (FERC Priority of Service Categories 1 to 3) were considered in the analysis. The evaluation showed a potential need for SNG on the part of these customers during a design winter. These estimates of need are summarized on page 10-11 of the DEIS and we believe they are reasonable projections.

BG&E's high priority gas requirements during a design winter are 54,089,000 Mcf. Page 10-46 of the DEIS shows that residential requirements during a design winter are 36,975,250 Mcf, while page 10-53 of the DEIS indicates that industrial and commercial requirements are 6,558,561 Mcf and 10,555,199 Mcf, respectively.

There is no data availabe on how many high priority industrial and commercial customers could use an alternate fuel. The BG&E survey described on page 10-14 of the DEIS does indicate that, with the exception of some large volume users, the vast majority of BG&E's high priority industrial and commercial customers do not have an alternate fuel capability in place.

(12) Instead of SNG, why were not alternatives such as emergency gas purchases analyzed as alternatives?

Response: Emergency gas purchases were not evaluated as an alternative because they do not represent a reliable source of gas supply. Furthermore, it should be noted that BG&E is not eligible to make emergency purchases of gas under FPC Order No. 533.

(13) (a) Further, what is not shown is what the cost of the SNG is. It is curious that the unit cost of SNG is buried by rolling it in, but the cost of all other supplemental energy sources is listed at its incremental price. See Table 10.2-3. Any objective cost analysis should have each supplemental source on an equal basis.

(b) It also is curious why the rolled-in cost of natural gas and SNG is constant for both winters while other costs escalate. Does the DEIS mean to imply that other energy will escalate but SNG will remain constant? While no other explanation is revealed in the DEIS, such an implication makes the cost comparison meaningless.

Response: (a) The unit cost of SNG is not directly relevant to the analysis shown on Table 10.2-3 of the DEIS, for this evaluation represents a cost comparison based upon the delivered fuel price to the consumer. Since the SNG will be priced on a rolled-in basis, the $3.00 per Mcf price was used. All other alternate fuel prices were likewise priced on the basis of the cost at the consumer level. As a result, all fuel prices used in the analysis have been placed on an equal cost basis.

(b) The energy cost analysis considers two time periods, the winter of 1977-1978 and the winter of 1980-1981. Potential gas deficits or shortfalls are associated with each time period: 3,082,000 Mcf in 1977-1978 and 7,269,000 Mcf in 1980-1981. The evaluation basically shows the difference in costs to the consumer if each of these gas deficits are offset through full switching as opposed to the use of a SNG/natural gas combination. Thus, the cost analysis does not reflect any escalation in fuel prices but merely looks at different volumes of fuel that must be substituted in order to offset the increasing gas deficits. The cost to the consumer of the SNG/natural gas combination remains constant because the price of SNG is rolled into the price of the natural gas. As a result, all customers (within the same rate schedule) would pay the same price, regardless of whether they physically receive natural gas or SNG. Under the proposed action, the SNG/natural gas combination would involve a total volume of 54,089,000 Mcf during the winter of 1977-1978, as well as during the winter of 1980-1981. At $3.00 per Mcf, the total consumer cost thus remains constant at about $162.3 million.

In contrast, if the allocation were not granted, the price of gas would be about $2.78 per Mcf (since no SNG would be rolled in). During the winter of 1977-1978, there would be 51,007,000 Mcf of natural gas and a deficit of 3,082,000 Mcf to be made up through fuel switching. If the shortfall were offset by switching to propane, the total cost would be $158.3 million [(51,007,000 x $2.78) + (3,082,000 x $5.35)], or $4 million less than if the proposed action were approved and fuel switching to propane did not occur. During the winter of 1980-1981, there would be 46,820,000 Mcf of gas and a 7,269,000 Mcf deficit. If this shortfall were again offset through switching to propane, the total cost would be $169.0 million [(46,820,000 x $2.78) + (7,269,000 x $5.35)], or $6.7 million less than if the SNG were approved and fuel switching to propane did not occur.

(14) It is suggested that conservation, not SNG, is more cost effective and certainly is more environmentally desirable. However, if SNG goes full speed ahead consumers of BG&E will have to pay the higher costs, whether they like it or not, and thus not be in a position to invest in conservation measures nor have any incentive to do so.

Response: Although the estimated gas shortfall could potentially be offset through customer conservation measures, the reliability of this alternative is questionable, particularly in the short term (~1980). As noted in Section 10.4 of the DEIS, there are still significant economic and motivational barriers which may constrain the achievement of significant gas savings through conservation.

The granting of a naphtha allocation does not preclude the pursuit of conservation. In fact, the increase in gas prices would provide an additional incentive to conserve. As the price of fuel increases, the return on a conservation investment becomes larger, and potentially more attractive.

3. Comments Received from the U.S. Environmental Protection Agency, Region III

The following comment was received on January 30, 1978 from Nicholas M. Ruha, Chief, EIS and Wetlands Review Section of U.S. EPA.

(1) "EPA requests that the EIS be revised to include the source of aluminum, its chemical nature, and its impact on the water quality of the harbor surrounding the SNG facility. Further, any adverse impacts to aquatic life in the vicinity of the discharge should be noted in the document."

Response: The original data used in the water quality assessment were subsequently found to be erroneous. On January 6, 1978, BG&E had laboratory tests performed on the effluent from the equalization basin. These tests were performed by ABCO Labs and Martel Labs. The certified test results showed aluminum concentrations to be between 0.17 ppm and 0.50 ppm rather than the 6.0 ppm cited in the DEIS. On the basis of these test results, the effluent discharge from the SNG plant will not contain hazardous or toxic concentrations of aluminum. The text of the DEIS has been changed to reflect the new information. The certified laboratory results are contained at the end of the appendix. EPA has been informed of the results of this test.

4. Comments Received from the National Oceanic and Atmospheric Administration, U.S. Department of Commerce

The following two comments were received from George P. Cressman, Director of the National Weather Service on January 25, 1978.

(1) "On page 4-16 second paragraph, the fourth sentence should read, 'The National Weather Service Forecast Office at Washington, D.C. issues air stagnation advisories and statements for the State of Maryland.'"

Response: The correction has been made as noted above.

(2) "Air pollution alerts during the past three years were due to photochemical pollution. These pollutants were hardly discussed. There is brief discussion of NO_2, less of hydrocarbons. This brief treatment of photochemical pollutants and their precursors may be justified if the plant operates only in the winter and the tankage presents no significant chance of leakage or emission from May to October."

Response: It is true that the air pollution alerts in Metropolitan Baltimore during the last three years were due to photochemical pollution. For each of those years, these alerts occurred in the summer months, June, July and August, only. This season holds greater potential for air stagnation and consequently for the trapping of such pollutants and their precursors. There are several sources of minor hydrocarbon and NO_2 emissions at the Sollers Point Facility. Some of these take place periodically during plant operations, only. These sources include plant leakage, periodic flaring and small amounts of NO_2 emitted from the stack. As plant operations are from November to May, the above periodic emissions are expected to occur in winter, only. Year around hydrocarbon emissions would be expected from the naphtha storage tanks, alone. As described in Section 3.4 of the DEIS, these tanks are of floating roof design to minimize hydrocarbon emissions. Each tank has an internal nitrogen vapor blanket which serves to reduce vaporization. However, minor vapor leakage does occur. Tank design is in compliance with regulations promulgated by the Air Quality Control Board of the Baltimore Metropolitan area of the State of Maryland.

5. Comments Received from the U.S. Department of the Interior.

Several comments were received from Mr. Larry E. Meierotto, Deputy Secretary, U.S. Department of the Interior on February 8, 1978. Mr. Meierotto's comments concerned the water quality impacts of the SNG facility.

(1) "We have strong reservations about the nature of the effluent discharge, especially the fact that aluminum, a toxic material, will be released in amounts that will degrade the receiving waters. We believe that the statement should discuss in greater detail the possible adverse effects aluminum can have on the already stressed biota in Baltimore Harbor."

Response: As noted in the response to EPA Comment No. 1, new data on the chemical composition of the effluent indicates that the concentration of aluminum is between 0.17 ppm and 0.50 ppm and not 6.0 ppm as cited in the DEIS. On the basis of the new test data, the aluminum concentration in the effluent discharge will be below hazardous or toxic levels.

(2) "Nothing is said about the construction or placement of the discharge pipe. For example, it would be helpful to know whether the outfall will be in the water or on land; if in the water, at what depth, and whether the pipe will be equipped with diffusers."

Response: The discharge pipe has already been constructed. It is situated on land approximately 280 feet from the Patapasco River. A gravel-paved culvert carries the discharge from the pipe outfall to the river. The discharge pipe is not equipped with diffusers.

(3) "Every feasible means should be employed to reduce the amount of additional pollutants entering the harbor. Emphasis must be placed on maintaining the present water quality so that, hopefully, the way back to higher water quality is not eliminated as a reachable goal."

Response: The various measures being employed by BG&E to mitigate water quality impacts are discussed on pages 3-17 through 3-20 of the DEIS as well as on page 6-3. Among the features incorporated into the plant design are:

- neutralization of the non-oily plant wastes;
- oil-water separation of the oily plant wastes;
- stabilization of the treated oily and non-oily wastewater effluent before discharge to the Baltimore Harbor;

- drummed off-site disposal of spent Stretford solution; and
- sanitary wastes to the city sewage treatment system.

It is believed that the plant operations will comply with all applicable federal, state, and local regulations, including those related to water quality. As a result of these factors, we are of the opinion that BG&E has employed a reasonable set of measures to reduce the amount of pollutants to be discharged into the harbor.

6. Comments Received from the Greater Dundalk Community Council

The following four comments were received from Mr. Thomas Kroen, President of the Greater Dundalk Community Council on February 1, 1978.

> (1) "Although the site is in an industrial section of Baltimore County, the document does not point out that this site is surrounded by residential properties."

Response: The DEIS explains in detail the adjacent land use activities currently taking place around the SNG site, including the residential uses referred to in your comment. See page 4-1 and the figure on page 4-2 of the DEIS.

> (2) "In the hearing, the noise factor was never brought up, and therefore was not considered, but how can anyone be so irresponsible as to say that additional noise is no factor because of the noise that is present. Studies recently undertaken have shown that the noise levels in this areas are already above acceptable levels."

Response: Pages 5-36 through 5-41 of the DEIS evaluate the noise impact of the SNG plant operations. The analysis showed that noise from plant operations would not be discernable from off-site community receptors. This is due to the fact that existing off-site noise levels are high. As a result, any noise to be generated from the SNG plant would be "masked" by these external noise levels.

The measurement of change in community noise is not based upon the simple addition of the sound pressure to be emitted by a new noise source to that which characterizes ambient conditions. Instead, the science of acoustics uses a logarithmic scale to compute changes in community noise levels. Subsequently, a doubling of sound pressure is equivalent to an increase of 3 dBA in sound level. Table 5.6-2 of the DEIS shows a quantitative comparison of expected community noise levels with and without the SNG plant. In only one instance (at the southeastern end of Main Street) is there a difference. In that one case, the incremental change is estimated to be 1 dBA. Such an increment is insignificant, for it requires a 3 dBA change before the human ear can begin to perceive any difference in ambient noise levels.

(3) "It might be of interest to you and to BG&E that some of the better crabbing in this area is done right out from shore at the BG&E Sollers Point Plant and could be adversely affected by the introduction of pollutants."

Response: The presence of blue crabs (Callinectes sapidus) in the Patapasco River was discussed on page 4-34 of the DEIS. The impact analysis on pages 5-42 and 5-43 of the DEIS indicates that the SNG plant will have only a minimal impact on the aquatic ecology of the area, including blue crabs.

(4) "'Effluents discharged into Baltimore Harbor are not hazardous with the exception of concentrations of aluminum.' Such ambiguity - how can you have an exception to a system which is nonhazardous?"

Response: The aluminum content of the effluent discharge will be below hazardous or toxic levels. See response to EPA Comment No. 1.

COMMENTS

UNITED STATES OF AMERICA
DEPARTMENT OF ENERGY
ECONOMIC REGULATORY ADMINISTRATION

In re:	)	
	)	Case No. DOE/EIS-0002-D
Baltimore Gas & Electric	)	
Company	)	

COMMENTS OF THE
PETROCHEMICAL ENERGY GROUP ON
DRAFT ENVIRONMENTAL IMPACT STATEMENT

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PETROCHEMICAL ENERGY GROUP

January 20, 1978

UNITED STATES OF AMERICA
DEPARTMENT OF ENERGY
ECONOMIC REGULATORY ADMINISTRATION

In re:	)	
	)	Case No. DOE/EIS-0002-D
Baltimore Gas & Electric	)	
Company	)	

COMMENTS OF THE PETROCHEMICAL ENERGY GROUP ON DRAFT ENVIRONMENTAL IMPACT STATEMENT

Pursuant to the notice in the Federal Register on December 12, 1977, [1/] the Petrochemical Energy Group ("PEG") hereby files its comments on the Draft Environmental Impact Statement ("DEIS") concerning the Baltimore Gas & Electric Company ("BG&E") SNG plant.

The purpose of PEG's comments is to provide an analysis of the Department of Energy's Draft Environmental Impact Statement concerning the allocation of petroleum feedstocks to BG&E's SNG plant.

1/ "Availability of Draft Environmental Impact Statement--Baltimore Gas and Electric Co. (No. DOE/EIS-0002-D)," 42 Fed. Reg. 62418, December 12, 1977.

I.

GENERAL COMMENTS

The Focus of the DEIS Is Improper

Under the National Environmental Protection Act, 2/ the Department of Energy and ERA are required for actions significantly affecting the quality of the human environment a statement as to, inter alia:

> "(1) The environmental impact of the proposed action;
>
> (2) Any adverse environmental effects which cannot be avoided should the proposal be implemented." 3/

Note the focus is on the adverse environmental impact of the proposed action. Here that is the impact of the allocation by ERA of naphtha to BG&E's SNG plant. Yet, the DEIS' focus is primarily on impacts, economic and environmental, if the allocation is not granted. Clearly, the denial of an allocation is not the type of major federal action that NEPA is directed toward.

Therefore, the emphasis in the DEIS on the consequences of denying an allocation is misdirected and diverts attention away from the adverse environmental, economic, and resource allocation impacts of an allocation.

2/ 42 U.S.C. §4321, et seq.

3/ 10 C.F.R. §208.1(b).

Impact of SNG Allocation on Others Ignored

We are concerned about the allocation of liquid petroleum feedstocks to BG&E's SNG plant because such allocation does not produce one additional Btu of energy but merely converts one clean burning fuel to another at a loss of Btu's. Therefore, any increase in adverse environmental effects should not be permitted.

Further, allocation of liquid petroleum feedstocks to SNG plants may foster growth or, at a minimum, increasing dependence and reliance upon gas as a fuel at the expense of existing users of petroleum or at the expense of increased imports or both.

The conclusion PEG reaches, therefore, is that an allocation of naphtha to an SNG plant diverts that naphtha from existing high priority users. In addition, PEG is also concerned about SNG plants running on imported naphtha, and the threat such usage poses to domestic supplies and traditional users if such imports become unavailable or unreliable.

The diversion of domestic supply to BG&E's SNG plant will create an ever increasing threat to users of heavier hydrocarbons such as naphtha. Given these serious results of allocating naphtha to an SNG plant, no adverse environmental impact should be tolerated. Instead, attention to alternatives to liquid-based SNG should be explored and encouraged. Allocations of naphtha to SNG plants simply delays and discourages development of alternatives.

The risk of curtailment of naphtha supplies will grow even greater in the future as the domestic petrochemical industry turns to naphtha for its feedstocks. Naphtha is the predominant feedstock of the European and Japanese petrochemical industries and is being used increasingly in this country due to present and future shortages of natural gas, propane and butane. Almost one quarter of the U.S. supply of ethylene, for example, is produced from naphtha or gas oil. The Department of Commerce has predicted that naphtha in general and imported naphtha in particular will become increasingly important as petrochemical feedstocks. 4/ As natural gas liquid supplies diminish, the U.S. petrochemical industry, like its counterparts abroad, must turn to naphtha for its feedstocks. Petrochemicals cannot be made from sunlight, the wind or the tides. Nor is coal a feasible alternative at present. It is simply imperative that access to a supply of naphtha for which there is no alternative, be assured. As evidenced by the competition for the supply of naphtha involved in this proceeding, there is no proven surplus naphtha for use as SNG feedstock even in the short term.

4/ U.S. Department of Commerce, "U.S. Industrial Outlook 1976 with Projections to 1985" (January 1976). See also finding (5) of the preamble to Special Rule No. 1, 2 CCH Energy Management ¶13,631 at p. 13,493-9.

Despite the above, there is scant reference in the DEIS to the impact of an allocation of naphtha on other users of naphtha, particularly those that have little or no alternative.

BG&E's SNG Plant--A Need for Perspective

This proceeding involves a request for some 12,000 barrels per day of naphtha to be used as feedstock to make SNG. BG&E's plant requires amounts of naphtha equal to 13% as much naphtha as used by the entire petrochemical industry in 1972.

As to need, BG&E is in no worse or better situation from a gas supply standpoint than numerous other gas distributors around the country. The entire Nation is experiencing a natural gas shortage and interruptible gas customers in literally thousands of communities have been forced entirely off natural gas. Several major pipelines are curtailing this winter, however, no curtailment of high priority loads is expected. 5/ A DEIS extolling the use of the SNG plant simply because BG&E faces gas shortages like everyone else ignores true alternatives, is no incentive to conservation or conversion, and is a clear invitation to build an SNG plant first and force the federal government to grant a feedstock allocation once the investment is made. As DOE

5/ East Tennessee Natural Gas Co., *et al.*, FERC Docket No. RP77-72, *et al.*, mimeo p. 2.

has recognized, 6/ there is simply not enough liquid-hydrocarbon SNG feedstocks available to solve the natural gas shortage. Yet, the DEIS gives the impression that the apparent goal of the BG&E plant is to solve the BG&E gas shortage.

In light of the history of SNG allocation, 7/ the DEIS gives far too much weight to the fact BG&E already has built its plant. Since BG&E proceeded to build its plant in the face of uncertainty as to feedstock, no consideration should be given to any monies expended by BG&E in developing its facility. The clear policy was that FEA did not intend to be coerced into granting allocations of scarce resources simply because the utility company was willing to gamble and build an SNG plant without first securing its feedstocks. BG&E proceeded to build its facility in the face of the energy shortage, allocation controls and sound governmental policies discouraging this wasteful response to the natural gas shortage. Yet, the DEIS ignores these factors and ignores virtually all environmental impacts of the plant except for the operation of the plant. Such an analysis is entirely inadequate to the point of making the DEIS deficient.

6/ See FEA Policy Statement regarding SNG plants, 39 Fed. Reg. 27911, August 2, 1974.

7/ Preamble to Special Rule No. 1 clearly stated:

> Petitions filed on behalf of proposed SNG facilities...will be handled under the special rule on a case-by-case basis without regard to capital expenditure.

BG&E's Need for SNG

Clearly the goal of a utility is to sell as much gas as possible and, under utility rate making concepts, the way a utility makes its money is not on the sale of gas it purchases but the return it receives on its investment in utility property. The higher the investment, the greater the return in dollars. Therefore, the utilities' "need" for gas from its SNG plant must be analyzed in the context of

1) its alternatives, and

2) the nature of the gas usage of its customers.

As to BG&E's alternatives, PEG first points out that none of BG&E's suppliers forecast curtailing any high priority loads this winter. The Federal Energy Regulatory Commission ("FERC") supports that conclusion. 8/ If high priority loads do not need the gas, and if SNG production is to be only to provide gas for priority loads, where is there the need for any SNG and any adverse environmental consequences attendant to the construction and operation of the plant.

The DEIS improperly assumes the curtailment projections and need for gas without any apparent independent analysis or inquiry. For example, the 1976 BG&E Annual

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8/ East Tennessee Natural Gas Co., *et al.*, FERC Docket No. RP77-72, *et al.*, mimeo p. 2.

Report reports that SNG production is "10% of total daily maximum gas requirements in winter." 9/ Therefore, even without any SNG, there should be no curtailment of high priority loads by its suppliers. Therefore, under DOE regulations, BG&E has no need for SNG that justifies an allocation of naphtha. At most, the SNG plant should be used only for standby in truly abnormal winters. There is no analysis of the environmental impact of running the plant on a standby basis.

Further, this past fall, BG&E passed up an opportunity to purchase LNG at $3.88 per Mcf 10/ which would have made the adverse environmental consequences of operating its SNG plant virtually nil. Query: why the compelling need for SNG when LNG is foresaken? From the above, it seems clear that if BG&E were granted an allocation of feedstock for its SNG plant, it would elect to run the plant whether the SNG were needed or whether cheaper, less environmentally adverse alternatives were available.

Perhaps the most revealing information as to the lack of need for SNG is found in the Executive Summary to the DEIS where it is stated:

9/ BG&E Annual Report, 1976, at 8.

10/ Perusahaan Pertambangan Minyak Dan Gas Bumi Negara (Pertamina), Dkt. No. 77-002-LNG, DOE/ERA Decision and Order Denying Petition for Declaratory Order Authorizing Importation of Natural Gas and Request for Hearing, December 23, 1977.

> A propane-air plant and liquified natural gas storage can meet increased short-term demands. Expansion of these facilities would not be possible prior to the winter when BG&E estimates that the SNG facility could be needed. 11/

If the short-term needs of BG&E can be met by propane-air plants and from LNG storage, there is no reason to run the SNG plant at all or to incur any of the environmental consequences related to the SNG plant. The failure of the DEIS to weigh this unavoidable result or to assess the preferable use of propane-air plants or LNG storage make the DEIS deficient.

As to the use of gas by BG&E's customers, the DEIS has no apparent analysis of end use considerations. There is no evidence that the SNG is needed for FPC Priority 1, 2 and 3 customers as intimated on DEIS page 2-5. Neither is there any evidence that denial of the allocation of feedstock to the SNG plant will in fact result in closing commercial and industrial firms. There are only inadequate speculative conclusory statements and no discussion of available alternate fuels. Without such information, the conclusion in the DEIS that SNG is more environmentally preferable to alternatives has no meaning.

The Comparison of SNG to Alternatives Is Inadequate

The DEIS is incomplete in its comparison of the environmental impact of SNG versus alternatives. In the

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11/ DEIS at 2-6.

first place, the DEIS reveals no basis for its conclusion that, absent SNG, high priority users would receive no gas. If these customers receive gas or have alternate fuel capability installed, there will be no appreciable environmental impact of denying BG&E an allocation.

Secondly, the DEIS assumes that if gas were not used, fuel oil would be used in its place. 12/ This shows that gas is not used for nonsubstitutable uses. As to the effect of using oil, the DEIS analysis fails to indicate whether any environmental safeguards on alternate fuel facilities would be used. Further, many permits may already exist permitting the use of alternate fuel or would be issued upon appropriate applications. Hence, it cannot be determined from the DEIS what the environmental impact of use of fuel oil would be.

Thirdly, the DEIS relies on outdated gas supply figures for one of the coldest winter periods on record to conclude that SNG may be needed.

The analysis at DEIS, pages 10-10, 11, is more objective and shows that there is little need for SNG from BG&E's plant for the foreseeable future for "firm" customers. It is noteworthy that nowhere is it suggested that all "firm"

12/ DEIS at 8-1.

customers are priority customers. Since allocations are to be made only where the need for SNG for priority uses is shown, 13/ the gas requirements of BG&E in all likelihood are far below those listed at page 10-11. Before any decision is made as to the "need" for SNG, the volumes of gas used by commercial customers and industrial customers should be broken down and alternate fuel capability assessed. With such an analysis, the true gas requirements could be established. The DEIS analysis does not pursue this critical point sufficiently. As a result of the above, if there is no demonstrated need for SNG for priority uses, there should be no allocation of naphtha 14/ and if there is no allocation, the plant will not operate and the adverse environmental effects would be eliminated.

Any adverse impact from the SNG plant should be avoided when there is no evidence in the DEIS that the SNG from the BG&E plant is needed for priority gas users. BG&E already has in existence a propane-air facility equal to 1,000,000 Mcf or 90,000 Mcf per day and LNG storage equal to 6,000,000 Mcf or 187,500 Mcf per day. 15/ Yet, during the coldest winter in years, BG&E used less than half of its propane capability and less than 25 percent of its LNG storage. 16/ Faced with this information, it is amazing

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13/ 10 C.F.R. §211.29.

14/ *Id.*

15/ DEIS at 10-3.

16/ *Id.*

that the DEIS concludes that SNG is needed to serve BG&E's high priority users under the guise of avoiding adverse environmental consequences or the closing down of plants due to lack of gas. It is also interesting that the DEIS summary on alternatives ignores the fact that BG&E admittedly could have expanded its propane-air facility and LNG storage by this winter to meet its gas needs. 17/

Economic Comparisons Are Inadequate

The study of the economic effects of certain gas shortfall (DEIS 10-22) is substantially overstated and therefore of no analytical value. Despite the DEIS' own studies showing that for a normal winter there is no gas shortfall (DEIS at 10-11), and the so-called BG&E "design" winter exceeds last year's record-breaking winter by 621 degree days (DEIS at 10-4), the economic study relies only on the "design" winter. Hence, the estimated gas deficiency (DEIS Table 10.2-3) of 3,082,000 Mcf for the winter 1977-78 is an unrealistic worst-case analysis. Instead of SNG, why were not alternatives such as emergency gas purchases analyzed as alternatives?

Further, what is not shown is what the cost of the SNG is. It is curious that the unit cost of SNG is buried by rolling it in, but the cost of all other supplemental energy sources is listed at its incremental price. See Table 10.2-3. Any objective cost analysis should have each supplemental source on an equal basis.

17/ DEIS at 2-6.

It also is curious why the rolled-in cost of natural gas and SNG is constant for both winters while other costs escalate. Does the DEIS mean to imply that other energy will escalate but SNG will remain constant? While no other explanation is revealed in the DEIS, such an implication makes the cost comparison meaningless. A mere increase in the price of naphtha of 5 cents per gallon would increase the cost of SNG by almost 50-55 cents per Mcf. 18/

To see the true effect of SNG on costs, the DEIS should have pointed out that feedstock costs for SNG alone are at least $3.50 per Mcf. 19/ This equates to a minimum of $4.37 per Mcf SNG. 20/ On a rolled-in basis, SNG is stated to raise the price of gas from $2.78 per Mcf to $3.00 per Mcf 21/ or at a cost of over $10 million to BG&E's customers for a normal winter. 22/

The $10 million cost for only one year is one third of the total cost to consumers for conservation of $30 million. 23/ Hence, three years of not running the SNG plant would pay for the conversion costs.

18/ It takes 10-11 gallons of naphtha to make 1 Mcf of SNG.

19/ BG&E Application, September 30, 1975, Appendix VI; Further Comments of BG&E, March 31, 1976.

20/ Feedstock costs are normally in the range of 80 percent of the cost of SNG.

21/ DEIS at 5-12, 13.

22/ 46,026,000 Mcf multiplied by 22¢ or $10,125,720.

23/ DEIS at 10-62.

It is suggested that conservation, not SNG, is more cost effective and certainly is more environmentally desirable. However, if SNG goes full speed ahead, consumers of BG&E will have to pay the higher costs, whether they like it or not, and thus not be in a position to invest in conservation measures nor have any incentive to do so.

III.
CONCLUSION

PEG takes issue with the DEIS approach of ignoring the fundamental environmental impact of the SNG plant merely because the plant is built. PEG also suggests the emphasis of the DEIS is misplaced because it focuses more on the impact of no allocation versus an allocation of feedstock. The major federal action involved is not the denial of a request but the granting of it.

PEG further points out that the DEIS gives too cursory treatment to the long range impact on others of a naphtha allocation.

The DEIS failed to adequately explore the true need of BG&E's priority users for SNG. Little attention is given to the actual alternate fuel capability of BG&E's priority customers and the impact on gas needs if such alternate fuel were used. The DEIS further relies too heavily on gas needs based on "a winter design" that is unrealistically high--so high that it matches last winter's usage. Gas needs based on such data bear little resemblance to actual needs of priority users, particularly where emergency purchases are ignored.

Finally, the DEIS' summary as to the cost of no allocation of SNG is lacking in merit because it prices all fuels on an incremental basis except for SNG. In a review of the impact of an allocation, the most important factor should have been the cost of the SNG, yet that is the only cost that is hidden by rolled-in pricing. It also is interesting that the actual cost of the SNG is nowhere mentioned.

For these reasons, PEG submits the DEIS is inadequate in its present form, should be reevaluated, and forms no basis for any allocation of naphtha to BG&E's SNG plant.

Respectfully submitted,

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Counsel for
PETROCHEMICAL ENERGY GROUP

January 20, 1978

UNITED STATES OF AMERICA
DEPARTMENT OF ENERGY
ECONOMIC REGULATORY ADMINISTRATION

In re:	)	
	)	Case No. DOE/EIS-0002-D
Baltimore Gas & Electric	)	
Company	)	

REQUIRED STATEMENTS UNDER
ECONOMIC REGULATORY ADMINISTRATION REGULATIONS

1. I, Bruce F. Kiely, hereby certify that I am a duly authorized representative of the Petrochemical Energy Group, that I am authorized to file these comments on behalf of the Petrochemical Energy Group as their counsel, and that these comments comply with the requirements of 10 C.F.R. §205.104.

2. A copy of these comments has been sent to each party appearing on the list of names and addresses attached to this document.

3. Except as set forth in these comments, to the best of the Petrochemical Energy Group's knowledge, information and belief, the same or related issues, acts or transactions which are the subject of DOE/ERA Decisions and Orders regarding Baltimore Gas & Electric Company -- Waiver of Use Limitation: Naphtha for SNG Feedstock Use dated November 8, 1977 and December 23, 1977, have not been, nor are they presently being considered or investigated by any ERA office or Federal agency, department or instrumentality or by state office,

state or municipal agency, or court, or any law enforcement agency.

4. I, Bruce F. Kiely, counsel for the Petrochemical Energy Group, hereby certify that to the best of my knowledge, information, and belief, no contact has been made by members of the Petrochemical Energy Group or anyone acting on its behalf with any person who is employed by ERA or any state office subsequent to service of the Draft Environmental Impact Statement that pertains to the issue, act, or transaction that is the subject thereof.

5. All correspondence and communications concerning these comments should be addressed to:

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Washington, D. C. 20006

6. Pursuant to 10 C.F.R. §205.109(f), the Petrochemical Energy Group states that none of the information contained in this document is confidential.

Bruce F. Kiely

BRUCE F. KIELY

January 20, 1978

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UNITED STATES OF AMERICA

DEPARTMENT OF ENERGY

ECONOMIC REGULATORY ADMINISTRATION

Comments on Baltimore Gas and Electric Co. Draft EIS

COMES NOW, Baltimore Gas and Electric Company (the Company) and, pursuant to notice duly published in the Federal Register for Monday, December 12, 1977, at 42 FR 62418-19, submits the following comments with respect to a Draft Environmental Impact Statement DOE/EIS-0002-D (Draft EIS), entitled Allocation of Petroleum Feedstock - Baltimore Gas and Electric Company Sollers Point, Maryland SNG Plant - December 1977, prepared and made available by the Economic RegulatoryAdministration (ERA) of the Department of Energy. The public hearing scheduled for January 12, 1978 on the Draft EIS was cancelled on January 11, 1978 when the two parties, one of whom was the Company, who had requested an opportunity to make oral presentations, withdrew their requests.

The hearing scheduled for January 12, 1978 was to have as its main concern the consideration of the Draft EIS. These comments and, hopefully, those comments to be filed by other "interested parties" will likewise have as their main concern the Draft EIS. The record to be developed here from written comments on the Draft EIS should not be a mere repetition of what transpired almost two years ago at the hearing held on this Company's initial Application for Assignment, filed in September 1975. The time frame for submission of comments on that Application for Assignment and the Company's oral and written presentations in connection therewith has long since expired.

I

The Draft EIS is a culmination of efforts initially commenced in March 1976 by ERA's predecessor agency, the Federal Energy Administration (FEA), following letter notice to the Company in January 1976 of an FEA determination that an Environmental Impact Statement was required regarding FEA's pending action on this Company's September 1975 Application for Assignment for an allocation of naphtha to be used as feedstock in the

Company's synthetic natural gas manufacturing facility then under construction at its Sollers Point site in Baltimore County, Maryland (SNG Plant), since that action would have amounted, in FEA's opinion, to a major federal action which would significantly affect the quality of the human environment.

The Company hereby commends the concerned ERA Staff members and ERA's consultant in this matter, Environmental Research & Technology Corporation, Inc., on their joint efforts on the form and content of the Draft EIS. The Draft EIS, so long in preparation, appears to justify that long, and many times exasperating, passage of time. While some debate could be joined in a few isolated instances on the style of presentation, such debate would detract from the force of the Company's agreement with the general conclusion expressed in the Draft EIS that, while the SNG Plant will create environmental impacts, they are not considered to be significant. More particularly, the Company wholeheartedly concurs in the significant statement expressed in the executive summary to the effect that, "If the SNG facility were not able to operate when it was needed, significant problems may be created."

However, the central question which must be addressed in these comments can be very simply stated: Does the Draft EIS meet the common requirements set forth in Section 102(2)(c) of the National Environmental Policy Act of 1969 (NEPA) (43 USC SS 4321, et seq.), the Council on Environmental Quality (CEQ) Guidelines (40 CFR SS 1500.1, et seq.), and the pertinent ERA regulations (10 CFR SS 208.1, et seq.)? If it does, then, regardless of whether all "interested" parties agree or are totally satisfied with the conclusions reached, the Draft EIS has "passed muster" and may, in accordance with ERA's established procedures, then become the final authoritative EIS. Compliance with these requirements is not achieved by a mere cataloging of environmental consequences or listing of alternatives. Broad generalities are not enough; sufficient preciseness of disclosure must exist to form a basis for reasonable evaluation by all concerned.

II

Prior to an analysis of the Draft EIS, it is necessary to delineate just what these requirements are. Section 102(2)(c) of NEPA provides that, to the fullest extent possible, federal governmental agencies shall include with every report on a major federal action significantly affecting the quality of the human environment a detailed report on, first, the environmental impact of the proposed action; second, any adverse environmental effects which cannot be avoided if the proposed action is taken; third, alternatives to the proposed action; fourth, the relationship between short-term use of man's environment and the maintenance of long-term productivity; and, fifth, any irreversible and irretrievable commitments of resources if the proposed action is taken. Section 1500.8 of the CEQ Guidelines and Section 208.7 of the ERA Regulations require an EIS to include, in addition to the five essential elements specified in Section 102(2)(c) of NEPA, (i) a description of the proposed action, its purposes and the environment which may be affected, (ii) a discussion of the relationship of the proposed action to governmental land use plans, policies and controls for the affected area, and (iii) a discussion of considerations offsetting the adverse environmental impacts of the proposed action. It is these requirements, basically straightforward and uncomplicated, which must be fully explored and considered by an agency's environmental impact statements. NEPA requires nothing less, for other government agencies concerned with the environmental impact of the particular federal action must be in a position to appreciate and understand the impacts produced. All known environmental consequences must be disclosed, along with project alternatives, so that agency decision-making can occur in the full light of relevant information.

Obviously, some of these requirements can more readily be met in a comprehensive manner than others; their analyses are similarly more readily identifiable in the Draft EIS. The description of the proposed action and its purpose (40 CFR S 1500.8(a)(1) and 10 CFR S 208.7(a)), in this instance an allocation of naphtha for use as feedstock in the operation of a synthetic natural gas manufacturing facility, comprehensively discussed in

Section 3 of the Draft EIS, is easily identified. So is the description of the environment affected by the operation of the SNG Plant contained in Section 4. The entire range of potential environmental impacts of the proposed action (40 CFR § 1500.8(a)(3) and 10 CFR § 208.7(b)), both positive and negative, direct and indirect, are simply and clearly discussed in Section 5, while Section 6 focuses on the efforts expended to mitigate these environmental impacts. Section 7 then discusses the primary adverse environmental impacts (40 CFR § 1500.8(a)(5) and 10 CFR § 208.7(c)), in this situation the discharge of air contaminants and waste water effluents, associated with full-scale commercial operation of the SNG Plant.

The relationship between the effect on local short-term uses of the environment by the commercial operation of the SNG Plant and long-term productivity of the affected land, water, air and other resources of the area (40 CFR § 1500.8(a)(b) and 10 CFR § 208.7(d)) can readily be found in Section 8. The discussion in Section 9 of the irreversible and irretrievable commitments of resources (40 CFR § 1500.8(a)(7) and 10 CFR § 208.7(e)) resulting from an allocation of feedstock for operation of the SNG Plant does, in fact, meet the requirements suggested by the pertinent sections of the CEQ Guidelines and ERA Regulations. The discussion on the conformity of an action allocating feedstock for the operation of the SNG Plant with land use plans, policies and controls for the area in which the SNG Plant is located (40 CFR § 1500.8(a)(2) and 10 CFR § 208.7(g) is discussed in Section 5.1.

Section 10 discusses in comprehensive fashion the alternatives (40 CFR § 1500.8(a)(4) and 10 CFR § 208.7(f)) which exist to an action allocating feedstock for use in operation of the SNG Plant. Every conceivable alternative need not be discussed, only those which are reasonable under the circumstances. Administrative alternatives which could be taken by ERA, including the alternatives of denial or reduction in requested allocation levels, and by other governmental agencies on the federal or state level, including deregulation of natural gas and revisions to retail rate structures, receive the requisite attention as do design alternatives. The potential for conservation of natural gas by th

Company's customers as an alternative to operation of the SNG Plant for increasing supplies of natural gas is exhaustively discussed. Once again, while there are those who will disagree with the conclusions drawn, the Draft EIS is not deficient in this instance since, clearly, it does not lack analyses of the reasonable alternatives.

The CEQ Guidelines (40 CFR § 1500.8(a)(8)) and ERA's Regulations (10 CFR § 208.7(h)) also mandate that an EIS include an indication of what public interest or other considerations of federal policy may offset any adverse environmental effects of the proposed action. It is suggested in Section 1 of the Draft EIS that national policies and their environmental impacts with respect to the use of SNG facilities to alleviate shortages of natural gas, fuel switching, priority of naphtha uses between classes of customers, etc., "represent programmatic considerations . . . [which] have been addressed in the Programmatic EIS on the Allocation of Petroleum Feedstocks to Synthetic Natural Gas Plants, FEA, August 1977." This requirement, almost more than any other, is subjective rather than objective. However, since the adverse environmental impacts, which are determined to result from the commercial operation of the SNG Plant, are, in turn, viewed as minimal in the Draft EIS, a specific discussion of offsetting alternatives is not a necessity. Those alternatives were exhaustively treated in the aforementioned Programmatic EIS. Some of the alternatives to the use of clean burning SNG have environmental impacts significantly more adverse.

III

Should any questions arise with respect to these comments, contact should be initiated with D. Pierre G. Cameron, Jr., Esq., Counsel to Baltimore Gas and Electric Company, in writing at 1700 Gas and Electric Building, P. O. Box 1475, Baltimore, Maryland 21203, or by telephone, at area code 301-234-5685 in order that concerned Company personnel may prepare appropriate responses to such inquiries.

Respectfully submitted,
Baltimore Gas and Electric Company

By D. Pierre G. Cameron, Jr.
D. Pierre G. Cameron, Jr.
Associate General Counsel

January 20, 1978

Certification

Pursuant to the requirements of 10 CFR §§203.5(a) and 205.9(b), I, D. Pierre G. Cameron, Jr., do hereby certify that, pursuant to the delegation of authority contained in a letter dated April 5, 1974, filed with the Federal Energy Office, as predecessor to the Economic Regulatory Administration of the Department of Energy, I am a duly authorized representative of Baltimore Gas and Electric Company, that I am authorized, inter alia, to execute on behalf of Balmore Gas and Electric Company the Comments on Baltimore Gas and Electric Co. Draft EIS, to which this certification is attached, and that a copy of the aforementioned Comments on Baltimore Gas and Electric Co. Draft EIS, except where specifically indicated otherwise, was mailed, first class mail, postage prepaid, this 20th day of January, 1978, to the persons listed below.

Honorable Charles McC. Mathias, Jr.
Honorable Paul S. Sarbanes
United States Senate
Washington, D.C. 20510

Honorable Robert E. Bauman
Honorable Goodloe E. Byron
Honorable Marjorie S. Holt
Honorable Clarence D. Long
Honorable Barbara A. Mikulski
Honorable Parren J. Mitchell
Honorable Gladys Noon Spellman
Honorable Newton I. Steers, Jr.
United States House of Representatives
Washington, D. C. 20515

Honorable Blair Lee III
Acting Governor
State of Maryland
Annapolis, Maryland 21401

Honorable Thomas J. Hatem, Chairman
Public Service Commission of Maryland
301 West Preston Street
Baltimore, Maryland 21201

Mr. G. W. Tiberio
Director, Energy Management Section
General Motors Corporation
Detroit, Michigan 48202

Sutherland, Asbill & Brennan
1666 K Street, N.W.
Washington, D.C. 20006
Attention: R. L. Winkler, Esq.

Mr. Robert Powers, Vice President
Amerada Hess Corporation
1185 Avenue of the Americas
New York, New York 10036

Baker & Botts
1701 Pennsylvania Avenue, N.W.
Washington, D.C. 20006
Attention: Bruce F. Kiely, Esq.
(hand delivered)

D. Pierre G. Cameron, Jr.

D. Pierre G. Cameron, Jr.
Associate General Counsel
Baltimore Gas and Electric Company

January 20, 1978

UNITED STATES OF AMERICA

DEPARTMENT OF ENERGY

430003

ECONOMIC REGULATORY ADMINISTRATION

Re: Further Comments on Baltimore Gas and Electric Company
Draft EIS - DOE/EIS-0002-D

COMES NOW, Baltimore Gas and Electric Company (Company) and submits these Further Comments to the Economic Regulatory Administration (ERA) of the Department of Energy regarding the Draft Environmental Impact Statement (Draft EIS) prepared by ERA on the Company's synthetic natural gas manufacturing facility (SNG Plant) and, more particularly, with respect to the Comments of the Petrochemical Energy Group on Draft Environmental Impact Statement (PEG Comments), dated January 20, 1978, submitted by the Petrochemical Energy Group (PEG).

Pursuant to the notice published by ERA at 42 FR 62418, December 12, 1977, the Company filed with ERA on January 20, 1978 its Comments on Baltimore Gas and Electric Co. Draft EIS, and caused copies thereof to be furnished to all "interested parties". The Company understands that copies of the PEG Comments were also furnished to all "interested parties". This exchange of comments on the Draft EIS prior to the January 26, 1978 final comment date set forth in the December 12, 1977 notice was for the specific purpose of permitting the Company and PEG the opportunity to "comment" constructively upon the initial comments filed by each regarding the Draft EIS.

I

It came to the Company, as it must have to ERA, without great surprise that the PEG Comments fell far wide of the mark. The PEG Comments were little more than a thinly veiled attempt to reargue the case against the grant of an allocation of naphtha to use as feedstock in the operation of the SNG Plant. For example, what earthly good in a constructive analysis of the Draft EIS are statements such as appear on page 3 in the PEG Comments?

> "We are concerned about the allocation of liquid petroleum feedstocks to BG&E's SNG plant because such allocation does not produce one additional Btu of energy but merely converts one clean burning fuel to another at a loss of Btu's (sic)."

The argument expressed in that sentence has been echoed time and time again by PEG and one supposes that no document filed by PEG regarding an SNG feedstock allocation is complete without its repetition. The remainder of the PEG Comments are replete with similar "age-old" irrelevant and immaterial declarations and innuendoes which, it is safe to assume, ERA will again astutely winnow out as chaff from the grain.

Even more presumptive on the part of the PEG Comments are the several references to the Statement of Policy and Appendix-Special Rule No. 1 to 10 CFR § 211.29, adopted by ERA's predecessor agency, Federal Energy Administration (FEA) on July 31, 1974 (30 FR 27910, et seq.), since said Statement of Policy and Special Rule No. 1 were expressly deleted from ERA's current regulations by the Amendments to Synthetic Natural Gas Feedstock Allocation Regulations, effective as of September 30, 1977 (42 FR 54403, et seq.).

PEG suggests that the existence of the Company's propane air plant and LNG facility obviate the necessity for any SNG production, since short-term demands are met from those facilities. It is almost unnecessary to restate the different operational concept between a true needle peaking facility and a peaking facility designed to meet longer term emergencies in gas supply. It is also significant to note that ERA's interpretation of 10 CFR § 211.29, as revised in September 1977, dictates the deletion of propane peak shaving capacity from a company's gas supply available to meet the demands of its high priority customers.

It should not be necessary to restate for the uncounted time that the Company's daily maximum gas requirements serve high priority loads, less than 5% of which are firm industrial; that the Company's firm commercial and industrial customers do not have alternate fuel capability; that the Company does not possess either the physical capability to accept liquid LNG, nor the storage capability (and attendant transmission capacity) to accept vaporized LNG; that the Company is not eligible to make emergency purchases of gas under FPC Order No. 533 (in fact, its own customers purchasing emergency gas face curtailment in deliveries in the coldest weather due to lack of transmission line capacity);

that the Company's LNG storage capacity amounts to 1,000,000 Mcf, rather than 6,000,000 Mcf; and, that the SNG Plant will be operated only when required, not on a maximum capacity basis for an entire 180-day period as postulated by PEG in the development of increased cost estimates for SNG production, a consumption rate of 10-11 gallons of naphtha for the production of 1 Mcf of SNG, and actual feedstock costs as a percentage of total SNG cost.

The PEG Comments suggest more than once that environmental impacts have been ignored but do not elaborate further, other than to infer that an alleged inability on the part of PEG member companies to obtain future supplies of naphtha constitutes an undiscussed adverse environmental impact. This inability to obtain supply has never been substantiated for any PEG member company in this or any other SNG feedstock allocation proceeding, and must still, therefore, be taken for its unsubstantiated worth. It is time to cease such allegations and accept the fact that both supply and price competition are a fact of life, both for the gas utility and the petrochemical manufacturer. While it is true that "petrochemicals cannot be made from sunlight, the wind or the tides", it is equally true that the requirements of this Company's firm customers cannot be met with them either.

II

Perhaps, as PEG has suggested, there is a "need for perspective", although one wonders how germane this need for perspective on the SNG Plant is to an analysis of the Draft EIS. Since the inception of the environmental impact statement process early after the enactment of the National Environmental Policy Act of 1969 (43 USC § 4332, et seq.), numerous judicial pronouncements have crystallized just what it is that a draft environmental impact statement must achieve. From those generic discussions, it is then possible to understand just what it is that the Draft EIS under current consideration must achieve.

These pronouncements are a veritable multitude, but the attention of ERA is drawn particularly to the following, as each individually and all collectively have developed the perimeters as to the adequacy of a draft environmental impact statement: Environmental Defense Fund v. Corps of Engineers, 342 F. Supp. 1211 (1972 DC Ark.), aff'd 470 F.2d

289 (1974 8th Cir.), cert. den. 412 U.S. 931, 37 L. Ed. 2d 160, 93 S. Ct. 2749 (1976); Environmental Defense Fund v. Froehlke, 473 F.2d 346 (1972 8th Cir.); Silva v. Lynn, 482 F.2d 1282 (1973 1st Cir.); Life of Land v. Brinegar, 485 F.2d 460 (1973 9th Cir.), cert. den. 416 U.S. 961, 40 L. Ed. 2d 312, 94 S. Ct. 1979 (1974); Environmental Defense Fund v. Corps of Engineers, 348 F. Supp. 916 (1972 DC Miss.), aff'd 492 F.2d 1123 (1974 5th Cir.); Minnesota Public Interest Research Group v. Butz, 498 F.2d 1314 (1974, 8th Cir.), cert. den. U.S. , 51 L. Ed. 2d 601, S. Ct. (1977); Trout Unlimited v. Morton, 509 F.2d 1276 (1974 9th Cir.); I-291 Why? Association v. Burns, 372 F. Supp. 223 (1974 DC Conn.); Citizens Against Destruction of NAPA v. Butz, 391 F. Supp. 1188 (1975 DC Cal.); Romulus v. County of Wayne, F. Supp. (1975 DC Mich.), 7 ERC 1866; National Resources Defense Council, Inc. v. Calloway, 524 F.2d 79 (1975 2nd Cir.); Concerned about Trident v. Schlesinger, 400 F. Supp. 454 (1975 DC Dist. Col.), aff'd in part rev'd in part sub nom. Concerned about Trident v. Rumsfeld, 555 F.2d 817 (1977 DC Cir.); Cady v. Morton, 527 F.2d 786 (1975 9th Cir.); Environmental Defense Fund v. Hoffman, F. Supp. (1976 DC Ark.), 9 ERC 1706; Alabama ex rel. Baxley v. Corps of Engineers, 411 F. Supp. 1261 (1976 DC Ala.); Minnesota Public Interest Research Group v. Butz, 541 F.2d 1292 (1976 8th Cir.), cert. den. U.S. 50 L. Ed. 2d 304, 97 S. Ct. 347 (1976); New York v. Kleppe, F. Supp. (1977 DC NY), 9 ERC 1798; Philadelphia Council of Neighborhood Organizations v. Coleman, F. Supp. (1977 DC Pa.), 10 ERC 1819.

An adequate environmental impact statement must be a detailed compilation of known environmental impacts and a detailed explanation of the course of inquiry, analysis and reasoning with respect to such impacts. It must be objective, comprehensive and understandable - a disclosure document which provides information as to the environmental consequences of a proposed action, for what is required is an evaluation of potential environmental impacts, not a mere cataloging of them. The environmental impact statement is not required to resolve differences of opinion as long as the differences and factual bases for the differences are enumerated; disagreement, therefore, among "interested parties" will not, per se, invalidate an environmental impact statement. The list of alternatives to a proposed action must be studied, developed and disclosed in an environmental impact statement, and must provide sufficient data and reasoning to evaluate the analysis and conclusions. Clearly, however, the content and scope of the discussion of alternatives to any proposed action depends upon its nature; such discussion need not encompass every conceivable alternative, but merely encompass all reasonable alternatives in a straightforward and comprehensible manner so that the responsible decision-makers are aware of the consequences when one course of action is chosen over another.

This Company's analysis of the Draft EIS filed in its Comments on Baltimore Gas and Electric Co. Draft EIS and the manner in which said Draft EIS meets the requirements of Section 102(2)(C) of the National Environmental Policy Act of 1969, the Council of Environmental Quality Guidelines, and the pertinent ERA regulations need not be reiterated here. PEG's disagreement with the conclusions cannot invalidate an otherwise adequate Draft EIS since, without any doubt, information as to the environmental consequences of the proposed action of an allocation of feedstock to a synthetic natural gas manufacturing facility is provided, as are the analysis of and inquiry into the alternatives to the proposed action. PEG does not contend that the Draft EIS is inadequate for its overall failure to discuss, but is, in fact, inadequate for the conclusions drawn after such discussion.

The adverse environmental impacts from the operation of the SNG Plant are unequivocally discussed. The adverse environmental impacts from an action of no allocation are equally as succinctly discussed. The SNG Plant exists and is ready to operate as required to serve the requirements of this Company's firm customers. What then are the adverse environmental impacts resulting from an allocation of naphtha for operation of the SNG Plant? PEG would argue the Draft EIS is deficient for its failure to discuss these impacts, but does not indicate what these impacts are. The Draft EIS is meant to disclose information so that concerned agencies can assess the environmental impact. The Draft EIS does not need to establish the "true need of BG&E's priority users for SNG"; it must develop and analyze the effect of their continued receipt of gas (beneficial) and their non-receipt of gas (detrimental whether or not alternate fuel capability exists).

III

Should any questions arise with respect to these comments, contact should be initiated with D. Pierre G. Cameron, Jr., Esq., Counsel to Baltimore Gas and Electric Company, in writing at 1700 Gas and Electric Building, P. O. Box 1475, Baltimore, Maryland 21203, or by telephone, at area code 301-234-5685 in order that concerned Company personnel may prepare appropriate responses to such inquiries.

Respectfully submitted,

Baltimore Gas and Electric Company

By D. Pierre G. Cameron, Jr.
D. Pierre G. Cameron, Jr.
Associate General Counsel

January 26, 1978

Certification

Pursuant to the requirements of 10 CFR §§ 203.5(a) and 205.9(b), I, D. Pierre G. Cameron, Jr., do hereby certify that, pursuant to the delegation of authority contained in a letter dated April 5, 1974, filed with the Federal Energy Office, as predecessor to the Economic Regulatory Administration of the Department of Energy, I am a duly authorized representative of Baltimore Gas and Electric Company, that I am authorized, inter alia, to execute on behalf of Baltimore Gas and Electric Company the Further Comments on Baltimore Gas and Electric Company Draft EIS - DOE/EIS-0002-D, to which this certification is attached, and that a copy of the aforementioned Further Comments on Baltimore Gas and Electric Company Draft EIS - DOE/EIS-0002-D was mailed, first class mail, postage prepaid, this 26th day of January, 1978, to the persons listed below.

Honorable Charles McC. Mathias, Jr.
Honorable Paul S. Sarbanes
United States Senate
Washington, D. C. 20510

Honorable Robert E. Bauman
Honorable Goodloe E. Byron
Honorable Marjorie S Holt
Honorable Clarence D. Long
Honorable Barbara A. Mikulski
Honorable Parren J. Mitchell
Honorable Gladys Noon Spellman
Honorable Newton I. Steers, Jr.
United States House of Representatives
Washington, D. C. 20515

Honorable Blair Lee III
Acting Governor
State of Maryland
Annapolis, Maryland 21401

Honorable Thomas J. Hatem, Chairman
Public Service Commission of Maryland
301 West Preston Street
Baltimore, Maryland 21201

Mr. G. W. Tiberio
Director, Energy Management Section
General Motors Corporation
Detroit, Michigan 48202

Sutherland, Asbill & Brennan
1666 K Street, N.W.
Washington, D. C. 20006
Attention: R. L. Winkler, Esq.

Mr. Robert Powers, Vice President
Amerada Hess Corporation
1185 Avenue of the Americas
New York, New York 10036

Baker & Botts
1701 Pennsylvania Avenue, N.W.
Washington, D. C. 20006
Attention: Bruce F. Kiely, Esq.

D. Pierre G. Cameron, Jr.

D. Pierre G. Cameron, Jr.
Associate General Counsel
Baltimore Gas and Electric Company

January 26, 1978

BALTIMORE GAS AND ELECTRIC COMPANY

GAS AND ELECTRIC BUILDING

BALTIMORE, MARYLAND 21203

February 28, 1978

M's Carrol Bordstrum
Department of Energy
Room 7119
12th Street & Pennsylvania Ave.
Washington, D.C. 20461

RE: Aluminum Content of Discharge Water from Equalization Basin, Riverside S.N.G. Plant

Dear M's Bordstrum:

As per our telephone conversation, attached are certificates of analysis showing the aluminum content in the wastewater effluent from the Equalization Basin at the Riverside S.N.G. Plant. The samples for the analysis were taken while the plant was operating at normal conditions.

If you have any questions, please give me a call at 301-234-7415.

Very truly yours,

Charles R. Jones

Charles R. Jones
Sr. Plant Designer
Gas Supply Department

CRJ:pmv

cc: Messrs. D. P. G. Cameron, Jr.
W. J. Brooksbank
R. W. Pohl
C. W. Crooks, Jr.
P. L. Dziubinski
C. R. Jones
File

WPB
2/28/78

SHEPPARD T. POWELL ASSOCIATES
CONSULTING ENGINEERS

HILARY E. BACON
JOHN W. SIEGMUND
ELMER L. KNOEDLER
WILLIAM J. LEWIS
WILLIAM E. CHESNEY
JAMES S. POOLE
STRATI YORGIADIS

31 LIGHT ST.
BALTIMORE, MARYLAND 21202

301-685-3210
CABLE ADDRESS: SHEPOW

January 10, 1978

Mr. Abraham Eagle
Plant Chemist, Sollers Point SNG Plant
Baltimore Gas and Electric Company
Gas and Electric Building
Post Office Box 1475
Baltimore, Maryland 21203

Subject: Analysis of Wastewater Discharged From Equalization Basin - January 5, 1978

Dear Mr. Eagle:

Attached is the certificate of analysis showing the metal constituents of the wastewater effluent from the Equalization Basin at the SNG Plant. The sample was analyzed by Martel Laboratories using Atomic Absorption.

If you have any questions in regard to the above, please let us know.

Very truly yours,

SHEPPARD T. POWELL ASSOCIATES

Strati Yorgiadis

SY:rc
Attachment

Martel Laboratories, Inc.

1025 Cromwell Bridge Road Baltimore, Maryland 21204 (301) 825-7790

Certificate of Analysis

Lab No. 8115
From Sheppard T. Powell Associates
Sample Marked Water 1/5/78 - City water BG&E SNG Plant 9:30 A.M. Neutralization Pond Effluent

Sheppard T. Powell Associates
31 Light Street
Baltimore, Maryland 21202

January 9, 1978

Attn: Mr. Steve Yorgiadis

Aluminum (Al)	0.5 ppm	Zinc (Zn)	0.10 ppm
Iron (Fe)	2.11	Calcium (Ca)	27.7
Copper (Cu)	<0.01	Magnesium (Mg)	7.7
Lead (Pb)	<0.10	Sodium (Na)	330
Tin (Sn)	<1	Potassium (K)	1150
Chromium (Cr)	<0.10	Silica (SiO_2)	10
Nickel (Ni)	<0.01	Manganese (Mn)	0.07
Cadmium (Cd)	<0.01		

Francis L. Ftak
Vice President
Laboratory Services

phm

ABCO
LABORATORY, INC.

6660 SECURITY BOULEVARD • BALTIMORE, MARYLAND • 21207
TELEPHONE AREA CODE 301 944-8110

CERTIFICATE

TO Baltimore Gas & Electric Co.
SNG Plant
Baltimore, Maryland 21203
Attn: Mr. Abe Eagle

DATE January 6, 1978

LABORATORY NUMBER 9076 ***SAMPLE*** Pond Water Sample 1/5/78

RECEIVED FROM Delivered ***DATE*** 1/5/78

Sample submitted for determination of aluminum content.

Method: APHA XIV, Eriochrome Cyanine R

Results:

Aluminum as Al . . . . 0.17 mg/L

At your request, we determined the aluminum content of Baltimore City water from our tap using the same method:

Aluminum as Al . . . . 0.05 mg/L

Comments:

The Baltimore City Water Dept. Laboratory reports the following values for aluminum in city water at the filtration plants for the period 7/76 - 6/77:

Montebello plant, Average 0.06 mg/L Maximum 0.13 mg/L
Ashburton plant, Average 0.04 mg/L Maximum 0.06 mg/L

Respectfully submitted
Abco Laboratory, Inc.

per Samuel L. Goldheim

ABCO
LABORATORY, INC.

6660 SECURITY BOULEVARD • BALTIMORE, MARYLAND • 21207
TELEPHONE AREA CODE 301 944-8110

CERTIFICATE

TO Baltimore Gas & Electric Co., *DATE* January 10, 1978
SNG Plant
Baltimore, Maryland 21203
ATTN.: Mr. Abe Eagle

LABORATORY NUMBER 9085 *SAMPLE* City Tap Water at SNG Plant 1/9/78

RECEIVED FROM Delivered *DATE* January 9, 1978

Sample submitted for determination of aluminum content.

Method: APHA XIV, Eriochrome Cyanaine R

Result:
Aluminum, as Al . . . . 0.02 mg/L

Respectfully submitted
Abco Laboratory, Inc.

per ______
S.L. Goldheim

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

ER 77/1128

FEB 8 1978

Mr. Barton R. House
Assistant Adminiatrator
Fuela Regulation
Economic Regulatory Administration
Department of Energy
Washington, D. C. 20461

Dear Mr. House:

OPERATIONS RP

9 FEB 78 5:55

Thank you for your letter of December 12, 1977, transmitting copies of the Department of Energy's draft environmental impact statement for the allocation of petroleum feedstock to the Baltimore Gas and Electric Company's SNG plant at Sollera Point, Baltimore County, Maryland.

Our comments are presented according to the format of the statement or by subject.

Water Quality Impacts

We have strong reservations about the nature of the effluent discharge, especially the fact that Aluminum, a toxic material, will be released in amounts that will degrade the receiving waters. We believe that the statement should discuss in greater detail the possible adverse effects Aluminum can have on the already stressed biota in Baltimore Harbor.

Further, we do not accept the principle of dilution as an acceptable and reliable means of reducing the lethal and/or degrading effects of hazardous substances in the discharge. The ability of the recsiving waters to properly dilute and render biologically acceptable, prescribed amounts of toxic and hazardous substances is directly related to the total amounts of these substances being discharged from all sources. The statement repeatedly declarea that the dilution is expected to reduce the effluent to nonhazardous levels. A monitoring program should be instituted to determine whether dilution is effectively providing a satisfactory level of protection to the aquatic environment. The size of the area of the receiving waters that is being degraded by the discharge, i.e., the "mixing zone," should also be described. The design and plans for implementation of a monitoring program should be discussed in the final statement.

The draft statement points out that the harbor is characterized by a well-mixed surface layer. However, nothing is said about the construction or placement of the discharge pipe. For example, it would be helpful to know whether the outfall will be in the water or on land; if in the water, at what depth, and whether the pipe will be equipped with diffusers. This and other pertinent information about the outfall should be presented in the final statement.

We suggest serious consideration be given to these observations for we cannot accept the thesis that the benthic fauna found in the receiving waters are insignificant. As depauperate as the harbor is, the fact that it still supports plants and animals is an indication that the area is operating as a viable ecosystem. Every feasible means should be employed to reduce the amount of additional pollutants entering the harbor. Emphasis must be placed on maintaining the present water quality so that, hopefully, the way back to higher water quality is not eliminated as a reachable goal.

Alternatives

Greater consideration might be given in the final statement to increasing biological treatment of the effluent, perhaps by creating a number of evaporation ponds in the 47 acres of open area remaining on the project site.

We hope these comments will be helpful to you in the preparation of the final statement.

Sincerely,

Larry E. Meierotto
Deputy Assistant SECRETARY

UNITED STATES DEPARTMENT OF COMMERCE
The Assistant Secretary for Science and Technology
Washington, D.C. 20230
(202) 377-3111

February 7, 1978

Mr. Barton R. House
Assistant Administrator
Fuels Regulation
Department of Energy
Washington, D. C. 20461

Dear Mr. House:

This is in reference to your draft environmental impact statement entitled, "Allocation of Petroleum Feedstock, Baltimore Gas and Electric Company, Sollers Point, Maryland." The enclosed comment from the National Oceanic and Atmospheric Administration is forwarded for your consideration.

Thank you for giving us an opportunity to provide this comment, which we hope will be of assistance to you. We would appreciate receiving twelve (12) copies of the final statement.

Sincerely,

Sidney R. Galler
Deputy Assistant Secretary
for Environmental Affairs

Enclosure: Memo from Mr. George P. Cressman
Director, National Weather Service, W

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL WEATHER SERVICE
Silver Spring, Md. 20910

W11x2/MJA

JAN 25 1978

TO: Dr. William Aron
Director, Office of Ecology and Conservation, EC

FROM: George P. Cressman
Director, National Weather Service, W

SUBJECT: DEIS 7712.34, Allocation of Petrole m Feedstock

Our comments are relatively minor. On page 4-16 second paragraph, the fourth sentence should read, "The National Weather Service Forecast Office at Washington, D.C. issues air stagnation advisories and statements for the State of Maryland."

Air pollution alerts during the past three years were due to photo-chemical pollution. These pollutants were hardly discussed. There is brief discussion of NO_2, less of hydrocarbons. This brief treatment of photo-chemical pollutants and their precursors may be justified if the plant operates only in winter and the tankage presents no significant chance of leakage or emissions from May to October.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
6TH AND WALNUT STREETS
PHILADELPHIA, PENNSYLVANIA 19106

January 30, 1978

Mr. Finn Neilsen
Office of Fuels Regulation
Department of Energy
2000 M Street, N.W.
Washington, D.C. 20461

Re: Allocation of Petroleum Fuelstock, Baltimore Gas and Electric Company, Sullers Point, Maryland SNG Plant

Dear Mr. Neilsen:

We have completed our review of the Draft Environmental Impact Statement for the above referenced project. Our review indicates that the Synthetic Natural Gas (SNG) production facility will discharge approximately six part per million (ppm) of aluminum to the Baltimore Harbor. The source of the aluminum is not defined in the Environmental Impact Statement. Furthermore, conversations with the Maryland Department of Natural Resources NPDES staff indicates that the discharge of aluminum is not included in any of the effluent limitation permits for the facility.

EPA requests that the EIS be revised to include the source of aluminum, its chemical nature, and its impact on the water quality of the harbor area surrounding the SNG facility. Further, any adverse impacts to aquatic life in the vicinity of the discharge should be noted in the document.

We cannot pass judgement on the environmental impacts of the SNG facility until our questions concerning the discharge of toxic quantities of aluminum are resolved. Therefore, we have assigned the document an EPA EIS Category Rating of ER-2 (Environmental Reservations due to a lack of sufficient information to determine environmental impact).

The classification and the date of EPA's comments will be published in the Federal Register in accord with our responsibilities promulgated under Section 309 of the Clean Air Act Amendments.

If you have any questions concerning this review, please do not hesitate to contact us.

Sincerely yours,

Nicholas M. Ruha
Chief
EIS and Wetlands Review Section

REGIONAL PLANNING COUNCIL
701 St. Paul Street
Baltimore, Maryland 21202

R & R File No. 77-477
B & P Committee January 6, 1978

REVIEW AND REFERRAL MEMORANDUM

PROJECT IDENTIFICATION

Jurisdiction: Baltimore County

Project Name: Allocation of Petroleum Feedstock to Baltimore Gas and Electric's Sollers Point Plant - Draft EIS

Applicant: U.S. Department of Energy

DESCRIPTION

This is a draft Environmental Impact Statement for an application filed by the Baltimore Gas and Electric Company (BG & E). BG & E is requesting an allocation of 1,000,000 barrels of naphtha to be used to produce synthetic natural gas (SNG). This process will offset deficiencies in natural gas supplies to BG & E's firm customers (residential, commercial and industrial).

BG & E has completed construction of a SNG facility at Sollers Point. It is at this plant that the naphtha will be used. Initially, BG & E is requesting an allocation of 1,000,000 barrels per year until the Spring of 1978. At this time, the allocation would be increased to 2,186,000 barrels per year.

The environment that will be influenced by the Federal Energy Administration action is primarily the site surrounding the SNG facility. The site is an industrial section of the Baltimore Metropolitan area.

Adverse Environmental impacts primarily involve the discharge of air contaminants and waste water effluents.

COMMENT

This facility would help relieve the region's natural gas shortage. Relieving this shortage is a goal of the General Development Plan. Currently, natural gas users are being forced to utilize oil, coal and electric energy because of increasing natural gas curtailments. These curtailments impact the region's air quality, energy costs, demand for new electric generating facilities, regional economic growth and the national balance of payments.

COMMENTS (Cont'd)

The site of this facility is situated in an area that is industrial and in addition, it will utilize its waterfront location. It is also adjacent to an existing Baltimore Gas and Electric facility.

It is felt that the negative impacts of this facility are greatly overshadowed by the need for increased gas supply in the Baltimore region.

ENDORSEMENT IS RECOMMENDED

I HEREBY CERTIFY that at its 166th meeting held January 20, 1978, the Regional Planning Council concurred in this Review and Referral Memorandum and incorporated it into the minutes of that meeting.

January 20, 1978
Date

Frederick L. Dewberry
Frederick L. Dewberry
Executive Director

FROM: Mr. Edmund Cueman
Director, Planning Commission
County Office Building
Westminster, Maryland 21157

DATE: January 3, 1978

B & P Meeting: 1/6/78
R P C Meeting: 1/20/78

☐ Joint RPC/CMHSA Review Cycle (up to 60 days)

SUBJECT: REFERRAL COORDINATOR REVIEW SUMMARY

Applicant: U.S. Department of Energy

Project: Allocation of Petroleum Feedstock to Baltimore Gas & Electric's Sollers Point Plant - Draft EIS

R & R File No.: 77-477

Comments Should be Returned By: January 16, 1978

This project has been forwarded to the following local departments or agencies (Check appropriate blanks and attach comments from the reviewing agencies):

________ Planning

________ Public Works

________ Environmental Protection

________ Human Relations

________ Others (specify)________________

JURISDICTION'S COMMENTS

Check One

✓ This jurisdiction has no comments on this particular project.

________ This project is consistent with or contributes to the fulfillment of local comprehensive plans, goals and objectives.

________ This project raises problems concerning incompatibility with local plans, or intergovernmental, environmental or civil rights issues and a meeting with the applicant is requested (attach comments).

________ This project raises problems concerning incompatibility with local plans, or intergovernmental, environmental or civil rights issues, however, a meeting with the applicant is not requested (attach comments).

________ This project is generally consistent with local plans, but qualifying comments are necessary (attach comments).

RETURN TO:
Coordinator, Metropolitan Clearinghouse
Regional Planning Council
St. Paul Street
Baltimore, Maryland 21202

Signature [signature]

Title Planning Director

Agency Car 11 County Planning Commission

Date January 18, 1978

FROM: Mr. Larry Reich, Director
Department of Planning
222 E. Saratoga Street
Baltimore, Maryland 21202

DATE: January 3, 1978

R & P Meeting: 1/6/78
R P C Meeting: 1/20/78

☐ Joint RPC/CMHSA Review Cycle (up to 60 days)

REGIONAL PLANNING C... JAN ...

SUBJECT: REFERRAL COORDINATOR REVIEW SUMMARY

Applicant: U.S. Department of Energy

Project: Allocation of Petroleum Feedstock to Baltimore Gas & Electric's Sollers Point Plant - Draft EIS

R & R File No.: 77-477

Comments Should be Returned By: January 16, 1978

This project has been forwarded to the following local departments or agencies (Check appropriate blanks and attach comments from the reviewing agencies):

✓ Planning

___ Public Works

___ Environmental Protection

___ Human Relations

___ Others (specify) ______

JURISDICTION'S COMMENTS

Check One

___ This jurisdiction has no comments on this particular project.

___ This project is consistent with or contributes to the fulfillment of local comprehensive plans, goals and objectives.

___ This project raises problems concerning incompatibility with local plans, or intergovernmental, environmental or civil rights issues and a meeting with the applicant is requested (attach comments).

___ This project raises problems concerning incompatibility with local plans, or intergovernmental, environmental or civil rights issues, however, a meeting with the applicant is not requested (attach comments).

✓ This project is generally consistent with local plans, but qualifying comments are necessary (attach comments).

RETURN TO:
Coordinator, Metropolitan Clearinghouse
Regional Planning Council
701 St. Paul Street
Baltimore, Maryland 21202

Signature [signature]

Title ______

Agency ______

Date ______

Date: January 3, 1978

TO: Mr. Larry Reich, Director
Department of Planning
222 E. Saratoga Street
Baltimore, Maryland 21202

REGIONAL PLANNING COUNCIL
JAN 20 1978
BALTIMORE, MARYLAND

SUBJECT: PROJECT NOTIFICATION REVIEW

Applicant: U.S. Department of Energy

Project: Allocation of Petroleum Feedstock to Baltimore Gas and Electric's Sollers Point Plant - Draft EIS

R & R File No.: 77-477

Comments Should be Returned By: January 16, 1978

Check One

______ This agency has no comments on this particular project.

______ This project is consistent with or contributes to the fulfillment of local comprehensive plans, goals and objectives.

______ This project raises issues concerning incompatibility with local plans or intergovernmental problems and a meeting with the applicant is requested (Specify below).

______ This project raises issues concerning incompatibility with local plans or intergovernmental problems, however, a meeting with the applicant is not requested (Specify below).

XX This project is generally consistent with local plans, but qualifying comments are necessary (Specify below).

Comments: We are supportive of the additional supply of natural gas to maintain service to firm industrial, commercial and other gas consumers during periods when shortages and curtailments might otherwise be created. Although there are questions about the critical need for this facility at this time, in view of the LNG program at Cove Point, our essential criticism relates to the apparent attitude of the applicant toward environmental degradation in circumstances when the environment currently fails to meet standards set by federal and state agencies. In particular, we feel that the applicant should not increase the difficulty of the region eventually satisfying improved water quality and air quality standards. The time to avoid further environmental degradation is now - before the new facility begins operations - rather than later when costs of retrofitting etc. may be greater.

RETURN TO LOCAL REFERRAL COORDINATOR NAMED ABOVE

Signature Neil W. Curran

Title Chief, Economic Analysis

Agency Baltimore City Planning Dept.

FROM: Mr. Kenneth Green
Director of Planning
45 South Main Street
Bel Air, Maryland 21014

DATE: January 3, 1978

B & P Meeting: 1/6/78
R P C Meeting: 1/20/78

☐ Joint RPC/CMESA Review Cycle (up to 60 days)

REGIONAL PLANNING COUNCIL JAN 23 1978

SUBJECT: REFERRAL COORDINATOR REVIEW SUMMARY

Applicant: U.S. Department of Energy

Project: Allocation of Petroleum Feedstock to Baltimore Gas & Electric's Sollers Point Plant - Draft EIS

R & R File No.: 77-477

Comments Should be Returned By: January 16, 1978

This project has been forwarded to the following local departments or agencies (Check appropriate blanks and attach comments from the reviewing agencies):

_____ Planning _____ Public Works

_____ Environmental Protection _____ Human Relations

_____ Others (specify) Extension Service

JURISDICTION'S COMMENTS - ATTACHED.

Check One

_____ This jurisdiction has no comments on this particular project.

_____ This project is consistent with or contributes to the fulfillment of local comprehensive plans, goals and objectives.

_____ This project raises problems concerning incompatibility with local plans, or intergovernmental, environmental or civil rights issues and a meeting with the applicant is requested (attach comments).

_____ This project raises problems concerning incompatibility with local plans, or intergovernmental, environmental or civil rights issues, however, a meeting with the applicant is not requested (attach comments).

_____ This project is generally consistent with local plans, but qualifying comments are necessary (attach comments).

RETURN TO:
Coordinator, Metropolitan Clearinghouse
Regional Planning Council
701 St. Paul Street
Baltimore, Maryland 21202

Signature Kenneth Green
Kenneth Green

Title Director,

Agency Planning & Zoning Department

Date January 20, 1978

SPEED LETTER

TO Lynn T. Warman
Extension Service

FROM Kenneth Green,
Planning & Zoning

SUBJECT A-95 - Allocation of Petroleum Feedstock to Baltimore Gas & Electric's Sollers Point Plant (77-477)

NO. 9 & 10 FOLD

MESSAGE

DATE January 1978

Attached you will find material on the referenced A-95 project for your review, together with project notification review form which I would appreciate your returning to me completed no later than January 13th. Thank you.

SIGNED Kenneth Green

REPLY

DATE 1/18/78 19

Limited review on my part does not surface any apparent harm to our agriculture industry.

NO. 9 FOLD

NO. 10 FOLD

SIGNED Lynn T Warman

RETAIN WHITE COPY, RETURN PINK COPY

Greater Dundalk Community Council

February 1, 1978

Regional Planning Council
701 St. Paul Street
Baltimore, Maryland 21202

re: Project 77-477
Draft Environmental Impact
Statement for Baltimore Gas
and Electric's Sollers Point
Plant

Dear Sirs:

This draft is the most irresponsible, reprehensible, ludicrous and incorrect EIS statement it has been my displeasure to read. Although the site is in an industrial section of Baltimore County, the document does not point out that this site is surrounded by residential properties. At what point is the need for an increased gas supply overshadowed by the health and well-being of the people who live in this area? At which point will heavy industrial pollutants strangle the last resident of the greater Dundalk area? At what point will the residents be protected? At present, we are polluted by the Dundalk Marine Terminal, Bethlehem Steel Corporation at Sparrows Point and by roads carrying heavy truck traffic being routed through our community.

Now to specifics. Having sat in on the original application hearing by the BG&E for this facility, we were assured that no additional pollutants would be placed in our waters, on which we are spending millions to clean up. In the hearing, the noise factor was never brought up, and therefore was not considered, but how can anyone be so irresponsible as to say that additional noise is no factor because of the noise that is present. Studies recently undertaken have shown that the noise levels in this area are already above acceptable levels.

It might be of interest to you and to BG&E that some of the better crabbing in this area is done right out from shore at the BG&E Sollers Point Plant and could be adversely affected by the introduction of pollutants.

Regional Planning Council
701 St. Paul Street
Baltimore, Maryland 21202

February 1, 1978

To state that this project will contribute any additional pollutants to the air and water of this area shows a total lack of regard for the people living in the area. The EIS tries to shift additional environmental impacts by discussing the conversion from oil to coal by major plants; however, I would like to point out that the EPA's policy is to make sure that the waters are safeguarded from run-off from such products.

The statement "overall air pollution and water quality of programs within the Baltimore metropolitan area are necessary" is a statement that should be followed through with, as it is our feeling that no additional pollutants should be added to our environment. "Effluents discharged into the Baltimore harbor are not hazardous with the exception of concentrations of aluminum." Such ambiguity - how can you have an exception to a system which is "non-hazardous"?

We are fully cognizant of the necessity for this plant, because of the shortage of natural gas, but feel that with better design and stricter pollution controls, all pollutants can be eliminated and therefore the Greater Dundalk Community Council must go on record as opposing the expanding of BG&E's Sollers Point gas operation until such time as the additional pollutants can be eliminated.

Very truly yours,

Thomas Kroen

Thomas Kroen, President
Greater Dundalk Community Council

TK:l

February 28, 1978

MEMORANDUM TO: Govenor Blair Lee
Senator P. Sarbanes
Senator C. Mathias
Congressman C. Long
Secretary Dr. N. Soloman
Councilman John O'Rourke
Mr. T. Kroen, President Dundalk Community Council
U.S. Department of Energy
Environmental Protection Agency
U.S. Council on Environmental Quality
Regional Planning Council of Central Maryland

FROM: Jane Rahl Apson, President Logan Village Improvement Assn.

RE: Draft Environmental Impact Statement (EIS):
Allocation of Petroleum Feedstock, Dept. of Energy
(DOE/EIS-0002-D) December 1977 Baltimore Gas & Electric Co.
Sollers Point, Maryland Synthetic Natural Gas Plant (SNG)
Project 77-477

I am representing more than 5000 citizens of Logan Village who are angry with the system that allows our quality of life to be degraded and permits anyone to violate the existing legal safe guards. Our community is located adjacent to "East Turners" on Dundalk Avenue and is also bordered by Belclare and Sollers Point Roads (see attached map - Attachment #1). We take umbridge with a number of important items in the EIS under discussion:

I. Definition of Affected Environment

We are protesting the small area chosen by the Dept. of Energy (DOE) as the "environment affected by the action" (in Section 4). Logan Village, as well as Watersedge (Sollers Point Rd, Dundalk Avenue & Bullneck Creek) also unrecognized by this EIS, have been affected by the previous testing and preliminary useage of the SNG plant at Sollers Point. We, along with "Est/Wst Turners" have been shocked by the flames, startled by the loud "popping" and choked by the sulfurous stink. Having made the point that Section 4 does not take into account a large enough land area, we will proceed with further inaccuracies of Section 4.

On page 4-1 the Carnegie Plats area (as the citizens group calls itself) is erroneously called "West Turners".

On page 4-3 one of the recreational areas not mentioned is the water off Sollers Point currently being used for crabbing, boating and fishing. The EIS goes on to say (page 4-4) that "the water has little recreational value". That statement is very simply false.

We, in Loagn (a stable blue collar working neighborhood of homes, both row and single family bungalows (resident owned) are very insulted by the description (Section 4.2 page 4-5) of the "stable neighborhood" in terms calculated to appeal to the prejudice in most of the "wealthy white collar class" who will make the final decision on this EIS and the resulting allocation.

(cont)

II. Adverse Environmental Effect of Heat Radiating Into The Atmosphere.

We find mentioned throughout the EIS (pages 3-11, 3-15, 3-16, 3-18) various atmospheric outlets that will exhaust heated air and no area of the EIS addresses the possibility of this heating affecting air stagnation in the summer or atmospheric changes of any kind (page 7-1) ((The word "radiation" is used in the list on page 3-11 but it is not defined. I assume since it is in 10^6 BTU per hour, it is heat)).

III. Fire and Hazard Safety.

Logan Village is very concerned about the safety of our area (see Attachment 2 & 3). We note that in Section 3 the future tense is consistently used to describe the fire protection equipment (page 3-23, 3-24). We hope that the BG&E SNG plant has not been operating this past year without the necessary protection. We realize that the safety precautions for this type of facility are stringent but we question why the statement (5-44) "It is expected that any fire which might occur at the SNG facility would be confined to the plant site", can be made. What other preparations (other than described in pages 3-23 & 3-24) contribute to that above statement? We are also concerned about the large use made of propane gas in the process.

IV. Air Quality Effects.

The EIS is inconsistent with respect to air quality. "Occasionally (the SNG facility will) exceed air quality standards " (2-2) and this plant will have a "small" impact on air quality (2-3, 7-1). But also therein is stated "adverse impact cannot be avoided (2-5, 7-1, 9-1). Logan Villagers, in fact all Dundalk residents, already know that the current air quality standards are exceeded in the Baltimore metropolitan region particularly SO_2 and particulates (4-13, 5-27). But the DOE requires: "All national, state and local air quality standards applicable to this plant should be met while the SNG facility is operating at design/operational capacity" (5-19). We want this compliance especially when the plant is put into an operational mode.

The analysis of air quality includes a lengthy discussion of prevailing winds (4-16, 5-20). The measure of these winds is taken at the Baltimore Washington International Airport, which is above our altitude and sits well off the bay and harbor area. But, the SNG facility is at "Riveredge" (an appropriate name) - it is directly on a large body of water. It is basic earth science that the thermal changes between land and water determine daily changes (night vs. day) in ground level air circulation, local thermal wind. This EIS does not take this situation into account when defining the leaward fallout of air pollutants. It makes no attempt to address the impact of the air pollutants in our neighborhoods during the longer air stagnation/inversion periods of the summer months.

Nowhere does any discussion of air quality address the SO_2 (mentioned throughout parts of section 4 and 5.4) as the stench of rotten eggs. We could also choke on the odorant added to the gas as a safety precaution (3-11).

(cont)

Alternative control systems for air quality are discussed in depth in Section 10.3.3, but are dismissed as having "substantial cost".(10-1, 10-41) We want to know dollar figures and comparision of these costs to the total profits expected per year and per the lifetime of this facility. We want clean, fresh smelling air, the "relative insignificance" of the output of air pollutants from this facility compared to existing excess pollution is no excuse to contribute to the existing sins against the residents of this urban area.

V. Water Quality Effects.

The problems of water quality are similar to those of air quality. The EIS makes the statement that "the water quality is bad" (2-2) and will "not now support a significant aquatic system" (2-2, 4-25); that the "waste water is non-hazardous" (2-4, 5-30) but "an adverse impact cannot be avoided" (2-5, 3-19, 5-31, 5-33, 7-1, 9-1).

A major fallacy we found concerns the use of water off Sollers Point as a recreational area (2-3, 5-4). The major premise of all statements about water quality can be proved false by the fact that many of us in these Sollers Point communities do more boating, fishing and crabbing (for the blue crab) off the BG&E Riverside facility. The crabs are there and are edible. This disproves the statements on pages 4-23, 25, 34, 5-30, 42. To say impact on our water will be insignificant because "aquatic organisms" will move from the area" is irresponsible considering the long fight (we've just begun to win) to bring the blue crab back home to Sollers Point and Bear Creek. We must maintain the water balance on the side of the crab whose lifeline is very delicate; any excesses will affect them (5-30, 5-32).

Erosion is another factor contributing to water quality. Page 6-4 mentions planting to mitigate this problem. We feel planting is a must and it goes hand-in-hand with air and visual quality.

Another contribution to water pollution could be the site of the off-site disposal of such things as Stretford solution and oil waste. We want to know where the "off-site industrial dump" (3-18, 3-21 5-35, 6-3) is situated. If it goes to Norris land fill, then Back River and the Chesapeake Bay will be polluted with waste anyway (Attachment #4- 5 part series by Judy Boggs: Norris Land Fill-Dundalk Eagle, Feb. 24, 1977, Mar. 3, 1977, Mar. 11, 1977, March 17, 1977, March 24, 1977 ~~Enclosure (2)~~). Reference is made to alternative waste water treatment systems (Section 10). As with air quality, these alternatives are said to be of "excessive costs" (10-44).

VI Noise Pollution.

Again, like air and water quality, noise levels in our area are at or above state standards already (2-2, 4-25, 4-28) and that "adverse impact cannot be avoided" (2-5). But the noise addition of the SNG facility is "inaudible on top of high background noise" (2-4) or "negligible" (5-36). How can 3dBA be "insignificant" and at the same time be" equivalent to doubling of traffic" background noise energy (5-39)? The EIS places more onus for noise on traffic (4-10, 5-43). But to have an increase of 10dBA on top of existing base noise when Riverside is operational (4-31) means tripling the noise producing energy of the base noise level (because dBA are 10 x log of the noise producing energy).

(cont)

We cannot afford the psychological impact of added noise. Because we are workers in industrial sites, we work all day in noisy environments and come home to sleep in the noise of our "residential" environment. We do n t care who generates the noise - we cannot afford its impact.

The only mitigating measures mentioned are planting of live trees as a buffer (5-42, 6-3). Why are no other controls proposed (Section 10)?

Irreversible mental anguish, sleeplessness, shattered nerves, etc. are not mentioned in Section 9 as being a negative consequence of noise excess over long periods of time. We want peace and quiet!

VII Visual Quality.

The community defined for measuring the impact of the SNG facility is very small compared to the Dundalk community (5-10). Citizens have seen the flares of the SNG facility from the other end of Dundalk and feared a major fire. The whole region in Figure 5.2-1 can see the flare.

The mitigating measures for improvement of visual quality, the planting of tall trees (5-42, 6-1) will do more than be a pleasure to view. A thick planting around the plant site perimeter of five HUNDRED yards of trees and shrubs both deciduous and conifer will:

1. inhibit erosion (5-43, 6-4);
2. clean the air and help precipitate the particulates;
3. baffle noise (6-3);
4. cut back on water runoff (6-4).

VII Alternatives

A. Design Alternatives

We have previously discussed these. We wish to see all design alternatives compared in cost of installation compared to the BG&E expected profits. EIS admits that BG&E estimates the cost of SNG would raise the price of gas to about $3.00/mcg, about 8% increase (5-12,13). Therefore, the switch to SNG must have added cost burdens on the consumers, that is on us.

B. Conservation Alternatives

Neither sections addressing conservation (2-6, Section 10) mention any alternative powers. We now have grants available to home owners who wish to install solar powered hot water heaters. Also, what about the use of wind power to generate electricity freeing gas and oil for other uses?

We expect some biases in the choice of such small samples in the BG&E survey (10-15, 10-17) and question the validity of the study.

C. Administrative Alternatives

Finally, and most critically, we have serious questions about the need for the SNG facility to be in service at full design capacity as it would be if the BG&E request for naptha is granted.

(cont)

During the original hearings, before the construction permits were granted, we understood that the SNG facility would only be used as a supplement during peak drain seasons and be operating in complete compliance with environmental laws and standards. We are not impressed by the flowery words of Section 10.1 and 10.2. We cannot see the need for the SNG facility to be used full time- if it will result in further pollution to our living area.

SUMMARY

We, as a community improvement association, are primarily interested in the quality of life and the well-being of our citizens, and have accepted as our guiding principle that any construction and/or alteration of any facility in our community must be in compliance with the environmental standards and laws of the State of Maryland, particularly, but not limited to noise standards as mandated by the Environmental Noise Act of 1974. Furthermore, said compliance shall be completed concurrently with the changes to said facilities, and further we resolve to be morally obligated to reject, resist and find not negotiable any attempt to circumvent or lower any existing environmental standards.

The residents of this community must vehemently object to this EIS; which, in effect states that the operation of the synthetic gas plant (Project 77-477) should be approved; because, the area already suffers from high levels of pollution (water, noise and air), and that the added pollution caused by this facility will be of little or no consequences to the people living there, furthermore, these people are used to living under already existing high pollution levels; therefore, the additional pollution can be tolerated. These assumptions are absurd and because of this, we must seek the protection of our governmental leaders to protect us from such stupidity. We are insulted that the Department of Energy considers our environment, our quality of life, our very sanity, insignificant compared to the energy needs of the area.

Also the original intended use of the facility must not be compromised, that is, the SNG facility be only used as a supplement during the peak usage season - winter. (We understand this only includes commercial use, and does not consider industrial requirements).

We also believe that the safety of the community must be protected, by providing concurrently with the start of the operation; ample safety equipment, procedures and personnel. In this respect, we believe that the Maryland Port Authority and the U.S. Coast Guard must be consulted to insure the continued safe operation of the Dundalk Marine Terminal in light of the proposed use of shipping channels near the Terminal for naptha transfer.

We believe that this facility's operation constitutes yet another major threat to the quality of our human environment, therefore, careful consideration must be given by all concerned - federal agencies, local leadership and elected officials. (see attachments #5 & 6)

Jane Apson

J. R. Apson, President
LOGAN VILLAGE IMPROVEMENT ASSN.

Attachment #2 has been withdrawn and is available on request.

ATTACHMENT #1

☆U.S. GOVERNMENT PRINTING OFFICE: 1978—261-325/529