DOE/EA-1157

ENVIRONMENTAL ASSESSMENT

METHYL CHLORIDE VIA OXYHYDROCHLORINATION OF METHANE:

A BUILDING BLOCK FOR CHEMICALS AND FUELS FROM NATURAL GAS

DOW CORNING CORPORATION
CARROLLTON, KENTUCKY

SEPTEMBER 1996

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FINDING OF NO SIGNIFICANT IMPACT

FOR THE PROPOSED

METHYL CHLORIDE VIA OXYHYDROCHLORINATION OF METHANE PROJECT

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

ACTION: Finding of No Significant Impact (FONSI)

SUMMARY: DOE has prepared an Environmental Assessment (EA) (DOE/EA-1157) for a project proposed by Dow Corning Corporation to demonstrate a novel method for producing methyl chloride (CH_3Cl). The project would involve design, construction, and operation of an engineering-scale oxyhydrochlorination (OHC) facility where methane, oxygen, and hydrogen chloride (HCl) would be reacted in a fixed-bed reactor in the presence of highly selective, stable catalysts. Unconverted methane, light hydrocarbons and HCl would be recovered and recycled back to the OHC reactor. The methyl chloride would be absorbed in a solvent, treated by solvent stripping and then purified by distillation. Testing of the proposed OHC process would be conducted at Dow Corning's production plant in Carrollton, Carroll County, Kentucky, over a 23-month period. Based on the analyses in the EA, the DOE has determined that the proposed action is not a major Federal action significantly affecting the quality of the human environment as defined by the National Environmental Policy Act (NEPA) of 1969. Therefore, preparation of an Environmental Impact Statement is not required, and DOE is issuing this FONSI.

COPIES OF THE EA ARE AVAILABLE FROM:

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Pittsburgh Energy Technology Center
U.S. Department of Energy
P.O. Box 10940, M/S 922-273C
Pittsburgh, PA 15236-0940
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FOR FURTHER INFORMATION CONTACT:

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U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, D.C. 20585
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BACKGROUND: Over the past five years, DOE's Pittsburgh Energy Technology Center (PETC) has supported a research program to determine the feasibility of producing methyl chloride (CH_3Cl), a key ingredient used in the silicone industry, directly from methane (the primary component of natural gas) via an oxyhydrochlorination (OHC) process. The concept originally began at PETC and patents were issued. Dow Corning approached PETC with a proposal to further develop the route. As a result of this research program, funded through cost-sharing by DOE, Dow Corning Corporation, the Gas Research Institute (GRI), and Texas Gas Transmission Company, the OHC process is now ready for further development. The proposed action, which would be funded by DOE, Dow Corning, and GRI, would advance the OHC natural gas conversion technology to an integrated engineering-scale process at the Dow Corning plant in Carrollton, Kentucky.

The benefits of developing such an economically viable natural gas conversion process are numerous. Successful development of the OHC technology would encourage economic growth, help to reduce the trade deficit resulting from methanol imports, enhance energy interests by increasing utilization of an abundant domestic resource, and improve environmental quality since the product separation process to be developed as part of the technology has the potential for more effectively capturing volatile organic compounds (VOCs).

While Dow Corning intends to use the CH_3Cl converted from natural gas for the manufacture of silicones, DOE's interest in the OHC process is to use the CH_3Cl to produce liquid transportation fuels. Because the OHC technology utilizes domestic natural gas as a feedstock and thereby provides a reliable, low cost source of CH_3Cl independent of methanol, considerable cost savings may be achievable.

DESCRIPTION OF THE PROPOSED PROJECT: The proposed action is the establishment of a cooperative agreement between DOE and Dow Corning to partially fund the engineering-scale development of the OHC process. The engineering-scale facility would be constructed on a one-quarter acre plot of land within Dow Corning's 1,400-acre industrial site at Carrollton, Carroll County, Kentucky. The proposed facility would be designed to process approximately 1,000 standard cubic feet per minute (scfm) of methane. It would involve the construction and installation of a fixed-bed reactor consisting of 1,600 one-inch diameter by 6-ft tubes, an absorber system (a glass-lined absorber column and phase separator), a stripper system (a stripper column and phase separator), and a distillation train to purify the CH_3Cl. Methane, oxygen, and HCl gases would be introduced into the reactor tubes, where chemical conversion would occur over a proprietary catalyst. Operational testing of the facility would occur over a 23-month period, during which time the proposed facility would be on-line approximately 50% of the time. Operational testing would be performed under a variety of conditions to establish

sufficient data for performing technical and economic viability assessments. Successful development of the OHC technology would enhance the commercial acceptability of this natural gas conversion process, and the product separation technology planned for use in capturing volatile organic compounds (VOCs) would be marketable to other chemical process industries.

ENVIRONMENTAL IMPACTS: The proposed engineering-scale facility would be constructed on a one-quarter acre plot of land within Dow Corning's 1,400-acre industrial site. Construction of the facility would not be expected to result in significant impacts to the human environment. Minimal air emissions would be expected as a result of vehicular exhausts and fugitive dust from site excavation. There are no concerns with groundwater contamination since construction would not reach groundwater levels. Construction would not encroach upon any floodplains. In addition, all construction-related waste would be non-hazardous (e.g., wood, concrete, and paper). A material control system would be used to ensure that documentation of all construction materials is received and meets design specifications and requirements. Increased noise levels would result from machinery used in the installation of process equipment, and vehicle operations during construction.

During operation of the engineering-scale facility, no substantial change in air emissions would be expected to occur. All wastewater discharges from operation of the facility would be handled and treated within existing facilities and would add less than one percent to current process water output. Primary safety and health hazards would be fire and chemical exposure, created by handling of the methyl chloride gas and methylene chloride, chloroform and carbon tetrachloride liquids; Dow Corning has performed methane-oxygen flammability studies and would operate outside flammability limits.

AIR EMISSIONS: A temporary increase in air emissions would be expected during the construction phase of the project due to vehicular exhaust emissions from construction equipment and "fugitive" particulate emissions from wind erosion during site excavation. The latter would be controlled by watering, to eliminate dust generation. During operation of the facility, there would be a slight increase in the production hazardous air pollutants. Because the increase in air emissions would be minimal, no complications with CAAA compliance would be anticipated. On the contrary, if the operation of the facility is successful, a proprietary absorber-stripper technology developed by Dow Corning would be demonstrated for reducing VOCs by up to 98%. A purge stream on the absorber effluent would still be necessary since oxygenates would accumulate in the recycle loop. However, this purge stream would be incinerated in a steam generating boiler, recovering the heat value of the unconverted methane.

WATER QUALITY: Construction of the proposed engineering-scale facility would not be expected to impact existing surface water or groundwater, nor would any new liquid waste streams be generated. However, during operation of the facility, the components and quantities of the wastewater anticipated would be: process water (710,000 gallons or 95,140 cubic feet), hydrochloric acid, methyl chloride, and methylene chloride. The Kentucky Pollutant Discharge Elimination System (KPDES) permit for the existing Dow Corning plant imposes monthly average and daily maximum discharge limitations for methyl chloride (0.655 lbs/day and 1.446 lbs/day) and methylene chloride (0.304 lbs/day and 0.677 lbs/day). Waste discharges from operation of the facility would be combined with discharges from existing operations and handled and treated within existing facilities. These discharges would add less than one percent to current process water output. Due to the existing treatment system and very low wastewater output from the proposed project, neither violations of existing KPDES standards nor adverse water quality impacts from the proposed project would be expected.

SOIL/GROUNDWATER: Prior study has documented that heavy groundwater withdrawal by industries in the Carrollton area actually induces infiltration from the Ohio River. Pumping by Dow Corning to support current operations induces such flow from the Ohio River. Further, Dow Corning has developed Spill Prevention Control and Countermeasure, Groundwater Protection, and Best Management Practice Plans that would also apply to the construction and operation of the proposed engineering-scale facility. There are no concerns about groundwater contamination impacts of the proposed action because construction activities would not reach groundwater levels, and the chance of an accidental chemical release would be small due to the existing environmental protection plans.

WETLANDS: Consultation with the U.S. Fish and Wildlife Service and consideration of soil types comprising the Dow Corning property indicates a very low likelihood of wetland encroachment by the proposed action.

FLOODPLAINS: The 100-year flood elevation near the project site is approximately 469.6 feet above sea level. The approximate top of ground site elevation is around 485.0 feet above sea level. All plant construction would be above this elevation and should not be affected by reasonable flood elevation such as the 100-year flood.

SOLID WASTE: Over the duration of the proposed action, approximately 170 cubic feet of solid waste would be generated. Miscellaneous construction waste debris would consist of wood, concrete, paper, and other garbage. During process operations, office waste, which would also be non-hazardous, would be generated. All of this solid waste would be aggregated with other non-hazardous waste from

Dow Corning's Carrollton plant, collected by the municipal waste hauler for Carrollton County, and transported to the Colerain landfill in Cincinnati, Ohio.

Dow Corning routinely recycles a variety of solid waste materials, including mixed office paper, cardboard, scrap steel, containers, aluminum, glass, motor oil, plastics, and wood pallets. All such waste materials produced during construction and operation of the proposed unit would be recycled.

HAZARDOUS WASTE: The materials to be used as process inputs would be methane, oxygen, and hydrogen chloride gases, while process outputs would be methyl chloride, and byproducts consisting of: methylene chloride, chloroform, and trace amounts of carbon tetrachloride. A commercially marketed catalyst consisting of metals on an alumina support would be used to promote chemical reaction of methane, oxygen, and hydrogen chloride to produce methyl chloride.

All hazardous materials that may pose disposal problems would be handled through the use of closed loop systems. These include the heat transfer fluids used in the OHC process, as well as the absorbent hydrocarbon solvent used to recover the chlorinated products and byproducts. In the latter case, the solvent would subsequently be stripped of the chlorinated products and recycled to the separation stage in a closed loop operation.

In addition, chemical reaction of the feed gases (methane, oxygen, and hydrogen chloride) over the process catalyst would be performed in a closed system. After separation of the products and byproducts, unreacted gases would be recycled for subsequent processing over the catalyst. Methyl chloride product (at a maximum production rate approximately 900 lbs/hr) would be separated from the three other chlorinated byproducts (methylene chloride, chloroform, and carbon tetrachloride which would have maximum production rates of 322.5, 26.6, and 3.1 lbs/hr, respectively) through distillation, temporarily stored, and pumped for use in other chemical manufacturing operations at the Carrollton plant.

Over the life of the proposed project, approximately 5,000 pounds of spent catalyst would be produced. It would characterized for its composition and then transported to a commercial organization specializing in catalyst processing for reclamation of metal values.

SAFETY AND HEALTH: Primary safety and health hazards would be fire and chemical exposure hazards associated with the raw material feeds (methane, oxygen, and hydrogen chloride gases) and reaction products (methyl chloride gas and methylene chloride, chloroform, and carbon tetrachloride liquids). Since handling and processing of these materials represent activities that have been historically and safely employed in Dow Corning's chemical manufacturing plant at Carrollton,

existing approaches for averting risk would be utilized and are deemed adequate for risk control at the engineering-scale development unit.

At the construction stage, a material control system would be used to ensure that documentation for all construction materials is received, that the supplied documentation appropriately demonstrates consistency of construction materials with design specifications for manufacturing, and that construction materials meet process design requirements.

Dow Corning maintains an on-site emergency response program and capability that precludes the need for responders from off-site emergency management organizations; this capability has been recognized by local planning and emergency response officials and sufficiently coordinated with local organizations such that the Carrollton plant's capabilities have been used for off-site safety response efforts.

ACCIDENTAL RELEASES: Natural gas would be supplied to the development unit from an existing pipeline supply to the Carrollton plant and purified on-site to separate methane for process feed. Non-methane components separated from the natural gas would be sent to an existing boiler house for steam generation. The methane would be stored as liquid in a 15,000 gallon cryogenic storage tank.

Hydrogen chloride gas would be delivered to the development unit by tube trailer.

Industrial grade liquid oxygen would be delivered to the development unit and stored in a 15,000 gallon cryogenic storage tank.

Methyl chloride produced from the development unit would be pumped directly into existing storage tanks for use in chemical manufacturing operations at the Carrollton plant. The by-product stream (91.6% methylene chloride, 7.5% chloroform, and 0.9% carbon tetrachloride) would be pumped directly into a rail car storage tank for market delivery.

Based on the similarities between development unit materials and materials currently handled at the Carrollton plant, and the small sizes of storage operations, procedures for handling accidental releases would be similar to those that currently exist at the Carrollton plant and would be adequate for risk control for the proposed project. The development unit would be constructed in an open environment and not enclosed within a building structure, thus providing a method for natural ventilation to dissipate any fugitive releases of process gases that might occur. In-plant monitors would be used to detect such releases, and procedures for evacuation and emergency response in the event of a release of methane, hydrogen chloride, or chlorinated reaction product would be employed.

ENVIRONMENTAL JUSTICE: The proposed action would take place in an area currently zoned for industrial activity. No disproportionately high or adverse impact on minority or low-income communities would be expected from this proposed project.

THREATENED AND ENDANGERED SPECIES: The U.S. Fish and Wildlife Service has been consulted to ensure compliance with the Endangered Species Act and the Fish and Wildlife Coordination Act. This project would not impound, divert, deepen, control, or otherwise modify any stream or other body of water; adverse impacts to fish, plant, or wildlife species would not be anticipated. Endangered species collection records do not indicate that any federally listed or proposed endangered or threatened species occur within the impact area of the project.

CULTURAL RESOURCES: Consultation with the State of Kentucky's Historic Preservation Office under the National Historic Preservation Act has concluded that there would be no effect on cultural resources or historic properties listed in or eligible for listing in the National Register of Historic Places.

NOISE: Increased noise levels would be expected from the machinery used for installation of process equipment and vehicle operations during construction, but these increases would be localized and sporadic. The equipment used during operation of the engineering-scale facility would be typical of that used for chemical processing units. Any additional noise load relative to Dow Corning's existing production plant would be very small. However, industrial hygiene personnel monitor the processes and procedures regularly for possible noise concerns, and employee exposure is limited.

POLLUTION PREVENTION: Dow Corning set a goal to reduce its toxic releases within the U.S. by 75% in the year 2000 compared to 1988 levels, with voluntary commitments to the U.S. Environmental Protection Agency under the 33/50 Voluntary Reduction Program and the Clean Air Act Early Reduction Credit Program. Compared to 1988 baseline levels, Dow Corning has exceeded its goal of 75% reduction of toxic air pollutants, having achieved 90% reduction as of 1994. In addition to these initiatives, the proposed OHC facility would avoid the bulk transportation of methanol, a flammable liquid, by using domestic supplies of methane. Finally, the absorber/stripper technology developed as part of the OHC process would be expected to reduce VOCs from other industrial processes by up to 98%.

SOCIOECONOMICS: During construction, between 20 and 50 jobs would be created in the Carrollton community. The construction positions would be filled by local laborers. These temporary jobs would have a minimal, but positive impact on the local employment and economy. Once constructed, the unit would be operated by trained operators and qualified engineers drawn from Dow Corning's existing workforce, and no impact on the local employment and economy would be expected.

LONG-TERM AND CUMULATIVE IMPACTS: The proposed Department of Energy action would result in testing of the Oxyhydrochlorination (OHC) process for a period of 23 months, during which time the proposed facility would be on-line approximately 50% of the time. If the project is successfully completed, the engineering-scale facility would be maintained in an operational condition, producing methyl chloride for use at Dow Corning plant. No other large-scale projects are proposed at the Carrollton plant that, in conjunction with the OHC project, would create adverse cumulative impacts.

ALTERNATIVES CONSIDERED: In addition to the proposed action, the no-action alternative was considered. Under the no-action alternative, DOE would not provide funding for the development of the OHC process. There are no other practical alternatives to the proposed demonstration project because an existing, developed site within a commercial production plant employing comparable operations and capable of easily handling products and discharges would be used. Constructing the facility at another site would involve unnecessary monetary expenditures and would probably result in greater impacts to the natural and human environment.

PUBLIC AVAILABILITY: This FONSI, and the EA on which it is based, will be distributed to all persons and agencies known to be interested in or potentially affected by the proposed action. Additional copies of the FONSI and EA may be obtained from the Pittsburgh Energy Technology Center.

DETERMINATION: The proposed Federal action, to provide cost-shared financial assistance for demonstration of the OHC process in an engineering scale facility, does not constitute a major Federal action that would significantly affect the quality of the human environment as defined by NEPA. This conclusion is based on the analyses contained in the EA. Therefore, an Environmental Impact Statement is not required and DOE is issuing this FONSI.

ISSUED IN PITTSBURGH, PA, this 27th day of September, 1996

Sun W. Chun
Director
Pittsburgh Energy Technology Center

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LIST OF ACRONYMS AND ABBREVIATIONS

CAA	Clean Air Act
CCl_4	Carbon Tetrachloride
$CHCl_3$	Chloroform
CH_2Cl_2	Methylene Chloride
CH_3Cl	Methyl Chloride
CH_4	Methane
CO	Carbon Monoxide
CO_2	Carbon Dioxide
DOE	U.S. Department of Energy
EA	Environmental Assessment
FE	Office of Fossil Energy
ft	feet
GRI	Gas Research Institute
HAP	Hazardous Air Pollutant
HCl	Hydrogen Chloride
H_2O	Water
KPDES	Kentucky Pollutant Discharge Elimination System
lbs	pounds
lbs/yr	pounds per year
NEPA	National Environmental Policy Act
NGVD	National Geodetic Vertical Datum
NO	Nitrogen Oxide
NO_2	Nitrogen Dioxide
OHC	Oxyhydrochlorination
ORSANCO	Ohio River Valley Water Sanitation Commission
OSHA	Occupational Safety and Health Administration
OVWB	Ohio Valley Waterbody
PM_{10}	Particulate Matter (less than 10 microns)
SO_2	Sulfur Dioxide
VOC	Volatile Organic Compounds

1.0 PURPOSE AND NEED

1.1 U.S. Department of Energy's (DOE's) Purpose

DOE's natural gas mission, in partnership with its stakeholders, is to undertake and promote activities to maximize the Nation's ability to supply, transport, and use natural gas to encourage economic growth, enhance energy interests security, and improve the environment.[1] In implementing this mission, DOE has been involved in promoting domestic natural gas as a clean, abundant, and reliable source of energy. In particular, DOE is interested in technologies capable of converting natural gas to other valuable resources, such as transportation fuels, hydrogen, and premium chemicals. The purpose of the proposed action is to further examine the potential of one such technology for natural gas conversion.

Over the past five years, DOE's Pittsburgh Energy Technology Center has supported a research program to determine the feasibility of producing methyl chloride (CH_3Cl), a key ingredient used in the silicone industry, directly from methane (the primary component of natural gas) via an oxyhydrochlorination (OHC) process. As a result of this research program, funded through cost-sharing by DOE, Dow Corning Corporation, the Gas Research Institute (GRI), and Texas Gas Transmission Company, the OHC process is now ready for further development. The proposed action, which would be funded by DOE, Dow Corning, and GRI, would advance the OHC natural gas conversion technology to an integrated engineering-scale process at the Dow Corning plant in Carrollton, Kentucky.

The benefits of developing such an economically viable natural gas conversion process are numerous. Successful development of the OHC technology would encourage economic growth; it would create manufacturing jobs, as well as improving U.S.competitiveness in a rapidly advancing global economy. Commercialization of the OHC technology could result in a savings of approximately $100 million per year for the Nation's silicone industry. Its competitive production costs are advantageous in that a potential opportunity for export growth also exists. Similar savings could also be achieved for byproducts of the technology, such as methylene chloride, chloroform, and carbon tetrachloride. Similarly, OHC technology could help to reduce the trade deficit resulting from methanol imports by approximately $600 million per year.[2] In addition, the OHC technology could enhance energy interests by increasing utilization of an abundant domestic resource and would assure an energy sector that is diverse in fuel usage. Finally, demonstration of the OHC technology could result in improvements to environmental quality since the product separation process to be developed as part of the technology has the potential for more effectively capturing volatile organic compounds (VOCs) using a technique that has broad applicability in chemical process industries, which are major sources of VOC emissions.

1.2 Project Purpose

The purpose of the proposed project is to advance OHC technology to an integrated engineering-

scale process. The primary objective of the proposed action is to test the engineering-scale process for producing CH_3Cl directly from methane, the primary component of natural gas, rather than from methanol, which must be imported. OHC involves reacting methane with oxygen and hydrogen chloride (HCl) using highly selective, stable catalysts in a fixed-bed reactor. Unconverted methane, light hydrocarbons, and HCl are recovered and recycled back to the OHC reactor, which improves overall process economics. Methylene chloride, chloroform, and trace amounts of carbon tetrachloride are formed as byproducts.

1.3 DOE's Need for Action

While Dow Corning intends to use the CH_3Cl converted from natural gas for the manufacture of silicones, DOE's interest in the OHC process is to use the CH_3Cl to produce liquid transportation fuels. Because the OHC technology utilizes domestic natural gas as a feedstock and thereby provides a reliable, low cost source of CH_3Cl independent of methanol, considerable savings may be achievable.

1.4 DOE's Decision

The decision to be made by DOE is whether to provide cost-shared support for engineering-scale development of OHC technology based on the potential impacts evaluated in this Environmental Assessment (EA).

1.5 Public Participation

Information describing the proposed action and opportunities to comment were provided to the public by placing public notice requesting comments on the draft Environmental Assessment (EA) in the local newspapers. Copies of the draft EA were placed in the Carrollton Public Library and the Carroll County Courthouse for public review. In addition, the EA was circulated to the State of Kentucky's Single Point of Contact and various other government agencies for comment.

1.6 Scope of Environmental Assessment

This EA was prepared in accordance with the Council on Environmental Quality's regulations implementing the National Environmental Policy Act (NEPA) and with DOE NEPA Guidelines. The scope of the EA was determined after reviewing the proposed technology, the scope of engineering-scale facility development, the extent of testing that was proposed for the Dow Corning plant in Carrollton, Kentucky, and all available environmental information relating to the site. The parameters examined were: air emissions, noise level, soil and ground water contamination, fugitive emissions, accidental releases, truck traffic, solid waste generation and disposal, production and use of hazardous substances, pollution prevention, threatened and endangered species, historical and cultural resources, floodplains and wetlands concerns, water resources, health and safety, environmental justice issue, socioeconomics, and long-term and cumulative impacts. Key issues for the proposed action were: air emissions, waste handling, and health and safety.

2.0 PROPOSED ACTION AND NO-ACTION ALTERNATIVE

This section describes the proposed action, the no-action alternative, and other alternatives, focusing on how their environmental impacts differ.

2.1 Proposed Action

The proposed action is the establishment of a cooperative agreement between DOE and Dow Corning to partially fund the engineering-scale development of the OHC process, which involves reacting methane with oxygen and HCl in a fixed-bed reactor to produce CH_3Cl, an important feedstock for the silicone industry. The scope of the proposed action would be construction, operation, and evaluation of an engineering-scale OHC facility, to determine the technical and economic feasibility of this unique concept. Optimum reactant ratios, temperatures, and pressures would be identified to maximize conversion, selectivity, and lifetime of the catalyst. The fixed-bed reactor design would be evaluated to determine if satisfactory performance is being achieved, or if an alternative reactor design is necessary. Dow Corning would obtain design, scale-up, and cost data in order to conduct a process economic evaluation. Successful development of the OHC technology would enhance the commercial acceptability of this natural gas conversion process, and the product separation technology planned for use in capturing volatile organic compounds (VOCs) would be marketable to other chemical process industries.

The engineering-scale facility would be constructed on a one-quarter acre plot of land within Dow Corning's 1,400-acre industrial site at Carrollton, Carroll County, Kentucky (see Figure 1). At this site, CH_3Cl, an intermediate material in the manufacture of silicones, solvents, agrochemicals, shampoos, detergents, paint additives, and fibers, is produced by reacting methanol with HCl. In the proposed facility, production of CH_3Cl by reacting methane with HCl and oxygen in a new chemical processing unit would be tested. The proposed concept would build on previous research performed by Dow Corning at a smaller scale. The CH_3Cl produced by the proposed facility would be added to the CH_3Cl currently produced in the plant and processed in existing reactors for subsequent conversion to marketed products.

The proposed facility would be designed to process approximately 1,000 standard cubic feet per minute (scfm) of methane. It would involve the construction and installation of a fixed-bed reactor consisting of 1,600 one-inch diameter by 6-ft tubes, an absorber system (a glass-lined absorber column and phase separator), a stripper system (a stripper column and phase separator), and a distillation train to purify the CH_3Cl. Methane, oxygen, and HCl gases would be introduced into the reactor tubes, where chemical conversion would occur over a proprietary catalyst. Process flow diagrams are provided as Figures 2a., 2b., 2c., and 2d. Operational testing of the facility would occur over a 23-month period, during which time the proposed facility would be on-line approximately 50% of the time. Operational testing would be performed under a variety of conditions to establish sufficient data for performing technical and economic viability assessments.

Figure 1. Site Plan of Dow Corning Production Plant

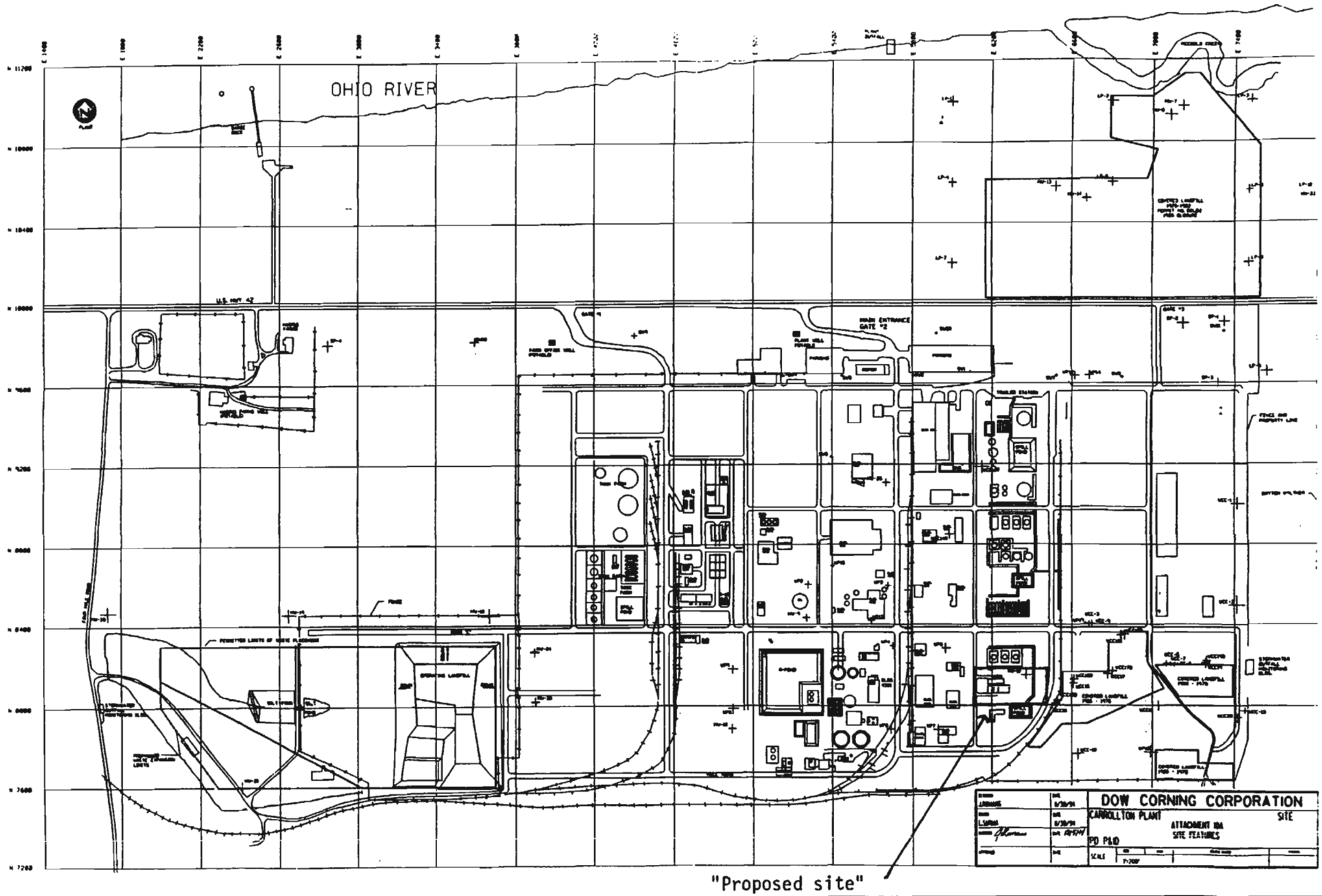
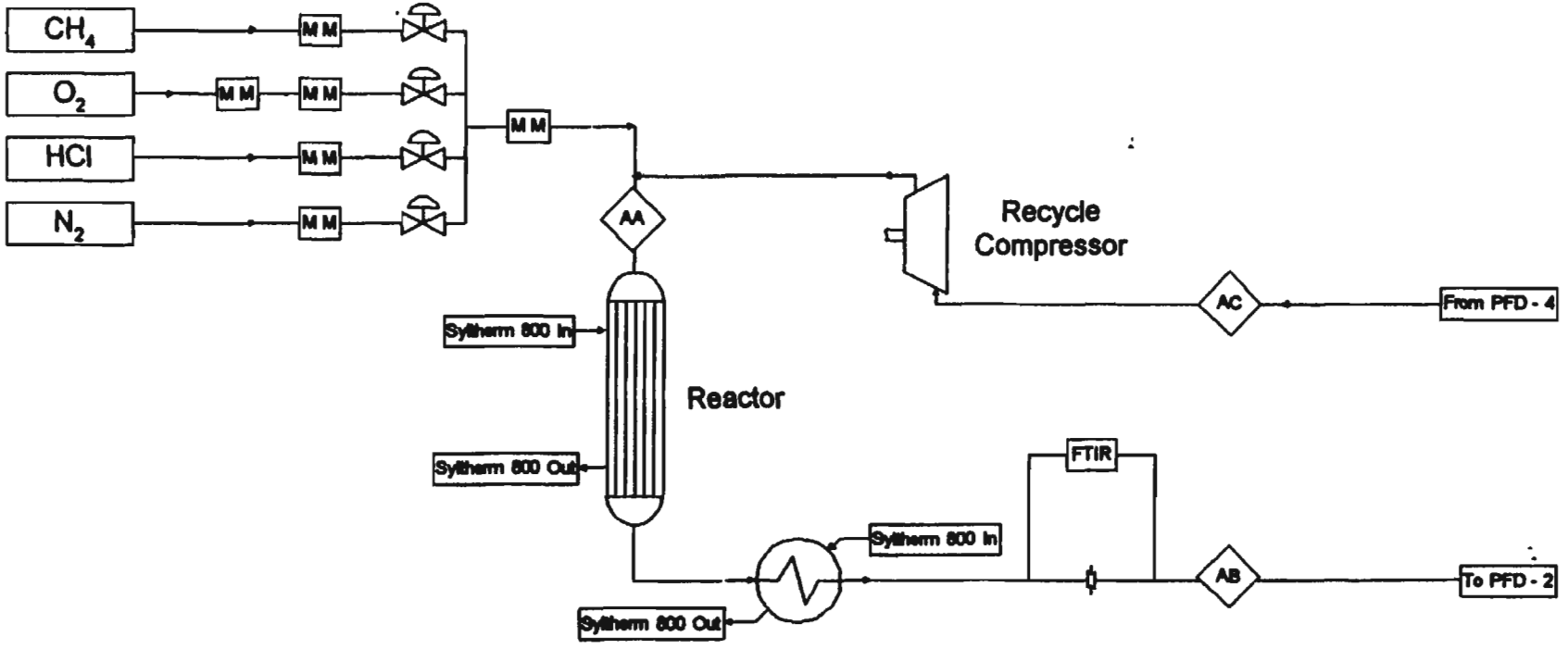


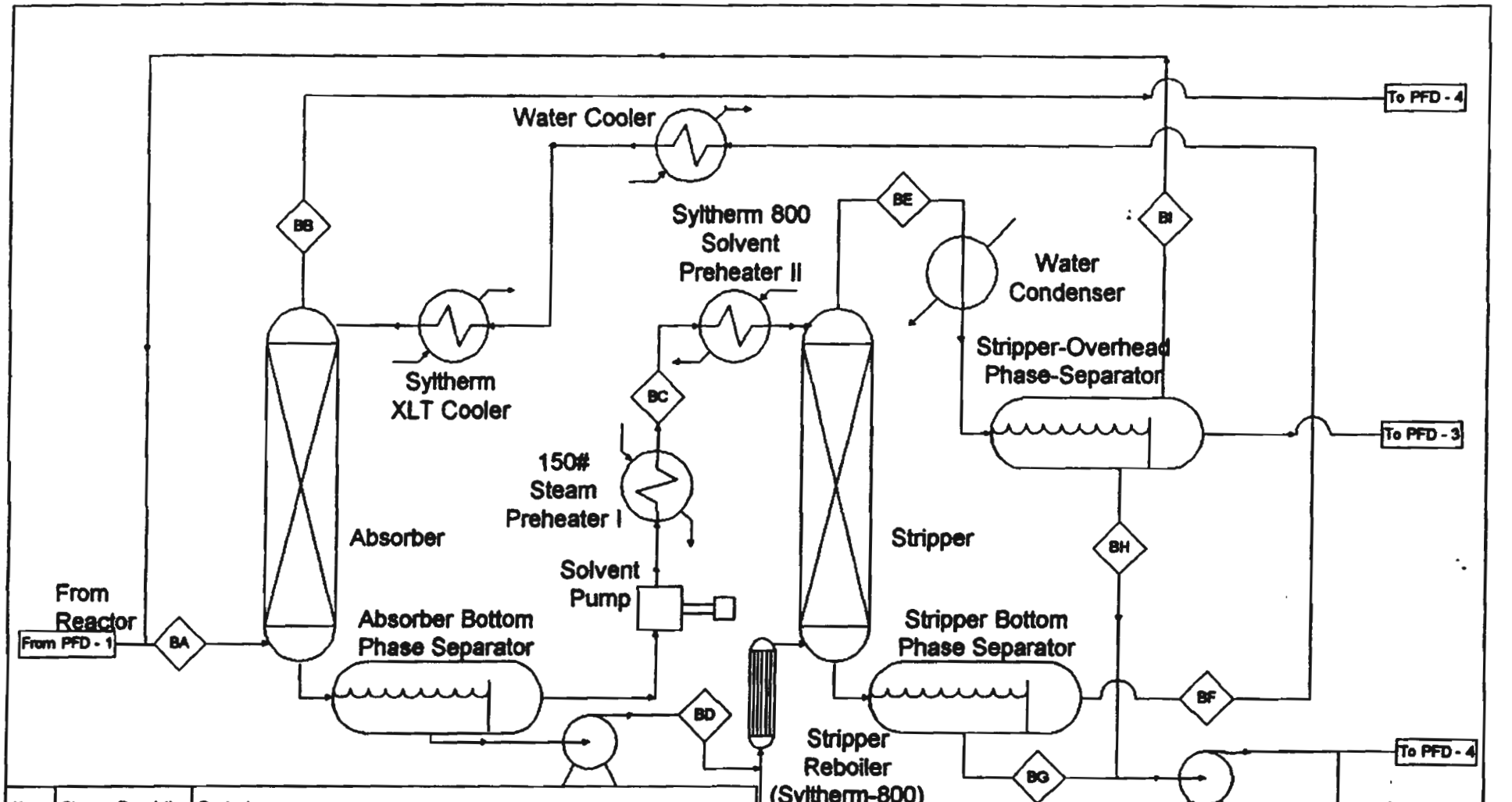
Figure 2a.



Key	Stream Description	Contents
AA	Reactor Inlet	CH_4, O_2, N_2, Trace (CH_3Cl, CH_2Cl_2, $CHCl_3$, CCl_4, HCl, H_2O), CO2, CO
AB	Reactor Outlet	CH_4, HCl, O_2, N_2, CH_3Cl, CH_2Cl_2, $CHCl_3$, Trace CCl_4, CO_2, CO, H_2O
AC	Absorber Recycle	CH4, O2, N2, Trace (CH3Cl, CH2Cl2, CHCl3, CCl4, HCl, H_2O) CO, CO_2

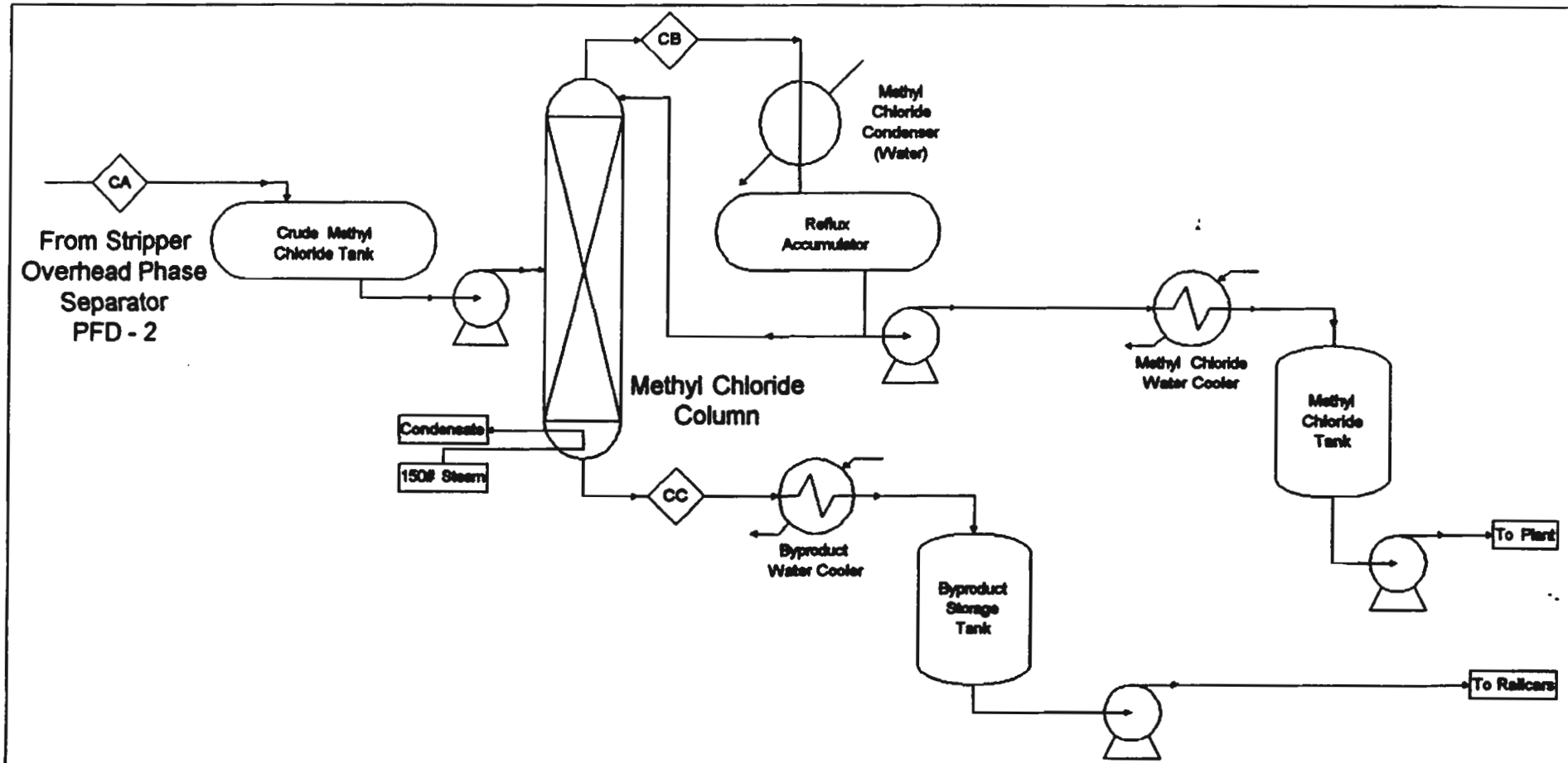
Dow Corning Corporation
Oxyhydrochlorination of Methane
Reactor System
Process Flow Diagram
PFD - 1

Figure 2b.



Key	Stream Description	Contents
BA	Absorber Inlet	CH4, HCl, O2, N2, CH3Cl, CH2Cl2, CHCl3, Trace CCl4, CO, CO2, H2O
BB	Absorber Outlet	CH4, HCl, O2, N2, Trace (CH3Cl, CH2Cl2, CHCl3, CCl4), CO2, CO
BC	Stripper Inlet	Solvent, Trace (CH4, HCl), CH3Cl, CH2Cl2, CHCl3, Trace CCl4,
BD	Abs Bot Outlet	H2O, HCl Trace (CH3Cl, CH2Cl2, CHCl3, CCl4)
BE	Stripper Outlet	H2O, Trace (CH4, HCl), CH3Cl, CH2Cl2, CHCl3, Trace CCl4,
BF	Solvent Recycle	Solvent, Trace (CH3Cl, CH2Cl2, CHCl3, CCl4)
BG	Strp Bot Outlet	H2O, HCl, Trace (CH3Cl, CH2Cl2, CHCl3, CCl4)
BH	Strp Ovhd Outlet	H2O, HCl, Trace (CH3Cl, CH2Cl2, CHCl3, CCl4)
BI	Stripper Vent	Trace (CH4, HCl, CH3Cl, CH2Cl2, CHCl3, CCl4)

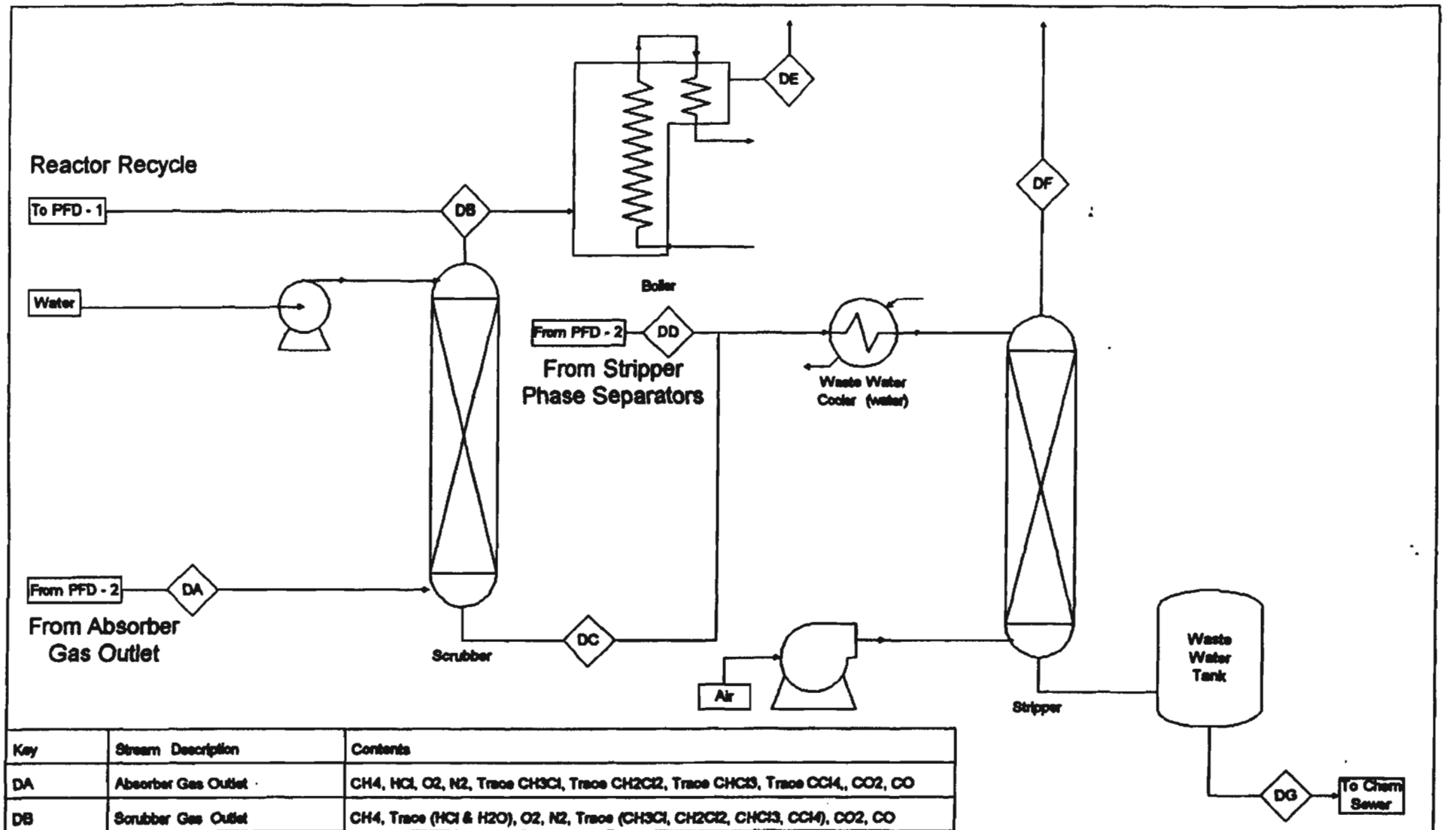
Dow Corning Corporation
Oxyhydrochlorination of Methane
Absorber/Stripper System
Process Flow Diagram
PFD - 2



Key	Stream Description	Contents
CA	Crude Methyl Chloride	CH_3Cl, CH_2Cl_2, $CHCl_3$, Trace CCl_4
CB	MeCl Column Overhead	CH_3Cl, Trace CH_2Cl_2, Trace $CHCl_3$, Trace CCl_4.
CC	MeCl Column Bottom	Trace CH_3Cl, CH_2Cl_2, $CHCl_3$, Trace CCl_4.

Dow Corning Corporation
Oxyhydrochlorination of Methane
Product Purification System
Process Flow Diagram
PFD - 3

Figure 2d.



Key	Stream Description	Contents
DA	Absorber Gas Outlet	CH4, HCl, O2, N2, Trace CH3Cl, Trace CH2Cl2, Trace CHCl3, Trace CCl4,, CO2, CO
DB	Scrubber Gas Outlet	CH4, Trace (HCl & H2O), O2, N2, Trace (CH3Cl, CH2Cl2, CHCl3, CCl4), CO2, CO
DC	Scrubber Liquid Outlet	H2O, HCl, Trace CH3Cl, Trace CH2Cl2, Trace CHCl3, Trace CCl4
DD	Stripper Phase Separator Outlets	H2O, HCl, Trace CH3Cl, Trace CH2Cl2, Trace CHCl3, Trace CCl4
DE	Boiler Vent	CO2, CO, H2O, Trace (NO_x, HCl)
DF	Stripper Vent	Air, H2O, Trace (CH3Cl, CH2Cl2, CHCl3, CCl4)
DG	Stripper Liquid Outlet	H2O, Trace (CH3Cl, CH2Cl2, CHCl3, CCl4)

Dow Corning Corporation
Oxyhydrochlorination of Methane
Environmental Systems
Process Flow Diagram
PFD - 4

2.2 Process Description

The Dow Corning OHC facility would involve a system of reactors, scrubbers, product separation units, and distillation column (see Figures 2a., 2b., 2c., and 2d.). At the inlet to the proposed engineering-scale unit; methane (CH_4), oxygen, and HCl would be fed to a downflow reactor where the CH_4 would convert primarily to methyl chloride (CH_3Cl). Syltherm 800, a heat transfer fluid, would be used to control the operating temperature of the reactor. The heat transfer fluid would recirculate between the reactor jacket containing the catalyst-filled tubes and a chiller. The exothermic reaction would result in the production of CH_3Cl, methylene chloride (CH_2Cl_2), chloroform ($CHCl_3$), trace amounts of carbon tetrachloride (CCl_4), and steam (H_2O). Unconverted methane would be recycled back to the reactor following removal of condensible products. The reactor product would be cooled and then sent into the absorber column of the product recovery unit. In the absorber column, a proprietary solvent would absorb the preferred product, CH_3Cl, and the chlorinated byproducts, while the absorber effluents (unconverted methane and trace quantities of CH_2Cl_2, $CHCl_3$, and CCl_4) would be removed and sent to a venturi scrubber. Methane gas and other oxygenates would leave the top of the scrubber and be recycled with fresh methane, oxygen, and HCl at the inlet of the reactor unit. A purge stream of the CH_4 and oxygenates would be sent to an existing steam generating boiler in order to recover the heating value of the methane and to prevent the accumulation of oxygenates in the recycle loop. The scrubber effluents (containing trace quantities of CH_2Cl_2, $CHCl_3$, and CCl_4) would be sent to the existing wastewater treatment system.

The solvent, containing CH_3Cl and traces of other chlorocarbons, would enter the absorber for separation of organic and aqueous phases. Wastewater containing some chlorocarbons would discharge from the bottom of the absorber, enter a surge tank, and then be sent to waste treatment. The wastewater would be treated in a scrubber, a portion of the emissions would be vented, and the remainder would be sent to a chemical sewer. Solvated CH_3Cl would leave the absorber column, pass through a stripper preheater, and then enter the stripper column. The product would be steam-stripped from the solvent and leave the column to enter an overhead condenser. The heated solvent would leave the bottom of the column, enter the stripper bottom-phase separator (where heat would be recovered), and then be sent to a cooler and a sylthern chiller before recycling back to the absorber column.

The condensed CH_3Cl would enter a holding tank and then be fed to a distillation column. Purified CH_3Cl would be condensed and sent to a reflux accumulator and finally sent to a storage tank dedicated to hold pure CH_3Cl. The byproduct stream, containing CH_2Cl_2, $CHCl_3$, and CCl_4, would be cooled and sent to a crude CH_3Cl storage tank.[3]

2.3 No-action Alternative

Under the no-action alternative, DOE would not provide partial funding for the design, construction, and operation of the test facility. As a result, it is unlikely that this new technology, which has been researched by Dow Corning over the past five years with partial DOE support, would be further developed in the near future. This would preclude the near-term opportunities for replacing methanol

use in the production of CH_3Cl.

Since a significant quantity of methanol used in the United States is imported and natural gas is a lower cost material in plentiful domestic supply, opportunities for lower cost production of CH_3Cl, which will have an estimated consumption level of nearly 2 billion pounds in 1996, would not be further tested. Also, environmentally improved technology for product recovery, which could be applied to other industrial processes for capturing up to 98% of VOC emissions from waste streams, would not be examined.

2.4 Alternative Sites

There are no other practical alternative sites for the proposed project as suitable as the one proposed. Prior research was performed at the Carrollton facility, and therefore this appears to be a logical location. In addition, because this is an existing facility, located at a previously disturbed, industrial site, it is anticipated that environmental impacts would be minimal. Constructing the engineering-scale facility at an undisturbed site would be expected to produce far greater impacts to the human environment.

2.5 Summary of Impacts

The proposed engineering-scale facility would be constructed on a one-quarter acre plot of land within Dow Corning's 1,400-acre industrial site at Carrollton, Carroll County, Kentucky (see Figure 1). Construction of the facility would not be expected to result in significant impacts to the human environment. Minimal air emissions would be anticipated as a result of vehicular exhausts and fugitive dust from site excavation. Construction would not encroach upon any floodplains. There are no concerns about groundwater contamination since no construction would reach groundwater levels and since the proposed project would add less than one percent to current process water output, all of which would be treated within existing facilities. In addition, all construction-related waste would be non-hazardous (e.g., wood, concrete, and paper). A material control system would be used to ensure that documentation of all construction materials is received, and meets design specifications and requirements. Increased noise levels would result from machinery, installation of process equipment, and vehicle operations during construction.

During operation of the engineering-scale facility, no substantial change in air emissions would be expected to occur; in fact the absorber-stripper technology that Dow Corning would be demonstrating is expected to be capable of reducing VOC emissions by up to 98%. Primary safety and health hazards would be fire and chemical exposure, created by handling of the methyl chloride gas and methylene chloride, chloroform and carbon tetrachloride liquids; Dow Corning has performed methane-oxygen flammability studies and would operate outside flammability limits.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION

3.1 Affected Environment

The proposed action would take place at Dow Corning's production plant, which is located on U.S. Highway 42, approximately 5 miles from the center of Carrollton, Carroll County, Kentucky. The plant was developed on approximately 200 acres of a 1,400 acre site in 1966. The area is zoned for industrial use; Dayton-Walther Castings Corporation is located directly to the east of the site.

The Ohio River lies northwest of the site and is approximately 3,200 feet from the location of the proposed action. (General information on the Ohio River can be found in Appendix A.) The Dow Corning plant is located on the left descending Ohio River bank at approximately river mile 540.8 (where river mile 0.0 is defined to be at Pittsburgh, Pennsylvania, and river mile 981.0 is at Cairo, Illinois). This location is approximately mid-way between Cincinnati, Ohio, and Louisville, Kentucky. The Ohio River Valley Water Sanitation Commission (ORSANCO) divides the Ohio River into a series of 34 waterbodies for water quality reporting (see Appendix A). Using ORSANCO waterbody identification protocol, one Dow Corning outfall from the production plant currently discharges into Ohio Valley Waterbody (OVWB) 23 (which includes river miles 531.5-545.8). There are nine other permitted dischargers into this waterbody. Table 1 summarizes OVWB 23 in terms of the ratings, causes, and potential sources of problems. The nearest public water intakes are located at Ohio River miles 463.2 (77.6 miles upstream) and 594.2 (53.4 miles downstream).

Waterbody OVWB 23 lies within a larger reach (Ohio River Miles 436.2 to 606.8) that was cited by ORSANCO as having depressed 'modified index of well being' levels (numerical representation of species diversity, total numbers of fish, and total fish biomass). The inflow from urban runoff and combined sewer overflows from the greater Cincinnati area (mile 462) and the Great Miami Basin (mile 491.1), and chronic problems at a sewage treatment plant in Cincinnati, were cited[4] as reasons for this but priority organics were not mentioned.

The Dow Corning plant is situated upon alluvial deposits of sand and gravel of Pleistocene age underlain by limestone bedrock of Ordovician age.[5] Soil series in the project area include Ashton, Wheeling, and Woolper.[6] The thickness of the alluvium in the Carrollton area is about 100 feet and the depth to water below land surface in this general area is approximately 60 feet. Industrial pumping in this area causes excessive drawdown in local pumping areas and induced infiltration from the Ohio River.[7] There are seven groundwater monitoring wells on the site, which are owned and operated by Dow Corning; none are directly adjacent to 1/4-acre project area. There are also two gas wells located on the site, southwest of the project area. The structures that would be adjacent to the proposed project area are Dow Corning's existing processes and building.[8]

The existing air quality in the vicinity of the proposed project is good. The Carrollton area is in attainment with National Ambient Air Quality Standards for ozone, sulfur dioxide (SO_2), particulate matter less than ten microns (PM_{10}), carbon monoxide (CO), and nitrogen dioxide (NO_2).[9] In

addition, Dow Corning monitors the criteria pollutant emissions from the existing production facilities, all of which achieve compliance with air quality standards (See Table 2).

TABLE 1
OHIO RIVER WATERBODY 23
USE RATINGS, CAUSES, AND POTENTIAL SOURCES OF PROBLEMS
ORSANCO (1992-1993)[10]

Use	Fully Support	Partial Support	Not Support	Causes	Potential Sources
Warm Water Aquatic	X	-	-	-	-
Contact Recreation	(*)	X	-	Pathogens	Combined Sewer Overflow, Urban Runoff
Public Water Supply	-	X	-	Pesticides	Agricultural Runoff
Fish Consumption	(*)	X	-	Chlordane/ PCBs	Nonpoint (Unknown)

(*)No Ohio River Waterbody was rated for full support for these uses.

TABLE 2
AIR EMISSIONS CURRENTLY GENERATED AT THE DOW CORNING PRODUCTION PLANT [11]

Criteria Pollutant	**Quantity Currently Generated at Facility (lbs/yr)**
NO_x	540,000
PM_{10}	24,000
SO_2	1,000
CO	69,000
VOC	124,000

Project activities would occur on approximately 1/4 acre of existing site, with little effect on the area, since the land use would be consistent with current utilization. The area consists of naturally compacted alluvium over glacial deposits of sand and gravel. Located east and southeast of the proposed project area are three covered landfills that were in operation from 1966 to 1975. The engineering-scale facility would be constructed near a tank farm used for storing and transferring chemicals, as well as adjacent to existing production facilities. These production facilities are currently used to produce dimethyldichlorosilane, which is then hydrolyzed to form dimethylsilicones. Additionally, there are facilities for distilling methylchlorosilanes and for producing CH_3Cl.

3.2 Alternative 1 - No-Action Alternative

The no-action alternative assumes that the current level of activity at the site will continue unchanged, that is, producing CH_3Cl from methanol. As a result, no new impacts to the existing environment are anticipated from the no-action alternative, but the existing impacts of CH_3Cl to air quality and the impacts of introducing methanol to the wastewater would continue.

3.3 Alternative 2 - The Proposed Action

3.3.1 Air Emissions

The primary sources of air emissions during the construction phase of the project would be vehicular exhaust emissions, such as from construction equipment, as well as "fugitive" particulate emissions. The latter emissions would be generated primarily by wind erosion during site excavation. However, construction would not involve moving large quantities of earth because the site is one-quarter acre in size and would not require recontouring. The site has gravel cover and precautions, such as watering, would be taken to eliminate dust generation. There would be shallow excavations for equipment foundations, but no other earthmoving activities would occur.

In terms of Clean Air Act (CAA) compliance, Dow Corning has a significant number of air permits for the various activities that occur onsite. Because the facility has a federally enforced plant-wide hazardous air pollutant (HAP) limit, any new emission points associated with the engineering-scale facility will need to be registered, and relevant permits modified accordingly. The Kentucky Department of Environmental Protection has received notification of the proposed action, and Dow Corning intends to submit their Title V application under the CAA Amendments early. It is intended to cover each air emission source, each pollutant, and each regulatory requirement pertinent to their entire production plant. It has not been determined how the proposed action would be covered under the Title V application, i.e., whether it would require a new permit or whether an existing air permit would be modified to include the proposed action.[12]

Table 3 provides the estimated emissions from operation of the engineering-scale facility, and illustrates that no substantial change in air emissions would result from its operation. On the contrary, if the operation of the facility is successful, a proprietary absorber-stripper technology developed by Dow Corning would be demonstrated for reducing VOCs by up to 98%. A purge stream on the absorber effluent would still be necessary since oxygenates would accumulate in the recycle loop; the purge stream would be incinerated to recover the heat value of the unconverted methane. As an example, if a purge fraction of 10% were necessary, it would consist of: 89% methane, 6.6% oxygen, 1% carbon monoxide, 3.3% carbon dioxide, and trace amounts of HCl and chlorocarbons. This stream would be incinerated in the flame-zone of a steam generating boiler with at least 98% reduction of VOCs.[13]

TABLE 3
ANTICIPATED EMISSIONS FROM CONSTUCTION AND OPERATION
OF THE ENGINEERING-SCALE FACILITY[14]

Pollutant	**Quantity Resulting from Facility Operation (lbs/yr)**
CO_2	3,430,000.00
NO	16,000.00
NO_2	63.00
H_2O	2,670,000.00
CH_3Cl	469.00
CH_2Cl_2	47.00
$CHCl_3$	4.00
CCl_4	0.50
HCl	325.00
PM_{10}	380
SO_2	40
CO	580
VOC	100
CH_4	60
HAPs	846

During facility operation, leaks in process equipment may result in fugitive emissions of the following: HCl, methyl chloride, methane, solvent, and silicon. These emissions would be minimal.

In addition, Dow Corning has set a goal to reduce its toxic releases within the U.S. by 75% in the year 2000 compared to 1988 levels. They have made voluntary commitments to the U.S. Environmental Protection Agency under both the 33/50 Voluntary Reduction Program and the Clean Air Act Early Reduction Credit Program. Specifically, hazardous air pollutants such as CH_3Cl, CH_2Cl_2, $CHCl_3$, CCl_4, and HCl were targeted for these reductions under the the 33/50 Voluntary Reduction Program. In addition, Dow Corning has committed to major reductions in the hazardous air pollutants, particularly CH_3Cl (methyl chloride), released at its largest U.S. manufacturing facilities under the CAA Early Reduction Credit Program. Consequently, compared to 1988 baseline levels, Dow Corning has exceeded its goal of 75% reduction of hazardous air pollutants, having achieved 90% reduction as of 1994.[15]

3.3.2 Water Quality

Construction of the proposed project is not expected to negatively impact existing surface water or groundwater, nor would there be any new liquid waste streams generated during construction.

Components and quantities of the wastewater anticipated from operation of the engineering-scale facility would be: process water (710,000 gallons or 95,140 cubic feet), hydrochloric acid, methyl chloride, and methylene chloride. The Kentucky Pollutant Discharge Elimination System (KPDES) permit for the existing Dow Corning plant (NPDES No. KY0001279, Carroll County, Kentucky) imposes monthly average and daily maximum discharge limitations for methyl chloride (0.655 lbs/day and 1.446 lbs/day) and methylene chloride (0.304 lbs/day and 0.677 lbs/day). Project waste discharges would be combined with discharges from existing operations and handled and treated within existing facilities. Project discharges would add less than one percent to current process water output.[16] Hydrochloric acid would be lime neutralized and clarified. Existing safeguards, which include sampling of discharges prior to entering the treatment plant, would accommodate project waste products.

Due to the existing treatment system and very low wastewater output from the proposed project, neither violations of existing KPDES standards nor adverse water quality impacts from the proposed project would be expected.

3.3.3 Soil/Groundwater

Prior study has documented that heavy groundwater withdrawal by industries in the Carrollton area actually induces infiltration from the Ohio River.[17] Pumping by Dow Corning to support current operations induces such flow from the Ohio River.[18] As previously mentioned, Dow Corning owns and operates seven groundwater monitoring wells on this

industrial site. Measurements taken from these wells indicate that the top of the water table in the vicinity of the plant is 400-410 NGVD (feet above sea level). Further, Dow Corning has developed Spill Prevention Control and Countermeasure, Groundwater Protection, and Best Management Practice Plans that would also apply to the construction and operation of the proposed engineering-scale facility.[19]

There are no concerns about groundwater contamination impacts of the proposed project for several reasons. Construction activities would not reach groundwater levels, and the chances for accidental chemical release would be small due to the existing environmental protection plans and facilities developed for existing operations.

3.3.4 Wetlands

Consultation with the U.S. Fish and Wildlife Service and consideration of the previous industrial activity and well-draining nature of the soils on the site indicates a remote probability of wetlands on site. Naturally occurring wetlands are not found within well drained soil series because excessive drainage eliminates the potential for wetland hydrology, which is required to maintain a hydrophytic plant community. Therefore, it is anticipated that the proposed project would not impact any wetlands. However, if at any time, it is determined that there is evidence of the potential presence of wetlands in any of the areas subject to impact, in terms of the presence of hydrophytic vegetation, wetland hydrology, and hydric soils[20], the U.S. Army Corps of Engineers would be notified to determine the applicability of Section 404 authorization, if any.

3.3.5 Floodplains

The 100-year flood elevation near the project site is approximately 469.6 NGVD. The approximate top of ground site elevation is around 485.0 NGVD. All plant construction would be above this elevation and should not be affected by reasonable flood elevation such as the 100-year flood.

3.3.6 Solid Waste

Over the duration of the proposed action, approximately 170 cubic feet of solid waste would be generated. Miscellaneous construction waste debris would consist of wood, concrete, paper, and other garbage produced during facility construction. The construction phase would last ten months. All construction waste would be non-hazardous and would be collected for disposal as municipal waste at an off-site permitted landfill. During process operations, office waste, which would also be non-hazardous, would be collected and transported for disposal at the same permitted municipal landfill.

The solid waste would be aggregated with other non-hazardous waste from Dow Corning's Carrollton plant, picked-up by the municipal waste hauler for Carrollton County, and

transported to the Colerain landfill facility in Cincinnati, Ohio.

For the proposed location of the engineering-scale development unit, there are no regulatory requirements for recycling. However, the proposer routinely recycles a variety of solid waste materials, including mixed office paper, cardboard, scrap steel, containers, aluminum, glass, motor oil, plastics, and wood pallets. All such waste materials produced during construction and operation of the proposed unit would similarly be recycled as a pollution prevention measure.

3.3.7 Hazardous Waste

The materials to be used as process inputs for producing methyl chloride would be methane, oxygen, and hydrogen chloride gases. Process outputs would be methyl chloride, the desired product, and byproducts consisting of methylene chloride, chloroform, and trace amounts of carbon tetrachloride. Internal to the process, which would operate as a closed system, a commercially marketed catalyst consisting of metals on an alumina support would be used to promote chemical reaction of methane, oxygen, and hydrogen chloride to the desired product, methyl chloride.

For control of process temperatures (i.e., heating and cooling), two different liquids with the trademark names of Syltherm 800 and Syltherm XLT would be used as heat transfer fluids in closed loop systems. For separation of product and byproducts from process feed materials, an absorbent hydrocarbon solvent would be used to recover the chlorinated product and byproducts. The chlorinated products would subsequently be stripped from the solvent, which would be recycled to the separation stage in a closed loop operation.

During process operations, no waste materials would be produced for handling and disposal as hazardous wastes. Chemical materials that could escape the process through vents on process vessels, as atmospheric releases, or through the process water system subsequent to treatment in the waste water treatment facility, are discussed in the air emission and water quality sections of this Environmental Assessment. Any releases of hazardous substances to air or groundwater would be very small and would not pose any risk to public health or safety.

Chemical reaction of feed gases (methane from natural gas purification, oxygen, and hydrogen chloride) over the process catalyst would be performed in a closed system, where unreacted gases after separation of the products and byproducts are recycled for subsequent processing over the catalyst. Operating conditions of temperature and pressure would be selected based on laboratory and smaller-scale process development work to optimize the production of methyl chloride. The methyl chloride product would be separated from the three other chlorinated products through distillation, temporarily stored, and pumped for use by Dow Corning in other chemical manufacturing operations at the Carrollton plant.

The maximum production rate of methyl chloride from the engineering-scale development unit would be approximately 900 pounds per hour. The flow rates and operating conditions used in a distillation operation for separation of the chlorinated products for methyl chloride recovery would be optimized to produce methyl chloride of required purity for subsequent use.

If, during operational testing, methyl chloride of unacceptable purity would be produced, engineering-scale development unit operations would be suspended until conditions for producing methyl chloride of the desired purity could be determined. Since the production rate of methyl chloride from the engineering-scale development unit would be substantially less than the current rate of methyl chloride production in Dow Corning's Carrollton plant, methyl chloride product that does not achieve the desired purity would be blended with the existing plant's production stream for further use in chemical manufacturing operations without adversely affecting current operations.

At the maximum production rate for methyl chloride, the distillation operation would generate a byproduct stream yielding methylene chloride, chloroform, and carbon tetrachloride at rates of 322.5, 26.6, and 3.1 pounds per hour. These byproducts would be commercially marketed.

During and after operation of the engineering-scale development unit, catalyst would be removed from the reactor and characterized for its composition. During process operations, the activity level of the catalyst for promoting the desired reaction would decline with time. Over the life of the proposed project, approximately 5000 pounds of used catalyst would be produced. While testing would be performed on alternative methods to improve catalyst activity, the bulk of the used catalyst would be transported to a commercial organization specializing in catalyst processing for reclamation of metal values.

3.3.8 Safety and Health

The primary safety and health hazards associated with the proposed action would be fire and chemical exposure hazards created by the raw material feeds (methane, oxygen, and hydrogen chloride gases) and reaction products (methyl chloride gas and methylene chloride, chloroform, and carbon tetrachloride liquids). However, since handling and processing of these materials represent activities that have been historically employed in Dow Corning's chemical manufacturing plant at Carrollton, existing approaches for averting risk would be used and are deemed adequate for risk control for this engineering-scale development unit. Dow Corning has undertaken methane-oxygen flammability studies and would operate outside flammability limits.

Dow Corning is the world's largest user of methyl chloride and is a world leader in designing and operating equipment to handle methyl chloride and corrosive environments for its production. At the Carrollton plant, substantial experience in the safe manufacturing and

handling of methyl chloride has been accumulated. Since the engineering-scale development unit would neither use nor produce materials that are not routinely handled or employed in the commercial operations at the Carrollton plant, procedures for safety and health protection, and experience in their use, are already in place for application to the development unit.

Risks associated with fire hazards and chemical exposure hazards to employees and the public would be minimized and controlled by a combination of adherence to Occupational Safety and Health Administration (OSHA) standards, design of engineering controls into the engineering-scale development unit, development of sound work practices and procedures, and use of administrative controls, including use of personal protective equipment when required. OSHA standards for process safety management of highly hazardous chemicals would be applied for operation of the engineering-scale development unit.

At the initial design stage for the engineering-scale development unit, a systematic evaluation of potential hazards from the chemical manufacturing operations would be performed. Also, a safety audit team would be commissioned to independently ensure that the proposed design meets standards and protects life, health, and investment. An OSHA-required Process Information File would be established.

At the detailed engineering stage, the OSHA-required Process Information File would be updated to incorporate all design changes and pertinent information generated during the detailed design. Also, procedures to receive and control construction materials would be established.

At the construction stage, a material control system would be used to ensure that documentation for all construction materials is received, that the supplied documentation appropriately demonstrates consistency of construction materials with design specifications for manufacturing, and that construction materials meet process design requirements. Also, weekly construction progress meetings would be conducted to review safety items. The engineering-scale development unit would be constructed to comply with prevailing codes. Established engineering standards would be monitored and corrective actions would be taken as necessary to maintain construction quality.

Prior to startup of the engineering-scale development unit, a final check of all safety systems would be performed. The unit would also be subjected to final pressure testing to ensure system integrity.

At the startup stage, all safety audit team and hazard analysis concerns would be addressed and resolved; documentation of actions would be developed prior to startup. Also, safety-critical and quality-critical instruments would be calibrated to a natural standard and placed on a project management system list for periodic performance evaluation and recalibration.

During construction, startup, and operation, routine inspections and audits for project safety

would be performed and documented. A safety audit team would be nominated to monitor construction, review completion, and approve start-up. An evaluation of normal and anticipated abnormal operating conditions would be performed and used to determine appropriate responses to ensure safety; these evaluations and response actions would be documented via standard operating procedures for the engineering-scale development unit and reviewed with a Safety Review Committee, through which site employee input is accepted and analyzed.

For 24-hour per day operation of the development unit, a work schedule of four operating shifts, with one operating engineer per shift, would be required. All four assigned operating engineers would undergo safety training unique to the operations of the development unit.

At the Carrollton plant, material safety data sheets for all process chemicals and materials are maintained in an on-line site-wide electronic data base. The electronic data base is supplemented with hard-copy material safety data sheets unique to particular operations, which are maintained in the areas employing those materials. This same approach would be used at the location of the engineering-scale development unit. Employees at the development unit would be instructed on process materials and on information in the safety data sheets pertinent to materials associated with unit operations.

Emergency conditions (e.g., fires, spills, or leaks) that could arise at the engineering-scale development unit, and the types of materials contributing to potential emergency conditions, would be similar to those that exist elsewhere within the Carrollton plant. Dow Corning maintains an on-site emergency response program and capability that precludes the need for responders from off-site emergency management organizations; this capability has been recognized by local planning and emergency response officials and sufficiently coordinated with local organizations such that the Carrollton plant's capabilities have been used for off-site safety response efforts. This existing capability would be available to the development unit.

3.3.9 Accidental Releases

Based on the similarities between development unit materials and materials currently handled at the Carrollton plant, and the small size of associated storage operations, procedures for handling accidental releases similar to those currently used would be implemented and would be adequate for risk control for the proposed project. The development unit would be constructed in an open environment and not enclosed within a building structure, thus providing a method for natural ventilation to dissipate any fugitive releases of process gases that might occur. In-plant monitors would be used to detect such releases, and procedures for evacuation and emergency response in the event of a release of methane, hydrogen chloride, or chlorinated reaction product would be employed.

Natural gas would be supplied to the development unit from an existing pipeline supply to the

Carrollton plant and purified on-site to separate methane for process feed. Non-methane components separated from the natural gas would be sent to an existing boiler house for steam generation. The methane would be stored as liquid in a 15,000 gallon cryogenic storage tank.

Hydrogen chloride gas would be delivered to the development unit by tube trailer.

Industrial grade liquid oxygen would be delivered to the development unit and stored in a 15,000 gallon cryogenic storage tank.

Methyl chloride produced from the development unit would be pumped directly into existing storage tanks for use in chemical manufacturing operations at the Carrollton plant. The by-product stream (91.6% methylene chloride, 7.5% chloroform, and 0.9% carbon tetrachloride) would be pumped directly into a rail car storage tank for market delivery.

A unique feature of the proposed process would be the presence of hydrogen chloride gas and water vapor in the product stream from the reactor. Contact of the hydrogen chloride with condensed water would cause the formation of corrosive hydrochloric acid. To control such corrosion and prevent process releases, special materials of construction would be used. Decisions on construction materials for the development unit would be determined from corrosion studies performed at a smaller scale prior to design of the development unit. Current expectations are that hastelloy steel for process vessels and piping and teflon for gasket materials would be used to provide adequate protection against corrosive leaks from the development unit.

3.3.10 Environmental Justice

Environmental Justice, as described in Executive Order No. 12898, means the fair treatment and meaningful involvement of all people, regardless of race, ethnicity, culture, income, or education level with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. In order to make all pertinent information about the project available to the public and to assess any environmental justice concerns, the DOE has conducted internal scoping and provided notice in the local newspapers.

The proposed action would take place in an area currently zoned for industrial activity. No disproportionately high or adverse impact on minority or low-income communities would be expected from this proposed project.

3.3.11 Threatened and Endangered Species

The U.S. Fish and Wildlife Service has been consulted to ensure compliance with the Endangered Species Act and the Fish and Wildlife Coordination Act. This project would not impound, divert, deepen, control, or otherwise modify any stream or other body of water. No negative impacts to fish, plant, or wildlife species are anticipated as a result of this project. According to the U.S. Fish and Wildlife Service, endangered species collection records do not indicate that any federally listed or proposed endangered or threatened species occur within the impact area of the project (see Appendix B)[21].

3.3.12 Cultural Resources

Consultation with the State of Kentucky's Historic Preservation Office under the National Historic Preservation Act has concluded that there would be no effect on cultural resources or historic properties listed in or eligible for listing in the National Register of Historic Places, (see Appendix C).[22] While there are undisturbed archeological remains present at the site of the Dow Corning production plant, there is little likelihood that these remains would be impacted by the proposed project. The remains are currently being investigated under a project that is partially funded by Dow Corning, however, their location is not in the immediate area of the proposed action. The proposed action is not expected to impact Native American tribal or other religious practices or sites.

3.3.13 Noise

The equipment used in the proposed action would be similar to that typically used to operate a chemical processing unit. The relative size of the proposed unit to the existing chemical plant would be very small. The additional noise load would be very small. Dow Corning is proactive in its pursuit of OSHA regulations with regard to noise. Industrial hygiene personnel monitor processes and procedures for possible noise concerns. Employees are limited as to how much time they can spend exposed to a given noise level. Noise from truck traffic from the proposed action would be very small compared to the many trucks transporting materials to and from the plant presently.

Increased noise levels would result from the machinery, installation of process equipment, and vehicle operations during construction. Increases in noise levels would be localized and sporadic.

3.3.14 Pollution Prevention

Dow Corning has set a goal to reduce its toxic releases within the U.S. by 75% in the year

2000 compared to 1988 levels. They have made voluntary commitments with the U.S. Environmental Protection Agency: the 33/50 Voluntary Reduction Program and the Clean Air Act Early Reduction Credit Program. Compared to 1988 baseline levels, Dow Corning has exceeded its goal of 75% reduction of toxic air pollutants, having achieved 90% reduction as of 1994. Under the CAA Early Reduction Credit Program, Dow Corning committed to major reductions in the methyl chloride released at its largest U.S. manufacturing facilities. In addition, Kentucky OSHA is initiating the Voluntary Protection Program during 1996. Dow Corning is participating in the mentoring program under the Voluntary Protection Program Association.

In addition to these initiatives, the proposed OHC facility would avoid the bulk transportation of methanol. By using domestic supplies of methane, the hazards of transporting methanol, a flammable liquid, would be avoided.

Finally, Dow Corning has developed an absorber/stripper technology as part of the OHC process that is expected to reduce VOCs by up to 98%. By extending the application of this technology to other chemical processes, Dow Corning could introduce an extremely effective pollution prevention method that could not only increase the viability of natural gas conversion to methyl chloride, but could significantly enhance the environmental acceptance of a number of other industrial processes.

3.3.15 Socioeconomics

During construction, between 20 and 50 jobs would be created in the Carrollton community. The construction positions would be filled by local laborers. These temporary jobs would have a small positive impact on the local employment and local economy.

Once constructed, the unit would be operated by trained operators and qualified engineers drawn from Dow Corning's existing workforce. There would be no impact on the local employment and local economy due to the operation of this proposed facility.

3.3.16 Long-term and Cumulative Impacts

The proposed Department of Energy action would result in testing of the Oxyhydrochlorination (OHC) process for a period of 23 months, during which time the proposed facility would be on-line approximately 50% of the time. If the project is successfully completed, the engineering scale facility would be maintained in an operational condition, producing methyl chloride for use at Dow Corning plant in Carrollton, Kentucky. No other large-scale projects are proposed at the Carrollton plant that, in conjunction with the OHC project, would create adverse cumulative impacts.

If the project is unsuccessful, the unit would be decommissioned in a safe and environmentally sound fashion.

4.0 LIST OF AGENCIES/PERSONS CONSULTED

Mr. Lee Barclay
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446 Neal Street
Cookeville, TN 38501
(615) 528-6481

Mr. John Booth
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512 Sycamore Street, P.O. Box 156
Carrollton, KY 41008
(502) 732-7043

Mr. Gerry Goebel
Department of Environmental Protection
Division of Air Quality
803 Schenkel Lane
Frankfort, KY 40601-1820
(502) 573-3382

Ms. Pat Haight
Department of Environmental Protection
Division of Air Quality, Chemical Section
803 Schenkel Lane
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(502) 573-3382

Mr. David L. Morgan, SHPO
Executive Director
Kentucky Heritage Council
The State Historic Preservation Office
300 Washington Street
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(502) 564-7005

Mr. David Pollack
Kentucky Heritage Council
The State Historic Preservation Office
300 Washington Street
Frankfort, KY 40601

Ms. Vickie Prather
Division of Water/KPDES
14 Reilly Road
Frankfort, KY 40601
(502) 564-3410, ext. 470

Mr. Allen Robison
U.S. Fish and Wildlife Service
446 Neal Street
Cookeville, TN 38501
(615) 528-6481

Mr. Jerry Schulte
Ohio River Valley Water
Sanitation Commission
5735 Kellogg Avenue
Cincinnati, OH 45228

Mr. Michael Unthank
U.S. Geologic Survey
2301 Bradley Avenue
Louisville, KY 40217

5.0 REFERENCES

1. U.S. Department of Energy, Natural Gas Strategic Plan and Program Crosscut Plans, DOE/FE-0338, June 1995.

2. Written communication from Scott Brown, Dow Corning Corporation, April 19, 1995.

3. Ibid., p.7

4. ORSANCO, Assessment of ORSANCO Fish Population Data Using the Modified Index of Well-being (Miwb), ORSANCO, June 1992.

5. Whitesides, D.V. and Ryder, P.D., Effects of Pumping from the Ohio River Valley Alluvium Between Carrollton and Ghent, Kentucky.

6. United States Department of Agriculture (USDA), Soil Conservation Service, Soil Survey of Carroll, Gallatin, and Owen Counties, Kentucky, USDA SCS in cooperation with the Kentucky Agricultural Experiment Station, August 1976.

7. Personal communication with Mr. Michael Unthank, United States Geological Service, Louisville, Kentucky.

8. Written communication from Scott Brown, Dow Corning Corporation, April 12, 1996.

9. Personal Communication with Gerry Goebel, Kentucky Department of Environmental Protection, Division of Air Quality, June 26, 1996.

10. Ohio River Valley Sanitation Commission (ORSANCO), Assessment of Water Quality Conditions, Ohio River, 1992-1993, prepared by ORSANCO as a Supplement to the Reports Prepared by the States of Illinois, Indiana, Kentucky, Ohio, Pennsylvania, and West Virginia.

11. Written Communication with Robert Jarvis, Dow Corning Corporation, June 13, 1996.

12. Personal Communication with Pat Haight, Kentucky Department of Environmental Protection, Division of Air Quality, Chemical Section, June 26, 1996.

13. Written communication from Scott Brown, Dow Corning Corporation, April 12, 1996.

14. Dow Corning Corporation, Environmental Volume submitted with Proposal to the U.S. Department of Energy for "Methyl Chloride via Oxyhydrochlorination of Methane: A Building Block for Chemicals and Fuels from Natural Gas," page 5, September 15, 1995.

15. Ibid.

16. Personal communication with Ms. Deanna Wheeler, Dow Corning Corporation.

17. Whitesides and Ryder, op.cit.

18. Unthank, op.cit.

19. Dow Corning, Environmental and Waste Control Procedures Manual, last revision April 1996.

20. Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1, January 1987.

21. Written communication from U.S. Fish and Wildlife Service.

22. Written communication with the State Historic Preservation Officer.

Appendix A

General Information on the Ohio River

The Ohio River is formed by the confluence of the Monongahela and Allegheny Rivers at the "Point" in Pittsburgh, Pennsylvania and flows over a distance of 981 miles until it drains into the Mississippi River at Cairo, Illinois. The upper 40 river miles flow in a northwesterly direction within Pennsylvania. The lower 941 miles form state boundaries for Ohio, West Virginia, Indiana, Illinois, and Kentucky. The predominateflow direction of the lower 941 miles is southwest, except for the portion forming the state boundary between Ohio and Kentucky where the flow is to the northwest.

Ohio River water serves many uses, including public drinking supply, cooling water for power plants, commercial navigation, and recreation, as well as, aquatic warm water habitat. As of 1993, over 600 facilities were permitted under the National Pollution Discharge Elimination System program to discharge wastewater directly into the Ohio River.[1] As of December 1994, there were 35 public water intakes along the Ohio River.[2] Drinking water processed from the Ohio River is provided to over 3 million people.[3] Commercial (barge) navigation is provided year round by a series of twenty locks and dams constructed and operated by the Corps of Engineers. In 1988, almost 195 million tons were shipped by barge, predominately coal and coke (111 million tons).[4] Recreational activities include boating, fishing, water skiing, and swimming.

Ohio River - Water Quality

The Ohio River Valley Water Sanitation Commission (ORSANCO) operates the water quality program along the Ohio River on behalf of states along the waterway (Pennsylvania, Ohio, West Virginia, Kentucky, Indiana, and Illinois). Arrangements with these states are formalized in the Ohio River Valley Water Commission Compact. In accordance with that compact and Section 305(b) of the Clean Water Act, ORSANCO prepares every two years a report that focuses on the water quality of the Ohio Rivr on behalf of those states (referred to as the Ohio River 305(b)

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[1]Ohio River Valley Sanitation Commission (ORSANCO), Assessment of Water Quality Conditions, Ohio River, 1992-1993, Prepared by ORSANCO as a Supplement to the Reports Prepared by the States of Illinois, Indiana, Kentucky, Ohio, Pennsylvania, and West Virginia.

[2]Personal Communication with ORSANCO Office concerning water withdrawal from Ohio River.

[3]Ohio River Valley Sanitation Commission (ORSANCO), Assessment of Water Quality Conditions, Ohio River, 1992-1993, Prepared by ORSANCO as a Supplement to the Reports Prepared by the States of Illinois, Indiana, Kentucky, Ohio, Pennsylvania, and West Virginia.

[4]U.S. Army Corps of Engineers (USCOE), 1990 Ohio River Navigation System, commerce on the Ohio River and its Tributaries, USCOE River Division.

Report). Findings are presented to the EPA.[5]

ORSANCO divides the Ohio River into a series of 34 waterbodies for reporting and assessment purposes. Dividing points are either dams or tributaries. The 1992-93 report will be referenced in this EA. Monitoring data was obtained from Manual Sampling, Organics Detection System, Bacterial Monitoring and Biological Monitoring. Over twenty-four water quality parameters, including metals, were considered in the manual sampling program. Twenty-one volatile organic compounds (VOCs) were analyzed inthe ODS program at eleven monitoring locations. Contact recreational monitoring considered bacterial counts at seven monitoring locations, all of which are within close proximity downstream of urban areas having large numbers of combined sewer overflow points. Biological monitoring included fish population surveys and fish tissue analysis.

Four designated uses were evaluated: aquatic life, public water supply, contact recreation, and fish consumption. For each of these four uses, the 34 waterbodies were classified as either "fully supporting", "partial support", or "not supporting," based on specific criteria. These criteria are explained in Table 1, while Table 2 characterizes the entire river by each dsignated use.[6]

Four causes for less than fully supporting characterizations of the Ohio River waterbodies were cited - metals, priority organics, pesticides, and pathogens (disease causing agents, including bacteria and fungi). The summary by river mile for each cause is shown in Table 3.

ORSANCO noted in 1993 that "...traditional problems, such as the treatment of sewage and industrial wastes have, for the most part, been addressed in the Ohio River. The remaining water quality problems in the river are primarily from nonpoint sources".

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[5]U.S. Army Corps of Engineers (USCOE), 1990 Ohio River Navigation System, Commerce on the Ohio River and its Tributaries, USCOE River Division.

[6]Ohio River Valley Sanitation Commission (ORSANCO), Assessment of Water Quality Conditions, Ohio River, 1992-1993, Prepared by ORSANCO as a Supplement to the Reports Prepared by the States of Illinois, Indiana, Kentucky, Ohio, Pennsylvania, and West Virginia.

TABLE 1
ORSANCO WATER QUALITY USE RATING CRITERIA

Use	Criteria Categories		
	Fully Supporting	Partial Support	Not Supporting
Aquatic Life	TOXIC PARAMETERS - 1 or less violations of the acute aquatic life criteria in three years for monthly sampling frequency, or no acute violations over three years for bimonthly sampling. CONVENTIONAL PARAMETERS - Criteria exceeded in 10 percent or less of samples collected over three years.	TOXIC PARAMETERS - 2 or more violations of the acute aquatic life criteria in three years for three years for monthly sampling, or 1 or more acute violations over three years for bimonthly sampling. CONVENTIONAL PARAMETERS - Criteria exceeded in 11 to 25 percent of samples collected over three years.	TOXIC PARAMETERS - No waterbodies were assessed as "Not Supporting" due to abundant biological data that indicates the presence of biological communities along the entire Ohio River. CONVENTIONAL PARAMETERS - Same as for toxic parameters.
Public Water	Average (mean) instream concentration is less than the stream criteria concerning toxic parameters or not more than 10 percent of samples exceed the criteria for conventional parameters AND No water supply closures were in effect for the reporting period or no unusual water treatment processes were required for the removal of a problem pollutant	Average instream concentrations greater than the stream criteria concerning toxic parameters, or 11 to 25 percent of samples exceeded the criteria for conventional parameters AND No water supply closures resulted from the above conditions, and drinking water standards for those particular parameters were essentially met.	Average instream concentrations grater than the stream criteria concerning toxic parameters or greater than 25 percent of samples exceeded the criteria for conventional parameters AND Water supply closures resulted from the above conditions, or significant violations of the drinking water standards for those particular parameters occurred during the reporting period.
Contact Recreation	Ten percent or less of monthly geometric means (of at least five samples) or instantaneous maximum exceed criteria.	Eleven to 25 percent of monthly geometric means (of at least five samples) or instantaneous maximum exceed criteria.	More than 25 percent of monthly geometric means (of at least five samples) or instantaneous maximums exceed criteria.
Fish Consumption	No fish consumption advisories were in place during reporting period.	Fish consumption advisories in place did not include all fishable species.	All fishable species were included in a fish consumption advisory.

TABLE 2
OHIO RIVER
INDIVIDUAL USE SUPPORT SUMMARY
ORSANCO (1992-1993)[7]

Use	No. of Rivermiles Fully Supporting	No. of Rivermiles Partially Supporting	No. of Rivermiles Not Supporting
Aquatic Life	377.3	603.7	0.0
Public Water Supply	531.5	449.5	0.0
Contact Recreation	0.0	800.4	180.6
Fish Consumption	0.0	981.0	0.0

[7]Ohio River Valley Sanitation Commission (ORSANCO), Assessment of Water Quality Conditions, Ohio River, 1992-1993, Prepared by ORSANCO as a Supplement to the Reports Prepared by the States of Illinois, Indiana, Kentucky, Ohio, Pennsylvania, and West Virginia.

TABLE 3
SUMMARY OF CAUSES OF USE IMPAIRMENT
ORSANCO (1992-1993)[8]

Cause Category	No. of River Miles w/Major Impact	No. of Miles w/Minor Impact
Metals	603.7	0.0
Priority Organics	0.0	981.0
Pesticides	403.0	578.0
Pathogens	180.6	800.4

[8]Ohio River Valley Sanitation Commission (ORSANCO), Assessment of Water Quality Conditions, Ohio River, 1992-1993, Prepared by ORSANCO as a Supplement to the Reports Prepared by the States of Illinois, Indiana, Kentucky, Ohio, Pennsylvania, and West Virginia.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
446 Neal Street
Cookeville, Tennessee 38501

June 6, 1996

Ms. Janice L. Murphy
Power Systems Division
Department of Energy
P.O. Box 10940
Pittsburgh, Pennsylvania 15236-0940

Re: Dow Corning Corporation, Prototype Production Facility for Methyl Chloride

Dear Ms. Murphy:

Thank you for your letter and enclosures of May 22, 1996, regarding the subject project in Carroll County, Kentucky. The Fish and Wildlife Service (Service) has reviewed the information submitted and offers the following comments.

Information available to the Service does not indicate that wetlands exist in the vicinity of the proposed project. However, our wetland determination has been made in the absence of a field inspection and does not constitute a wetland delineation for the purposes of Section 404 of the Clean Water Act or the wetland conservation provisions of the Food Security Act. The Corps of Engineers or the Natural Resources Conservation Service should be contacted if other evidence, particularly that obtained during an on-site inspection, indicates the potential presence of wetlands.

Endangered species collection records available to the Service do not indicate that federally listed or proposed endangered or threatened species occur within the impact area of the project. We note, however, that collection records available to the Service may not be all-inclusive. Our data base is a compilation of collection records made available by various individuals and resource agencies. This information is seldom based on comprehensive surveys of all potential habitat and thus does not necessarily provide conclusive evidence that protected species are present or absent at a specific locality. However, based on the best information available at this time, we believe that the requirements of Section 7 of the Endangered Species Act of 1973, as amended, are fulfilled. Obligations under Section 7 of the Act must be reconsidered if (1) new information reveals impacts of the proposed action that may affect listed species or critical habitat in a manner not previously considered, (2) the proposed action is subsequently modified to include activities which were not considered during this consultation, or (3) new species are listed or critical habitat designated that might be affected by the proposed action.

Thank you for the opportunity to comment on this action. If you have any questions, please contact Allen Robison of my staff at 615/528-6481.

Sincerely,

Lee A. Barclay, Ph.D.
Field Supervisor

Education, Arts and Humanities Cabinet

KENTUCKY HERITAGE COUNCIL
The State Historic Preservation Office

Paul E. Patton
Governor
Roy Peterson
Cabinet Secretary

David L. Morgan
Executive Director
and SHPO

June 13, 1996

Ms. Janice L. Murphy
Power Systems Division
Department of Energy
Pittsburgh Energy Technology Center
P.O. Box 10940
Pittsburgh Pennsylvania 15236-0940

Re: Cooperative Agreement Entitled "Methyl Chloride Via Oxyhydrochlorination of Methane: A Building Block for Chemicals and Fuels From Natural Gas"
Dow Corning Corporation, Carrollton Facilities, Carroll County, Kentucky

Dear Ms. Murphy:

Thank you for your letter concerning the above referenced project. Our review of this project indicates that it will have no effect on any property listed in or eligible for listing in the National Register of Historic Places. If you have any questions concerning this project please feel free to contact David Pollack of my staff at 502-564-7005.

Sincerely,

David L. Morgan, Director
Kentucky Heritage Council and
State Historic Preservation Officer

300 Washington Street
Frankfort, Kentucky 40601

Telephone (502) 564-7005
FAX (502) 564-5820