

RELATED CORRESPONDENCE

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION



Before the Atomic Safety and Licensing Board

In the Matter of)
CONSUMERS POWER COMPANY)
(Midland Plant, Units 1 and 2))

7/2/77

Docket Nos. 50-329
50-330

SUPPLEMENTAL RESPONSES TO INTERROGATORIES

The Dow Chemical Company ("Dow") submits the following supplemental answers to Interrogatory 8 of Intervenors other than Dow and Interrogatory 1(k) of the NRC Staff. Since these Interrogatories request similar information, the answers to both have been combined in the statement set forth below.

8. State in detail the present status of your current facilities for generating electricity or steam in light of each of the following:

(a) regulation, discussion, citation, demands or requests by or from the United States Environmental Protection Agency regarding State or Federal air pollution requirements in Midland, Michigan.

(b) regulation, discussion, citation, demands or requests by or from the Michigan Air Pollution Authority regarding State or Federal air pollution requirements in Midland, Michigan.

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THIS DOCUMENT CONTAINS
POOR QUALITY PAGES

Include within your answer to this interrogatory, separately for Federal and State regulatory authorities, whether you presently believe that each or both of them would permit you to operate your present generation facilities past 1980 and if so, under what circumstances, explaining in detail any costs or capital changes in connection with such circumstances.

1. With reference to Dow's "Presentation to Michigan Air Pollution Control Commission" of January 18, 1977:

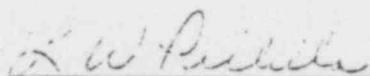
k. Please relate the substance of any meetings with the MAPCC and/or its Staff and/or the Environmental Protection Agency occurring after January 21, 1977 to the NRC Staff on a continuing basis.

Answer

Attached hereto as Exhibit A are various correspondence between Dow, the Staff of the Michigan Air Pollution Control Commission and the United States Environmental Protection Agency, relating to the Stipulation for Entry of Consent Order and the Final Order entered in conjunction therewith which was previously provided to you in Dow's Supplemental Response to Interrogatories dated July 29, 1977.

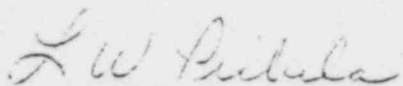
As a result of Dow's proposed conversion from coal to oil as a fuel as required by said Stipulation and Final Order, there have been various letters exchanged between Dow and the Federal Energy Administration (FEA). These letters are attached hereto as Exhibit B.

Following this correspondence, a meeting was arranged by FEA in Washington, D.C. on September 13, 1977. Attached hereto as Exhibit C is a list of attendees at said meeting. Finally attached hereto as Exhibit D is the Dow presentation at said meeting.



 L. W. Pribila, Attorney
 The Dow Chemical Company
 Legal Department

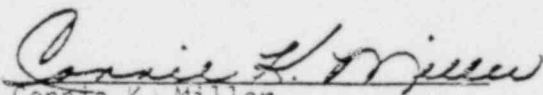
L. W. Pribila, being duly sworn, deposes and says that the foregoing Supplemental Responses to Interrogatories are true to the best of his knowledge and belief.



 L. W. Pribila, Attorney
 The Dow Chemical Company
 Legal Department

STATE OF MICHIGAN)
 ss.
 COUNTY OF MIDLAND)

Subscribed and sworn to before me, a Notary Public, this 15th day of September, 1977.



 Connie K. Miller
 Notary Public, Midland County, Michigan
 My Commission Expires: August 16, 1981

RELATED CORRESPONDENCE

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION



In the Matter of
CONSUMERS POWER COMPANY
(Midland Plant, Units 1 and 2)

Docket Nos. 50-329
50-330

CERTIFICATE OF SERVICE

I hereby certify that copies of the attached "Supplemental Responses to Interrogatories" dated September 15, 1977 were served upon the individuals whose names appear on the attached Service List by deposit in the United States mail, postage prepaid and properly addressed, on the 15th day of September, 1977.

Connie K. Miller
The Dow Chemical Company
Legal Department
47 Building
Midland, Michigan 48640

September 15, 1977
Attachment: Service List

Frederic J. Coufal, Esq., Chairman
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dr. J. Venn Leeds, Jr.
Atomic Safety and Licensing Board
10807 Atwell
Houston, Texas 77096

Dr. Emmeth A. Luebke
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Myron M. Cherry, Esq.
1 IBM Plaza
Chicago, IL 60611

Judd L. Bacon, Esq.
Consumers Power Company
212 West Michigan Avenue
Jackson, MI 49201

Ms. Mary Sinclair
5711 Summerset Street
Midland, MI 48640

Harold F. Reis, Esq.
Robert Lowenstein, Esq.
Lowenstein, Newman, Reis &
Axelrad
1025 Connecticut Avenue
Washington, D.C. 20036

Mr. Steve Gadler
2120 Carter Avenue
St. Paul, Minnesota 55108

Norton Hatlie, Esq.
Attorney-at-Law
P.O. Box 103
Navarre, Minnesota 55392

Richard K. Hoefling, Esq.
Nuclear Regulatory Commission
Washington, D.C. 20555

R. Rex Renfrow, III, Esq.
David J. Rosso, Esq.
Isham, Lincoln & Beale
One First National Plaza
Suite 4200
Chicago, IL

Atomic Safety and Licensing Board
Panel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Atomic Safety and Licensing Appeal
Panel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Docketing and Service Section
Office of the Secretary
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555



UNITED STATES
 ENVIRONMENTAL PROTECTION AGENCY
 REGION V
 230 SOUTH DEARBORN ST.
 CHICAGO, ILLINOIS 60604

EXHIBIT A

Air Pollution Control

AUG 17 1977

AUG 10 1977

Mr. Lee E. Jager, Chief
 Division of Air Pollution Control
 Michigan Department of Natural
 Resources

Stevens T. Mason Building
 Lansing, Michigan 48926



RE: Dow Chemical Company
 Department of Natural Resources
 Consent Order APC No. 10-1977

Dear Mr. Jager:

Thank you for the transmittal of the July 21, 1977, Consent Order APC No. 10-1977. The United States Environmental Protection Agency (U.S. EPA) policy regarding State compliance schedules which provide for final compliance with emission limitations at some date beyond an applicable attainment date, is that such schedules must conform to the requirements of the Clean Air Act and 40 CFR Part 51 and be accompanied by a control strategy demonstration. If such document demonstrates that the compliance schedule will not interfere with the attainment or maintenance of national ambient air quality standards, the schedule will be approved as a revision to the State Implementation Plan, see 41 FR 18510 (May 15, 1976), Train v. NRC et al, 421 U.S. 60 (1975). The typical strategy demonstration contains the latest available comprehensive data regarding air quality, emissions and background levels which influence that air quality, the regulations which control the emissions, and the procedures which ensure that the national standards will be maintained in the future.

Please note that the Michigan Implementation Plan currently sets out a compliance schedule specifically for Dow Chemical Company at 40 CFR Section 52.1175(e), which requires final compliance with emission limitations by April 1, 1975. If the State of Michigan wishes to grant Dow Chemical Company a Consent Order which delays compliance beyond this final date, then a control strategy demonstration must be submitted. Until such time as the New Consent Order is approved by U.S. EPA as a revision to the State Implementation Plan, the source is subject to Federal enforcement action and citizen suit under the current Implementation Plan.

Due to the utilization by the subject source of a supplemental control system, it should be specifically noted that, in order to obtain U.S. EPA

AUG 10 1977

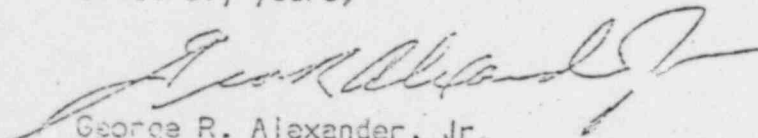
-2-

approval, any Consent Order must conform to the U.S. EPA Tall Stack-Supplemental Control System Policy set out at 41 FR 7450 (February 18, 1976) and the Sixth Circuit's decision in Big Rivers, et al v. EPA, 523 F. 2d 16 (CA6, 1975).

This office has received a copy of a letter from Mr. Robert I. Hanfling, Deputy Assistant Administrator of the Federal Energy Administration to Mr. Zoltan Merszel, President of the Dow Chemical Company, expressing concern that the proposed conversion of coal fired boilers to oil utilization is contrary to National energy policy. Has this recommendation of the Federal Energy Administration that "all potential alternatives" to conversion be considered affected the conversion compliance strategy set out in your Consent Order?

Consistent with the above, will you please supply this office with a control strategy demonstration for Michigan Consent Order APC No. 10-1977 in order that an Implementation Plan revision analysis can be performed. If you have any questions or desire additional information, please contact Mr. Michael Smith of my staff at (312) 353-2086.

Sincerely yours,



George R. Alexander, Jr.
Regional Administrator

CARL T. JOHNSON
 E. M. LAITALA
 DEAN PROSSER
 HILARY F. SNELL
 HARRY H. WHITELEY
 JOAN L. WOLFE
 CHARLES G. YOUNGLOVE



WILLIAM G. MILLIKEN, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING, BOX 30323, LANSING, MICHIGAN 48903
 HOWARD A. TANNER, Director

AUG 24 '77

H. W. HENRY

RELATED CORRESPONDENCE

August 22, 1977

Mr. Hunter W. Henry, Jr.
 General Manager
 Michigan Division
 The Dow Chemical Company
 47 Building
 Midland, Michigan 48640



RECEIVED

AUG 24 1977

MICHIGAN DIVISION LEGAL

Dear Mr. Henry:

I am enclosing for your information a copy of a letter which was recently received from Mr. George Alexander, Regional Administrator, U.S. Environmental Protection Agency, concerning your company's program for abatement of air pollution emissions from your coal burning power plants and also enclosing a copy of my reply. I wish to call your attention to the two issues raised in Mr. Alexander's letter.

First, Mr. Alexander has required that a "control strategy demonstration" must accompany the compliance schedule. We have asked EPA to furnish us with an example of a "typical strategy demonstration" and intend to put together a package of the requested information. In order to develop a satisfactory and timely submittal, it is likely that some of the material will have to be prepared by Dow. Staff of this agency will be in touch with your staff in the near future to discuss this.

The second issue concerns the apparent opposition of the Federal Energy Administration to the burning of additional oil in your boilers. It is requested that you submit to this office a positive assurance, including a brief of the company's legal arguments, that this oil will be available. We ask that this information be submitted not later than November 1, 1977. We also ask that Dow seek an official reply from FEA on their position in this matter at an early date.

If you have any questions on these matters, please contact me at (517) 373-7573.

Very truly yours,

Lee E. Jager
 Lee E. Jager, Chief
 Air Quality Division

LEJ:mah
 Enclosures (2)

cc: Delbert Rector
 Paul Shutt
 Ben White



STATE OF MICHIGAN



WILLIAM G. MILLIKEN, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MADON BUILDING, BOX 00020, LANSING, MICHIGAN 48909
HOWARD A. TANNER, Director

RELATED CORRESPONDENCE

NATURAL RESOURCES COMMISSION

- CARL T. JOHNSON
- E. M. LAITALA
- DEAN PROCEON
- HILARY F. SWELL
- HARRY W. WHITEHEAD
- JOAN L. WOLFE
- CHARLES G. YOUNGLOVE

August 22, 1977

Mr. George R. Alexander, Jr.
 Regional Administrator
 U.S. Environmental Protection Agency
 Region V
 230 South Dearborn Street
 Chicago, Illinois 60604



Dear Mr. Alexander:

This is in reply to your letter dated August 10, 1977 and received in this office on August 17, 1977 concerning Consent Order, APC No. 10-1977, issued by the Michigan Air Pollution Control Commission to the Dow Chemical Company of Midland, Michigan. In your letter you state that this compliance program as contained in that Consent Order can only be approved as an amendment to the Michigan State Implementation Plan and, therefore, the compliance schedule must be accompanied by a "control strategy demonstration".

Quoting further from your letter, "The typical strategy demonstration contains the latest available comprehensive data regarding air quality, emissions and background levels which influence that air quality, the regulations which control the emissions, and the procedures which ensure that the national standards will be maintained in the future." It appears to me that the regional EPA office has all of the information that is being requested, specifically the regional office receives regular reports from our air quality monitoring network and should by this time be in receipt of our most recent published Air Quality Data Report covering 1976 data. Additionally, EPA regularly receives emissions data from all sources in the State of Michigan, including the Dow Chemical Company. EPA is, of course, aware of our regulations and procedures which ensure that national standards will be maintained in the future, since these are the same regulations and procedures that were accepted by the EPA in their approval of the Michigan State Implementation Plan.

This office is willing to prepare a reasonable package of information pertaining to the specific situation in Midland; however, it is not clear to us from your letter how extensive this package should be and what the format of such a submittal should be. Your letter refers to




Mr. George R. Alexander, Jr.
August 22, 1977
Page 2

a "typical strategy demonstration" and it would be greatly appreciated if you could send to this office an example of a typical strategy demonstration so that we may have some guidance in the preparation of our submittal.

In your letter you note that the Supplementary Control System must be consistent with U.S. EPA tall stack policy. To the best of our knowledge, the SCS program being implemented by Dow Chemical Company is totally consistent with that policy and is an interim program to protect air quality prior to full compliance with emission standards, which according to the Consent Order will occur in 1980.

Your letter also notes that the Federal Energy Administration has raised question as to whether the proposed conversion of these coal-fired boilers to oil utilization is contrary to the national energy policy. The use of additional oil in lieu of coal at the Dow Chemical Company and the consistency of that action with the national energy policy has been discussed between the Commission and the Company. The Company legal representatives have assured the Commission that there are no legal barriers to this increased use of oil in their boilers. If EPA differs with that legal position, this agency would greatly appreciate receiving those legal arguments. If the Company is not legally entitled to use oil as will be required under this Consent Order, of course, we will immediately renegotiate the terms of the Consent Order with the Company.

Very truly yours,


Lee E. Jager, Chief
Air Quality Division

LEJ:mah

cc: Mr. Hunter Henry
The Dow Chemical Company



DOW CHEMICAL U.S.A.

August 29, 1977

MICHIGAN DIVISION
MIDLAND, MICHIGAN 48640

Mr. Lee E. Jager, Chief
Air Quality Division
State of Michigan
Department of Natural Resources
Box 30028
Lansing, MI 48909

Dear Mr. Jager:


This letter is in response to your letter of August 22, 1977.

With respect to the U.S. Environmental Protection Agency's request for a control strategy demonstration, I have asked Mr. Jack Brown to be prepared to provide your staff with whatever assistance is required in preparing a satisfactory and timely response. Since a significant improvement in air quality in the Midland area has been achieved during the time Dow has operated its version of a Supplemental Control System, conclusive data should be available to demonstrate to the EPA that the Federal ambient air quality standards can be maintained with this system.

With respect to the U.S. Federal Energy Administration's position on fuel conversion from coal to oil, I am enclosing a copy of a letter from Mr. Paul Oreffice to Mr. Robert F. Hanfling in reply to the latter's letter of July 22, 1977 to Mr. Zoltan Merzei, President of The Dow Chemical Company. As a result of Mr. Oreffice's letter, a meeting to discuss this matter has been scheduled with the FEA at its offices in Washington, D.C. on September 13, 1977. It is my understanding that representatives of the EPA and the State of Michigan will be invited by the FEA to attend. At this meeting it is my intention to provide FEA with information regarding the cost and timing of alternatives to fuel conversion in order to alleviate any concerns FEA may have in this regard. Moreover, I would suggest deferring any decision on the assurances you requested in your penultimate paragraph until after the FEA has had an opportunity to evaluate the information provided and to clarify its position.

Please contact me if I may be of any further assistance on this matter.

Sincerely,


H. W. Henry
General Manager

attachment





DOW CHEMICAL U.S.A.

September 15, 1977

MICHIGAN DIVISION
MIDLAND, MICHIGAN 48640

Mr. Fred Khedouri
U.S. House of Representatives
Longworth Building, Room 1021
Washington, D.C. 20515

Michael G. Smith, Esq.
U.S. Environmental Protection Agency
Enforcement Division
Region V
230 South Dearborn Street
Chicago, IL 60604

William J. Olmstead, Esq.
Counsel for NRC
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Mr. A. M. Vaitekunas
Energy Resource Development
Federal Energy Administration
Federal Building
12th and Pennsylvania
Room 6119
Washington, D.C. 20461

Gentlemen:

Enclosed as requested are copies of the presentations given by Messrs. Henry and Brown during our meeting in Washington, D.C. on September 13, 1977. Also enclosed is a copy of the Black and Veatch report which was discussed during said meeting.

Please make whatever distribution of this information within your organization as you deem appropriate.

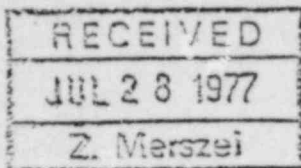
Very truly yours,

L. W. Pribila
Attorney

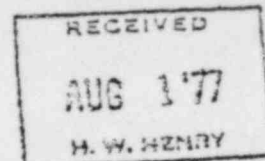
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FEDERAL ENERGY ADMINISTRATION
WASHINGTON, D.C. 20461



RELATED CORRESPONDENCE

JUL 22 1977

Mr. Zoltan Merszei
President
Dow Chemical Company
Dow Center
Midland, Michigan 48640



Dear Mr. Merszei:

I have recently learned of the circumstances involving Dow Chemical with respect to compliance with the Clean Air Act at its South and West Side Power Plants in Midland, Michigan, and of Dow's plans to convert those coal burning facilities to oil. Conversion of large existing coal-fired plants to oil is of great concern during a period when this Nation is attempting to achieve energy self-sufficiency through greater coal utilization.

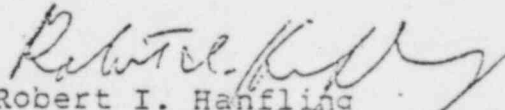
As you know greater coal utilization is a cornerstone of the Administration's Energy Plan. President Carter, for example, stated to the Nation in his address of April 18, 1977, with regard to the use of coal in place of oil:

"We must conserve the fuels that are scarcest and make the most of those that are plentiful. We can't continue to use oil and gas for 75 percent of our consumption, as we do now, when they only make up 7 percent of our domestic reserves. We need to shift to plentiful coal, while taking care to protect the environment ..."

FEA recommends that Dow consider all potential alternatives to converting any of its Midland, Michigan, units from coal to oil firing. We would welcome the opportunity to meet with you and the interested State and Federal environmental protection agencies to discuss this situation.

By copy of this letter I am informing relevant State and Federal environmental protection agencies of FEA's concerns relating to Dow's proposed coal-to-oil conversions. Should you wish to pursue this matter, please feel free to contact me or Mr. Walter Romanek, Director, Office of Coal Utilization, (202)566-7941.

Sincerely,



Robert I. Hanfling
Deputy Assistant Administrator
Energy Resource Development

cc: George R. Alexander, Jr.
Regional Administrator
EPA Region V

N. Allen Andersen
Regional Administrator
FEA Region V

Lee E. Jaeger
Acting Executive Secretary
Michigan Air Pollution Control Commission



DOW CHEMICAL U.S.A.

RECEIVED
AUG 9 '77
H. W. HENRY

August 5, 1977

RECEIVED BARSTOV BUILDING
AUG 25 1977 2020 DOW CENTER
MIDLAND, MICHIGAN 48640

MICHIGAN DIVISION LEGAL

Mr. Robert I. Hanfling
Deputy Assistant Administrator
Energy Resource Development
Federal Energy Administration
Federal Building
12th & Pennsylvania
Room 6119
Washington, D.C. 20461

RELATED CORRESPONDENCE



Dear Mr. Hanfling:

Your letter of July 22, 1977, to Mr. Zoltan Merszei, President of The Dow Chemical Company, has been received; and I am answering it on behalf of the Company.

Let me assure you that we enthusiastically support the President's position that the Nation must increase its utilization of coal by shifting away from oil and natural gas; and we, at Dow, are moving in this direction as rapidly as we can at our Gulf Coast locations. However, our situation at our Midland location is uniquely different in that environmental laws are forcing us to switch from coal to oil. I have attached a document that describes the particular situation we face in Midland.

In order to acquaint your office on a firsthand basis with that situation, I asked Mr. H. W. Henry, General Manager of our Michigan Division, where the plants referred to in your letter are located, to contact your office to determine if we can arrange a meeting with the FEA. He has advised me that he has contacted you and others in your office for this purpose. He talked with Mr. Fred Sheap, Administrative Aide to Mr. Romanek. In that conversation, Mr. Sheap advised that he would have Mr. Anthony Vaitekunas, the Director of the Industrial Division for Coal Utilization, contact Mr. Henry in order to make arrangements for a meeting where we could fully describe to you our capabilities and restrictions.

We look forward to getting together with you because we strongly believe that increased coal utilization is a significant step in solving the Country's energy problems. Further, we believe we can demonstrate that burning oil on a 100% basis provides only marginal benefits in the air quality here in Midland.

We wish to cooperate with you in any way possible.

Sincerely,

Philip Croffice
Philip Croffice

President AN OPERATING UNIT OF THE DOW CHEMICAL COMPANY
Dow Chemical U.S.A.



The Dow Chemical Company has cogeneration facilities for the production of power and process steam at its manufacturing complex in Midland, Michigan. These facilities are antiquated and cannot be made to operate with productive reliability after 1984 at the latest. It was originally planned to retire these facilities in the mid-1970's when Consumers Power Company was scheduled to begin supplying Dow with power and process steam from a nuclear plant it is constructing at a location adjacent to Dow's manufacturing complex. Repeated delays in construction of the nuclear plant have caused the estimated date that Consumers will supply Dow with process steam to slip to March 1982. Dow's present plans are to retire its cogeneration facilities at that time, but in any event even if there is further delay in the nuclear plant by 1984 at the latest.

Dow presently burns coal, oil and natural gas in its existing cogeneration facilities. Although the operating economics significantly favor the use of coal, Dow cannot use this fuel exclusively because its pollution control equipment is inadequate to meet the state emission regulations and thus on occasion the federal ambient air quality standards could be exceeded in the Midland area. Dow recognized the potential for air pollution problems and yet it was anxious to maximize the use of coal as an energy source. These factors prompted Dow to agree to a Consent Order with the Michigan Air Pollution Control Commission (MAPCC) on May 17, 1974. This Order provided that Dow would operate a Supplementary Control System (SCS) which would enable it to meet the federal ambient air quality standards for sulfur dioxide. SCS are systems which limit the rate of pollutant emissions during periods when meteorological

conditions are conducive to ground level concentrations in excess of federal ambient air quality standards. In other words, when there is a potential for a violation of the federal ambient air quality standards for sulfur dioxide, Dow burns low-sulfur oil or natural gas in its boilers; otherwise, Dow burns coal. The 1974 Consent Order further provided that so long as the federal ambient air quality standards for sulfur dioxide were met, and they have been met since the inception of SCS on July 1, 1975, Dow was granted a variance until July 1, 1980 from Michigan's emission regulations for air pollutants.

At the time the 1974 Order was negotiated, the parties anticipated Consumers' nuclear plant would be operating and the Dow facilities retired before July 1, 1980. When it became apparent that the nuclear plant would not be available by that time, the MAPCC, through its staff, pressed Dow to commit itself as to how it would meet the Michigan emission regulations upon the expiration of its variance on July 1, 1980 until March 1982 when process steam from the nuclear plant would be available. As a result, on July 21, 1977 a new Consent Order between Dow and the MAPCC became effective. This Consent Order provided that Dow would continue to operate an SCS until July 1, 1980 after which time it would eliminate coal as a fuel in its power plants. During the negotiations leading up to the 1977 Order, Dow demonstrated to the satisfaction of the MAPCC that the only constant emission reduction technology reasonably available to Dow and economically feasible to install on its antiquated facilities is fuel conversion from coal to low-sulfur oil. Modification to these facilities, if physically possible, to enable Dow to burn coal and meet emission limitations would require at least three

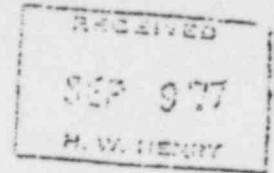
years lead time and cost as much as \$100 million. Such expenditures are unreasonable in view of the limited time Dow will continue to operate its facilities.

Compliance with the emission regulations through complete fuel conversion to low-sulfur oil will require over thirteen thousand barrels per day of fuel oil. The present operation of the SCS requires approximately three thousand barrels per day of fuel oil and an equivalent amount of natural gas. This excessive use of a scarce resource could be averted if the MAPCC would grant Dow a further variance from the State emission regulations for the period following July 1, 1980 and thus allow Dow to continue to operate its SCS in the present fashion.

Dow has informed the MAPCC that it may seek such a variance at some time in the future. Since neither the MAPCC nor the Environmental Protection Agency have demonstrated that Dow is causing violations of the federal ambient air quality standards, such a variance could be granted without endangering the health or welfare of the citizens of Midland, Michigan. The granting of a variance for the interim period beyond July 1, 1980 would result in a savings of seven thousand barrels per day of fuel oil.

RELATED CORRESPONDENCE

FEDERAL ENERGY ADMINISTRATION
WASHINGTON, D. C. 20461



SEP 6 1977

Mr. Paul F. Creffice
President
Dow Chemical U.S.A.
Harstow Building
2020 Dow Center
Midland, Michigan 48640



Dear Mr. Creffice:

Thank you for your letter of August 5, 1977 in which you expressed Dow Chemical Company's support of increased coal use and your interest in meeting to discuss Dow's initiatives in the matter of coal utilization.

Per your suggestion, my staff has arranged to meet with Mr. H. W. Henry of your Michigan Division on September 13, 1977 at 2:00 p.m. in Room 3700 B, New Post Office Building, 1201 Pennsylvania Avenue, N. W., Washington, D. C. We have taken the liberty to invite representatives of the Environmental Protection Agency Region V, Chicago Office and the Michigan State Energy Office to join us since the subject of our discussion is of vital importance to each of those organizations.

We appreciate your cooperation and concern in this matter. Please call if I may be of further assistance.

Sincerely,

151

Robert I. Hanfling
Deputy Assistant Administrator
Energy Resource Development

cc: ✓ H. W. Henry
David Kee, EPA

Sept. 13, 1977

Walter ~~Romanek~~ ^{ROMANEK} - Dir. Office of Coal Utilization FEA

Jas Hisselman - Asst. GENL. Counsel

Orl Alexander - Office of coal util.

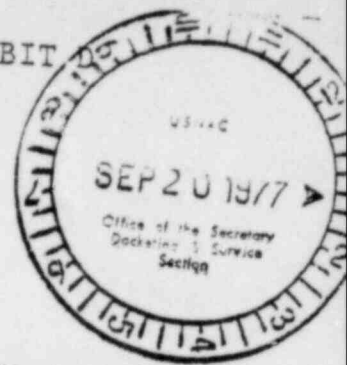
Fred Khidoui - Hon. Dare Stockman
James Hertel - Dow Chemical
LOREN E. FARRAR - FEA-ERD-OCU ENGINEER

LOUIS PRIBILA - DOW CHEMICAL
HUNTER HENRY - DOW CHEMICAL General Mgr
JACK BROWN - DOW CHEMICAL

George C Evans - FEA Region I Chief - Fossil Fuels
R. Williams - Counsel Region I FEA
MICHAEL G. SMITH - EPA Region I Enforcement Attorney
William J. Olmstead - NRC Counsel ELD
Steve L. Dudas - FEA - Region II, Chicago
A.M. VAITEKUNAS - FEA - Office of Coal Utilization

~~W.A.B.~~





PRESENTATION TO FEA ON SEPTEMBER 13, 1977

My name is Hunter Henry. I am the General Manager of the Michigan Division of Dow Chemical, U.S.A. In this position a portion of my responsibilities include management of a large chemical manufacturing plant located in Midland, Michigan. This plant employs 7,500 people and annually produces goods with a worth in excess of \$1,000,000,000.00.

In conjunction with our manufacturing at this location, we operate two power plants for the cogeneration of power and process steam. Today these power plants are generating 100 MW of electric power and 2.5 million pounds per hour of process steam. We presently burn coal, oil and natural gas in our existing cogeneration facilities. Although the operating economics significantly favor the use of coal, we cannot use this fuel exclusively because our pollution control equipment is inadequate to meet the State of Michigan's emission regulations and thus on occasion the federal ambient air quality standards could be exceeded in the Midland area. We recognized the potential for air pollution problems and yet we were anxious to maximize the use of coal as an energy source. These factors prompted us to agree to a Consent Order with the Michigan Air Pollution Control Commission (MAPCC) on May 17, 1974. The 1974 Consent Order provided that Dow would operate a Supplementary Control System (SCS) which would enable it to meet the federal

ambient air quality standards for sulfur dioxide. SCS are systems which limit the rate of pollutant emissions during periods when meteorological conditions are conducive to ground level concentrations in excess of federal ambient air quality standards. In other words, when there is a potential for a violation of the federal ambient air quality standards for sulfur dioxide, we burn low-sulfur oil or natural gas in the boilers; otherwise, we burn coal. Jack Brown will describe the operation of the SCS for you in more detail later. The 1974 Consent Order further provided that so long as the federal ambient air quality standards for sulfur dioxide were met, and they have been met since the inception of SCS on July 1, 1975, Dow was granted a variance until July 1, 1980 from the emission regulations for air pollutants.

The boilers, turbines and auxiliary equipment located in our power plants are antiquated and cannot be made to operate with productive reliability after 1984 at the latest. Jack Brown will also be providing you with the specific age and condition of this equipment as well as the current programs we have underway to extend its productive reliability until 1984. Because of the age of this equipment, it was originally planned to retire our power plants in the mid-70's when Consumers Power Company was scheduled to begin supplying Dow with electric power and process steam from a nuclear plant it is constructing at a location adjacent to our chemical plant. Repeated delays in the construction of

the nuclear plant however have caused this facility to be unavailable for commercial operation until March 1982.

At the time the 1974 Consent Order was negotiated, we anticipated the nuclear plant would be operating and our power plants retired before July 1, 1980. When it became apparent that the nuclear plant would not be available by that time, the MAPCC, through its staff, pressed us for a commitment as to how we would meet the emission regulations upon the expiration of the variance on July 1, 1980 until March 1982 when process steam from the nuclear plant would be available. As a result, on July 21, 1977 a new Consent Order between Dow and the MAPCC became effective. The 1977 Consent Order provided that we would continue to operate an SCS until July 1, 1980 after which time we would eliminate coal as a fuel in our power plants. During the negotiations leading up to the 1977 Consent Order, we demonstrated to the satisfaction of the MAPCC that the only constant emission reduction technology reasonably available to Dow and economically feasible to install on our antiquated power facilities is fuel conversion from coal to low-sulfur oil.

Jack Brown will be discussing the alternatives to fuel conversion that we considered in order to meet the emission regulations. I think that you will agree after his presentation that if Dow must comply with these regulations, fuel conversion is our only viable alternative.

Dow's present energy plans are predicated on Consumers Power's nuclear plant commencing commercial operation

on or before March 1982. At that time our power plants will be retired and we will purchase our electric power and process steam from Consumers Power Company. I would be remiss however if I did not point out to you that there may be further delays in the completion of the nuclear plant. The issuance of the original construction license was challenged in the courts and as a result the Nuclear Regulatory Commission has been ordered to reopen the licensing proceedings. As a result of these reopened proceedings, the construction license for the nuclear plant could be either continued as is, modified or temporarily or permanently suspended. I mention these possibilities only to emphasize the uncertainty which surrounds Dow's future energy supply.

As a result of this uncertainty, I would summarize our energy situation as this:

(1) At the present time, we still intend to purchase our power and process steam from Consumers Power when its nuclear plant commences commercial operation in 1982.

(2) Since the nuclear plant will not be available until 1982 and perhaps longer, we must continue to operate our present facilities in the interim.

(3) Under the terms of both our 1974 and 1977 Consent Orders, our power plants must meet all emission regulations after July 1, 1980.

(4) We are in no position to commit to significant expenditures of capital for the construction of new steam

generation facilities until the future of the nuclear plant is resolved.

(5) Dow's entire energy situation must be clarified in sufficient time in order that we may construct and put into operation appropriate replacements for our present facilities if this is required prior to the end of 1984. As I said earlier, we have no confidence in the productive reliability of our power plants beyond that date.

At this point, I would like to defer to Jack Brown who will provide you specific information on the age and condition of our existing cogeneration facilities and the alternatives we considered to fuel conversion. In addition, I have asked him to discuss air quality in the Midland area and to give you some idea of the anticipated improvement in air quality which will occur when we are forced to meet the emission regulations.

(AT THE CONCLUSION OF JACK BROWN'S PRESENTATION)

As I hope you can now see, we have no viable alternatives available to us other than conversion from coal to oil if we are to meet the emission regulations. You should also recognize at this point that the anticipated improvement in air quality in the Midland area will be slight and yet the cost, as Jack has demonstrated, will be significant.

The cost in depletion of natural resources will also be significant. Compliance with the emission regulations through complete fuel conversion to low-sulfur oil will require over thirteen thousand barrels per day of fuel oil.

The present operation of the SCS requires approximately three thousand barrels per day of fuel oil and an equivalent amount of natural gas. Thus we will be burning an additional seven thousand barrels per day of fuel oil in order to satisfy emission regulations.

In view of the slight environmental improvement which will be achieved from this conversion, Dow is reluctant to proceed in this manner, but unless the MAPCC will extend our variances from the emission regulations beyond July 1, 1980 we have no other choice. We have informed the MAPCC that we may seek such an extension at some time in the future. Since neither the MAPCC nor the Environmental Protection Agency have claimed that Dow is responsible for violations of the federal ambient air quality standards, such an extension could be granted without endangering the health or welfare of the citizens of Midland, Michigan. The granting of a variance for the interim period beyond July 1, 1980 would result in a savings of seven thousand barrels per day of fuel oil.

REMARKS OF JACK M. BROWN

As Mr. Henry indicated, we originally expected to shut down our cogeneration facilities in 1975. When it became apparent that the Midland Nuclear Plant would not be on stream by 1975, we developed an SCS, (Supplementary Control System) to enable us to meet the Federal Ambient Air Quality Standards for Sulfur Dioxide.

SLIDE 1 - Permit me briefly to explain how this SCS program operates. SCS depends on the ability to forecast the weather conditions that will cause SO₂ buildup. The Division has employed Environmental Research & Technology, Inc. (ERT) of Concord, Massachusetts, as round-the-clock consultants to assist in this effort. A computer in the Dow plant provides ERT with hourly data on planned and actual boiler loads, current meteorological readings, and ambient SO₂ levels. Three times each day, the shift meteorologist at ERT prepares a weather forecast for the Midland area. This forecast, together with the current data mentioned previously, is put into a computer model which predicts resultant SO₂ levels at 89 points scattered throughout the entire Midland area. Whenever these forecasted levels equal or exceed Federal standards, ERT will evaluate the pre-determined options or "supplementary steps" as we call them, provided by Dow and recommend an operating mode that will reduce the power house emissions and thus keep the air quality in Midland within allowable limits. Such an operating mode might include switching one or more boilers from coal to oil or reducing load. Changes in expected weather conditions or planned boiler operations may necessitate an immediate re-evaluation.

SCS, then, is designed to maximize our coal use without offending the environment. The scarce, clean burning fuels, low sulfur oil and gas, are only used when adverse meteorological conditions are present and the potential exists for violating the federal standards.

SLIDE 2 After an in depth review of our SCS, the Michigan Air Pollution Control Commission (MAPCC) granted us a variance through July 1, 1980 from the Michigan emission requirements as long as the Federal ambient air quality standards for SO_2 were met.

SLIDE 3 To insure compliance with these standards, we maintain, throughout the City of Midland, an extensive network of continuous monitors for SO_2 and Hi-Vol ("High Volume") samplers for suspended particulates. All of our monitors and samplers are operated under the supervision of the State of Michigan and the results are reported to them on a daily basis. Additionally, the State operates their own units, independent of our network. The results of this monitoring is compared against the Federal standards to determine the performance of our SCS system. Since the inception of our SCS program on July 1, 1975, these Federal standards for SO_2 have not been violated.

SLIDE 4 This graph shows how our fuel mix has been varied to help improve the Midland air quality. The projected result of the 1977 Consent Order is also shown.

SLIDE 5 The emission reductions resulting from the change in fuel mix and SCS is shown on this chart. Our projections through the mid 1980's are also included. Prior to 1975, 24-hour running averages for SO_2 as high as .34 ppm had been recorded. Since February, 1976, no 24-hour trailing average for SO_2 has exceeded .12 ppm. The maximum annual average recorded at any site has dropped from 0.034 ppm in 1974 to 0.021 ppm in 1975 and to 0.016 ppm in 1976. The average of all sites in 1976 for SO_2 was 0.009 ppm while the annual standard is 0.03 ppm. The record on suspended particulates is also

impressive. Even with a sampling method that indiscriminantly measures the results of dusty roads, light construction, and grain elevator dust as well as industrial boiler emissions, the Federal primary or health related standard has likewise not been exceeded in Midland since the start of our SCS. The highest annual geometric mean for any site in 1976 was 62 micrograms/cubic meter which is well within the Federal standard of 75 micrograms/cubic meter.

At this point, I believe that some background on the configuration, age and general condition of our boilers would prove helpful.

SLIDE 6 On this slide, I have shown the boiler configuration by powerhouse, each boiler's fuel capability, and its age. All but two of our units have the capability to burn oil. One of those, Boiler 18, is currently being converted and will be capable of oil firing by mid-1978. Boiler 19 is scheduled for gas to oil conversion in 1979.

The package boilers are the youngest of our units, but they only produce low pressure steam and are used primarily to handle peak demands. The bulk of our steam load, then, is carried by those 10 boilers, which range in age from 11 years to 43 years -- the average age being 26.

During the period 1967 through 1972, our plan was to shut down our cogeneration facilities in 1975 when the Midland Nuclear Plant was to begin supplying our process steam and power. Our boiler maintenance efforts were limited to that which was necessary to meet the 1975 shut down. As a result of the delays in

the Nuclear Plant startup and our postponement of some preventative maintenance, we are now involved in a major boiler rehabilitation program.

SLIDE 7 As you can see from this integrated maintenance schedule, every boiler is involved. Each boiler is unique as to the actual work to be performed, but the type of tasks underway include replacement of the furnace wall tubes, superheater banks, air heaters, and in some cases, new furnace bottoms. Many of the steam generating tubes have been patched so often that the original tube wall is completely gone. We have been literally patching the patches. Throughout this rehabilitation program, we must continue to provide process steam and power to our chemical complex. The schedule must be tight enough to minimize both the number of boilers off-line at one time and the length of time each boiler is out of service. The extreme harshness of the Michigan winter also makes it imperative that, in so far as possible, all boilers be available during the months of December through February. Thus, the program will extend over a five year period and cost more than \$31M. The reliable productive life of the boilers will only be extended through 1984.

SLIDE 8 Although our engineers felt quite strongly about the estimated life of the boilers, we asked Black & Veatch, an independent boiler engineering firm, to review our equipment and our maintenance program. As you can see, their findings concur that we cannot expect to safely and reliably operate our boilers past 1984.

Continued delays in the nuclear plant start up date and pressure from the MAPCC to provide our plans to meet the Michigan emission requirements by

1980 caused us to intensify the search for an acceptable method of constant emission control for our coal fired boilers.

SLIDE 9 This slide shows what we believe to be the complete list of options potentially available to us. I will review the results of our studies so that you will have a better understanding of why we feel that none of these options are viable for us.

SLIDE 10 Our stacks are relatively short - our powerhouses are 100 ft. high and the stacks are only 177 ft. high. This combination tends to cause downwash, or plume entrapment, in high winds. This could result in high concentrations of SO_2 at ground level. The meteorological parameters involved with this downwash phenomena were defined after extensive wind tunnel tests of our powerhouse configuration conducted by Mount Auburn Research Associates, Inc., of Newton, Massachusetts. These parameters have been included in the model used by ERT in our SCS program. Hence, our SCS program prevents SO_2 buildup due to downwash. Physically overcoming this downwash by increasing the existing stacks is not possible due to old and inadequate stack and building foundations. A new tall stack (400 ft.) at each powerhouse, with all of the necessary breeching and electrostatic precipitator, would require more than three years to construct and an investment of over \$35M. This construction time does not include the time necessary to secure regulatory approval or company authorization. However, if we assume that regulatory approval could be secured in time for us to commence work by March, 1978, we would not be able to meet the July 1, 1980 deadline. The structure would only be used as short as one year, but no more than four years. Most significantly, we would still not meet Michigan emission standards for SO_2 .

SLIDE 11 Low sulfur coal was another option we considered. In 1975 we tested several rail car loads of Western coal (<1% sulfur) in our boilers. Due to excessive fouling of the superheater section, we were unable to continuously fire a boiler for more than 4 days. These tests identified the areas listed here as requiring major modifications or replacement. Even after completing these modifications, the combustion chamber on our boilers would still be too small to allow sufficient residence time for this low BTU, low sulfur coal to completely combust. Hence, boiler operability would be seriously impaired or restricted. At least four years and \$50M would be required to complete these changes. Again, assuming that the regulatory process allows us to start by March, 1978, we would not be completed until March 1982 - one month prior to the scheduled startup of the nuclear plant. We would be operating on Western coal as little as one month and no more than three years. Due to market pressures, environmental requirements for strip mining, and tremendous transportation costs, we project this coal to cost twice that of Eastern coal. Further, it is presently only available on long-term contracts. Finally, there would be no extension of the reliable productive life of our boilers.

SLIDE 12 Flue gas desulfurization, or scrubbers, is another option we reviewed. The tall stacks and precipitators mentioned earlier would also have to be included. After reviewing the extremely limited space available adjacent to our powerhouses, the very tight boiler rehabilitation program I mentioned earlier, and the age of the powerhouses themselves, our engineering consultants are not even sure that this is physically possible. But if further study determined that it is possible, then they estimate four years and \$61M would be required for construction. As I said earlier, this time is after regulatory approval and company authorization. However, if construction were to start immediately, the operating life of these units would be no more than three years and as little as one month. This, of course, is based on the fact that there would be no extension of the reliable productive life of our boilers.

SLIDE 13 Sometimes, a portion of the sulfur content of coal can be removed by washing the coal. Our coal comes from two sources; 60% from Powhatan and 40% from Nelms #2 - both mines in Eastern Ohio. Our contracts with both run through 1981. Neither mine currently has washing facilities available or planned. The coal cannot be washed at an intermediate location since all northern Ohio coal washing facilities are projecting capacity operations through the mid-80's. Construction of a new facility would require 30 months and \$5M. Coal washing facilities are usually located at the mine mouth. The operator can then use played out portions of the mine for disposal of the run-off. Hence, due to the disposal and water treatment problems, as well as the short usable life, we concluded that installation of a coal washing facility in Midland was impractical. Powhatan coal could be washed from 3.75% sulfur to about 3.0%. However, the mine is expected to play out by 1982. Hence, installation of a washing facility with a projected life of less than two years is not practical. Nelms #2 could be washed from 3% to 2%. But, since Nelms is only 40% of our coal supply, it would have the effect of lowering our average sulfur content less than $\frac{1}{2}$ of 1%. Hence, we would still be unable to meet the Michigan emission standards for SO₂ or suspended particulate.

SLIDE 14 Another option considered was a complete replacement of our facilities. Such a new facility would, of course, be coal fired, and meet all of the New Source Performance Standards. However, it could not be completed in less than five years and would require in excess of \$300M. The Midland Nuclear Plant is scheduled for startup before such a plant could be built.

SLIDE 15 We have also looked to new technology, primarily fluidized bed combustion and coal gasification. We and others are actively pursuing these processes. However, much work remains before either process can be considered commercially reliable. Our research indicates that commercial units will not be in the planning stage before the mid-1980's.

SLIDE 16 I gave you a lot of information on several constant emission control methods. This slide lists the options and the reasons each was rejected. Tall stacks and precipitators and washed coal accomplish nothing - we would still not meet the emission standards. Western coal would require an investment of \$50M with a useful life of no more than three years. Boiler operations would be seriously impaired and fuel supplies may be totally unavailable due to the short term nature of the project. It may not be possible to even fit scrubbers and their associated hardware onto our powerhouses. If it is, \$61M would have to be invested for a usable life of no more than three years. A new compliance facility could not be built prior to nuclear startup and more than \$300M would be needed. Most important, none of these options could be operational in time for us to meet the July 1, 1980 deadline of our Consent Order. Finally, new technology processes are simply not ready for commercial operation at this time.

Our conclusion was that conversion to 100% oil was the only practical and reasonable alternative for us to meet the Michigan emission regulations by July 1, 1980.

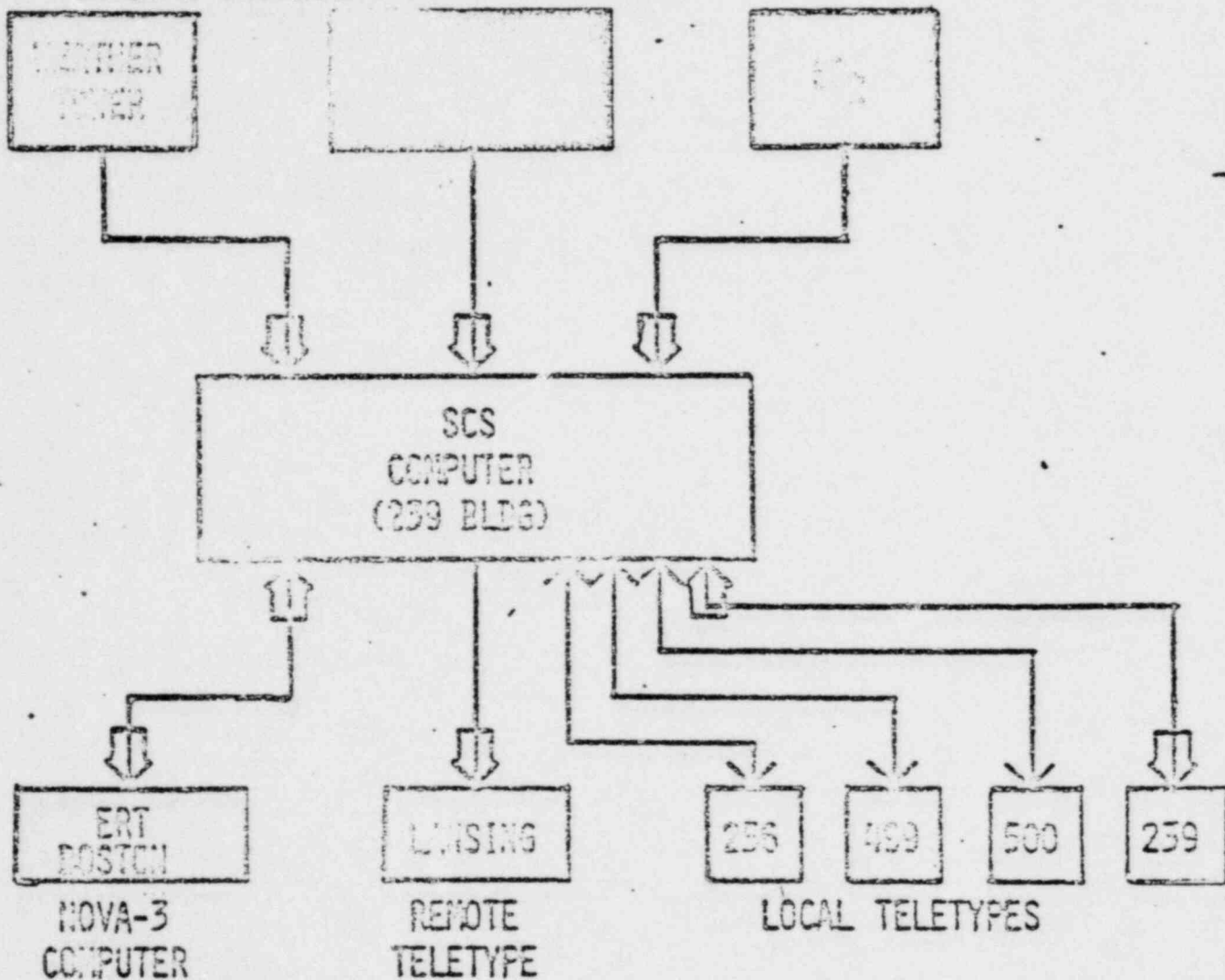
SLIDE 17 This slide shows the quantities of oil that we are talking about. Operating on SCS, current oil consumption averages 6000 BBL/day - adding \$12M/year to our fuel costs. Conversion to 100% oil will require an additional 7000 BBL/day or a total of 13,000 BBL/day. If we are forced to continue on this path our fuel penalty will then be \$25M/year.

SLIDE 18 To demonstrate the improvement to be expected from burning 100% oil, we plotted the observed SO_2 during a period last winter that was particularly conducive to a buildup of ground level pollutants. We asked ERT, our SCS consultants, to model the expected results had we been on 100% oil during the same period. SLIDE 18 OVERLAY The red line shows those results. In terms of the Federal ambient standard for SO_2 , with SCS, there is no problem. An additional 125,000 barrels of oil would have been needed during this period to displace the coal burned and would have represented only a .01 ppm improvement in ambient SO_2 . In other words, 125,000 barrels of oil would have been used to solve a non-existent problem.

SLIDE 19 We did the same thing for a period this summer when our coal burn was high with very little impact on air quality. As you can see, ambient SO_2 levels during this period were extremely low. This time a quarter of a SLIDE 19 OVERLAY million barrels of oil would be required and the improvement is nearly non-existent.

SCS COMPUTER SYSTEM

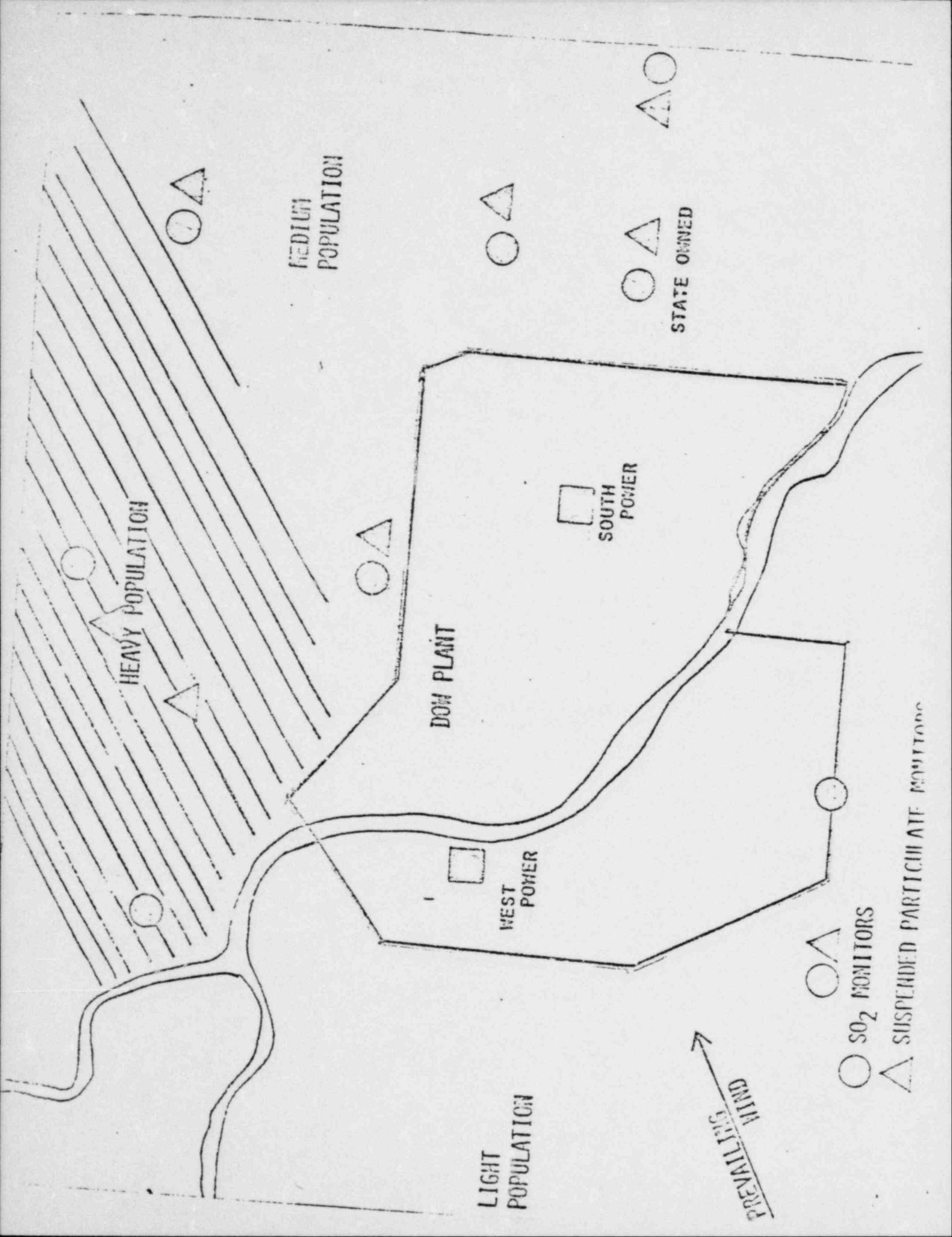
ON-LINE INSTRUMENTS



SO₂ AIR QUALITY STANDARDS

SCS ALLOWS US TO MEET THE ABOVE

BASED ON AVERAGE FUEL MIX OF:
50% COAL 50% OIL + GAS
OUR EMISSIONS AVERAGE 2.2 LBS
SO₂/MM BTU



HEAVY POPULATION

MEDIUM POPULATION

DOW PLANT

WEST POWER

SOUTH POWER

STATE OWNED

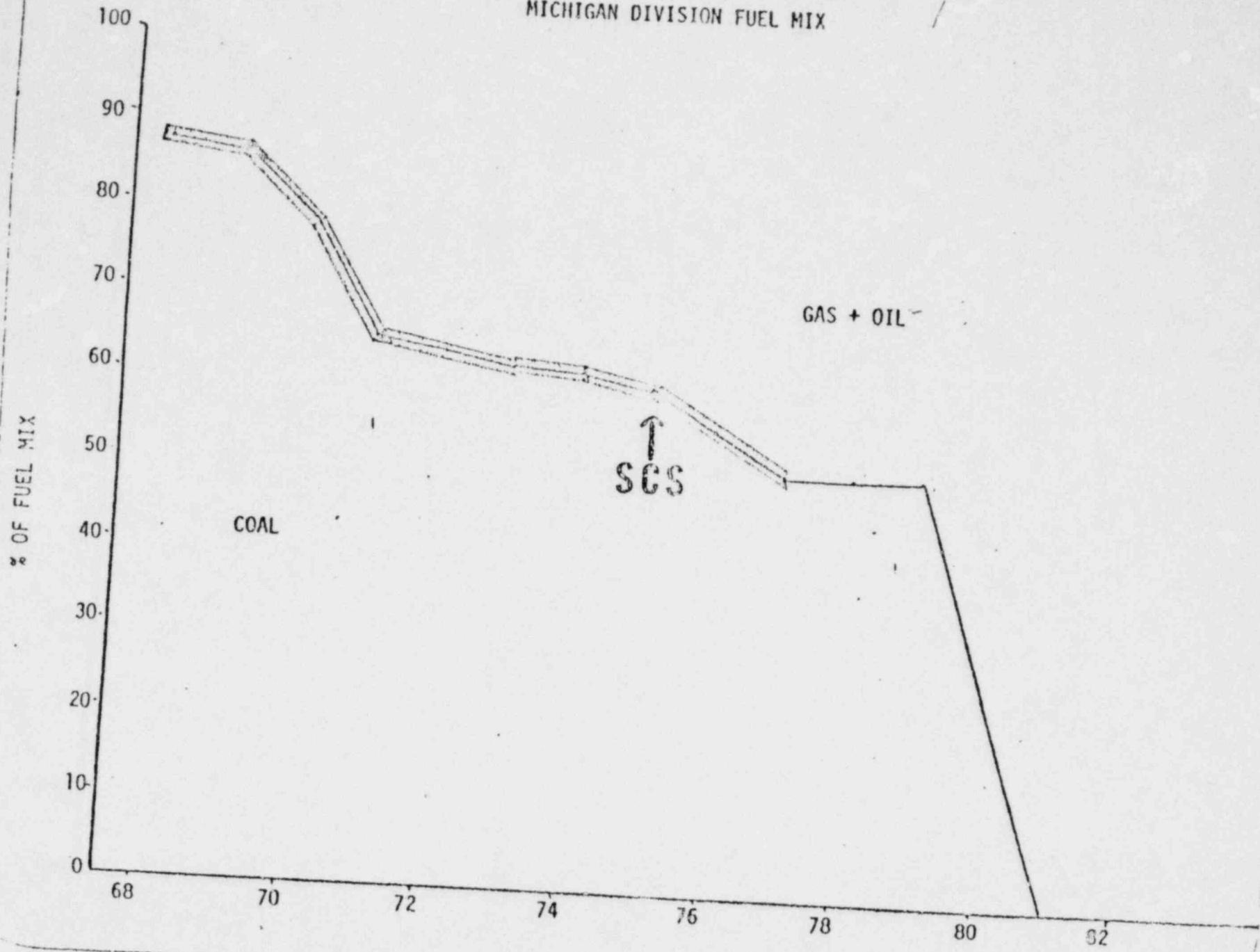
LIGHT POPULATION

PREVAILING WIND

SO₂ MONITORS

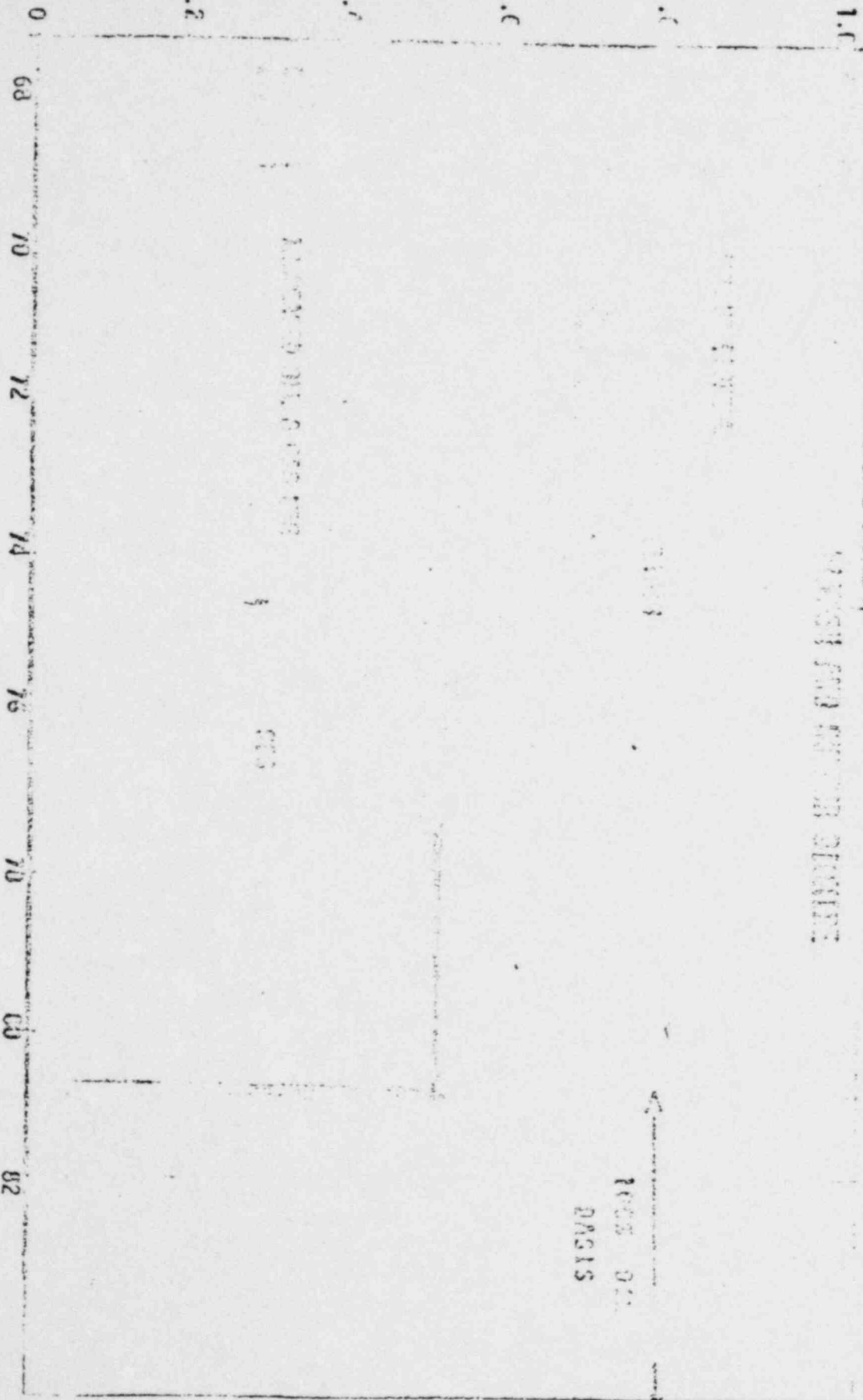
SUSPENDED PARTICULATE MONITORS

MICHIGAN DIVISION FUEL MIX



FRACTION REDUCED

1969 BASE YEAR



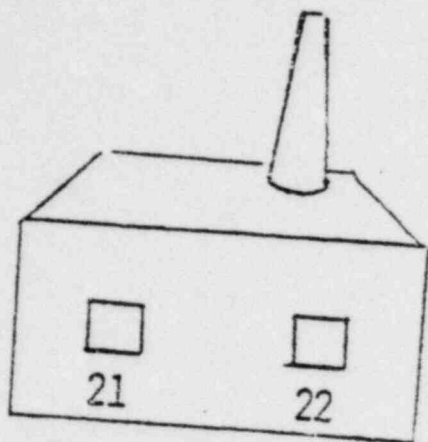
EMISSION REDUCTIONS - DOW CHEMICAL

MIDLAND, MICHIGAN

1969 AND 1970 BASE YEAR

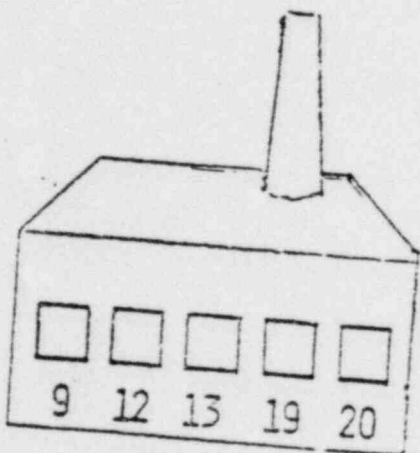
1969
1970
BASIS

BOILERS AT THE MIDLAND PLANT



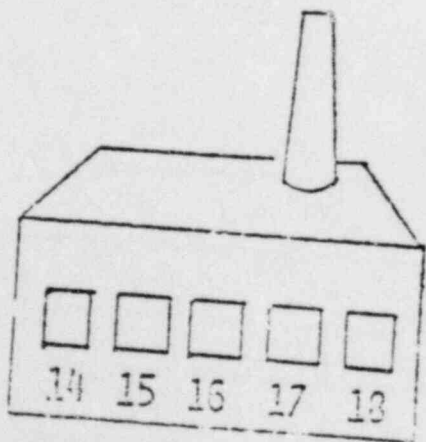
PACKAGE BOILERS

BOILER NO	FUEL CAPABILITY			AGE
	COAL	OIL	GAS	
21		X	X	8
22		X	X	8



WEST POWER

9				
12		X	X	45
13		X	X	35
19	X	X		30
20	X		X	17
	X	X		11

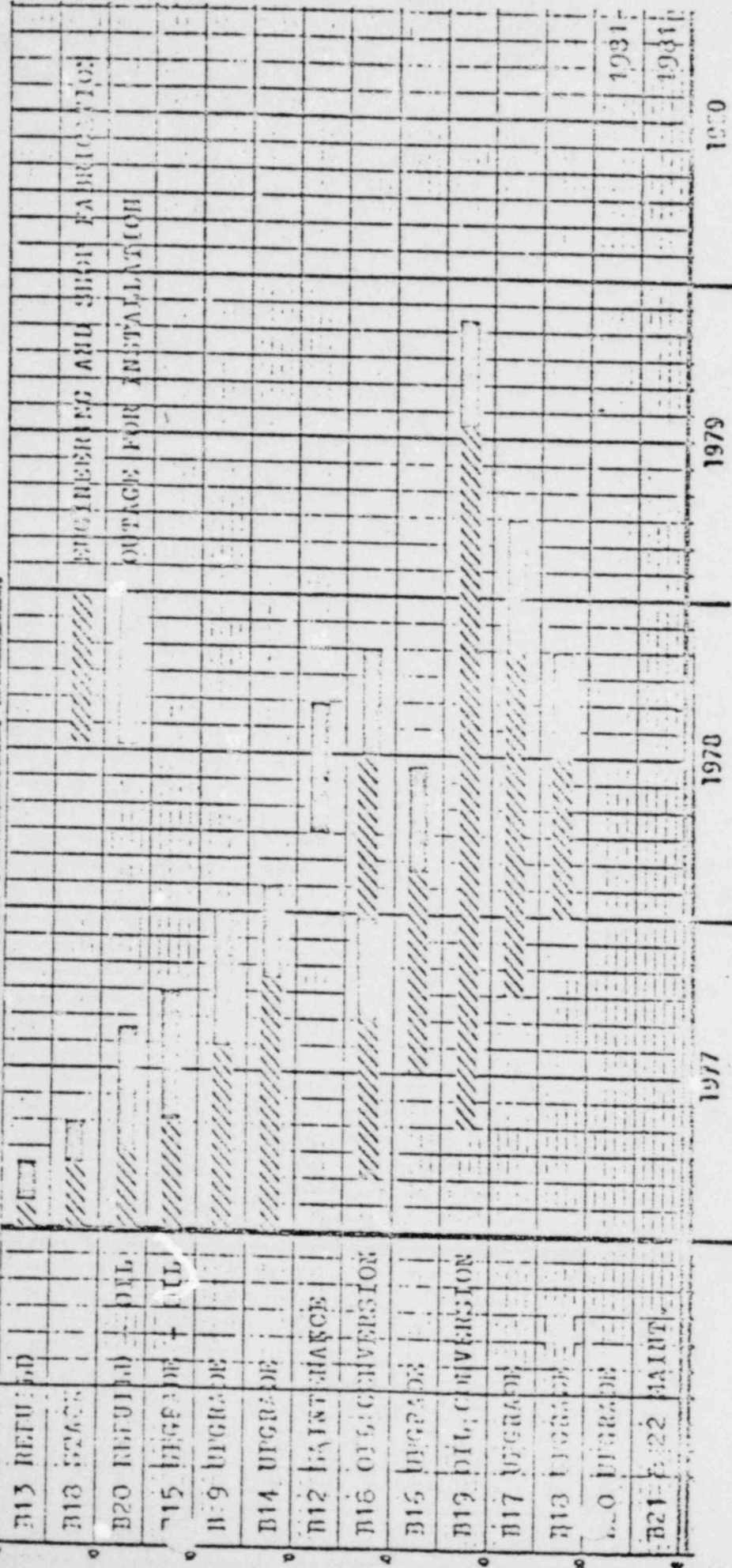


SOUTH POWER

14				
15	X	X		29
16	X	X		29
17	X	X		25
18	X	X		25
	X		X	19

*CURRENTLY BEING CONVERTED FROM GAS TO OIL

INTEGRATED BOILER REHABILITATION AND OIL CONVERSION SCHEDULE



- "IT CAN BE SEEN THAT BY 1985 MOST OF THE EQUIPMENT WILL BE OVER 30 YEARS OLD AND SOME WILL BE OVER 50 YEARS OLD. NORMAL LIFE EXPECTANCY FOR EQUIPMENT OF THIS TYPE IS ON THE ORDER OF 30 YEARS IN LESS RIGOROUS USE THAN IS NECESSARY AT MIDLAND."

BLACK & VEATCH
CONSULTING ENGINEERS
AUGUST 17, 1975

CONSTANT EMISSION CONTROL METHODS

EXISTING TECHNOLOGY

- TALL STACKS AND PRECIPITATORS
- WESTERN COAL
- FLUE GAS DESULFURIZATION
- WASHED COAL
- NEW COMPLIANCE FACILITY

NEW TECHNOLOGY

- FLUIDIZED BED COMBUSTION
- COAL GASIFICATION

INCREASED STACK HEIGHT

- SHORT STACKS CAUSE POOR ATMOSPHERIC DISPERSION
DOWNWASH EFFECT MODELED IN SCS PROGRAM
- CANNOT INCREASE HEIGHT - BUILDING STACK
FOUNDATIONS INADEQUATE
- NEW STACKS, BREECHING, PRECIPITATORS REQUIRE
>3 YEARS + \$35M
- USEFUL LIFE: MINIMUM 1 YEARS
 MAXIMUM 4 YEARS
- STILL NOT MEET MICHIGAN EMISSION STANDARDS FOR SO₂

COAL WASHING

- ⊕ PRESENT SUPPLY FROM TWO MINES
 - POWHATAN - 60% - 3.75% SULFUR
 EXPECT TO PLAY OUT BY 1982
 - NELMS NO. 2 - 40% - 3.0% SULFUR
 - NEITHER HAS COAL WASHING FACILITY
 - CONTRACTS WITH BOTH RUN TO 1981

- ⊙ OHIO WASHING FACILITIES AT CAPACITY

- ⊙ NEW FACILITY REQUIRES 30 MONTHS CONSTRUCTION
 + \$5M

- ⊙ STILL NOT MEET MICHIGAN EMISSION STANDARDS

NEW COMPLIANCE FACILITY

⊙ FIVE YEARS LEAD TIME

- COULD NOT BE BUILT PRIOR TO PROJECTED
NUCLEAR STARTUP

⊙ >\$300M INVESTMENT

OTHER ALTERNATIVES

- ① FLUIDIZED BED COMBUSTION
- ② COAL GASIFICATION
- ③ TECHNOLOGY NOT COMMERCIALY AVAILABLE
(Mid 1980's)

CONSTANT EMISSION CONTROL METHODS

EXISTING TECHNOLOGY

- ⊙ TALL STACKS AND PRECIPITATORS
 - NOT MEET EMISSION STANDARDS
- ⊙ WESTERN COAL
 - \$50M INVESTMENT FOR 1-3 YEAR LIFE
 - SERIOUS OPERATIONAL IMPAIRMENTS
- ⊙ GAS DESULFURIZATION
 - 6M INVESTMENT FOR 1-3 YEAR LIFE
- ⊙ WASHED COAL
 - NOT MEET EMISSION STANDARDS
- ⊙ NEW COMPLIANCE FACILITY
 - \$300M INVESTMENT
 - NOT ON STREAM PRIOR TO NUCLEAR

NEW TECHNOLOGY

- ⊙ FLUIDIZED BED COMBUSTION
- ⊙ COAL GASIFICATION
 - NEITHER PROCESS COMMERCIALY AVAILABLE PRIOR TO MID 1980's

MICHIGAN DIVISION

ADDITIONAL OIL USE

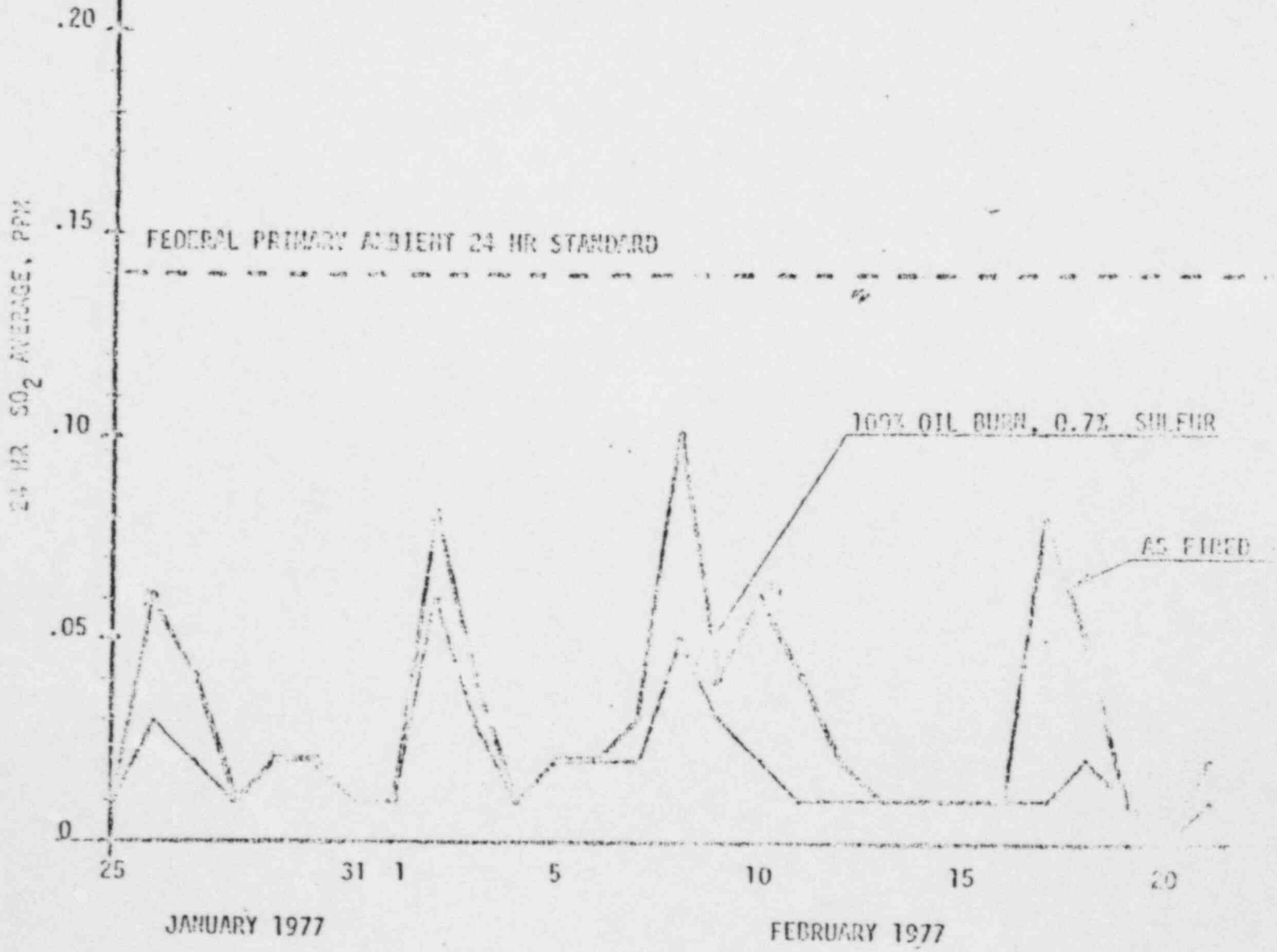
TO MEET AIR QUALITY STANDARDS

1. TO MEET FEDERAL PRIMARY 6,000 BBL/DAY
& SECONDARY AMBIENT STANDARDS
(USING S C S)

2. TO MEET STATE EMISSION 13,000 BBL/DAY
STANDARDS
(BY BURNING 100% OIL WITH
.7% S CONTENT)

ADDITIONAL OIL FOR 2 2,600,000 BBL/YEAR

SO₂ CONCENTRATIONS AT THE DOWNWIND MONITOR
DURING THE MOST SEVERE WEATHER CONDITIONS ON RECORD
JANUARY 25 THRU FEBRUARY 21, 1977



SO₂ CONCENTRATIONS AT THE DOWNHIND MONITOR
DURING JULY, 1977

