

BY THE COMPTROLLER GENERAL

Report To The Congress

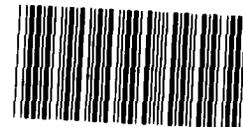
OF THE UNITED STATES

Status Of The Great Plains Coal Gasification Project--Summer 1983

Construction of the Great Plains coal gasification plant in North Dakota was 3 weeks behind schedule as of May 31, 1983, but cumulative project costs were less than originally estimated.

A March 1983 analysis by Great Plains raised questions about the project's economic viability, which is closely linked to future energy prices. The estimated gas prices used in the analysis were lower than those used in January 1982 to justify construction. As a result, the project's investors are concerned about possible losses during the early years of operations.

GAO's review shows, however, that Great Plains did not--nor was it required to--consider substantial tax benefits which may be available to the parent companies of the project's investors. If these benefits are considered, the project's economic viability could be more positive. Should the investors end their participation, some tax benefits previously obtained would have to be repaid.



122544

GAO/RCED-83-212
SEPTEMBER 20, 1983

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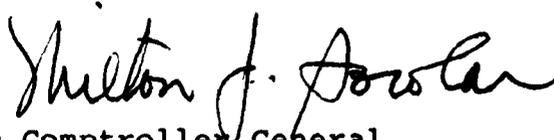
COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON D.C. 20548

B-207876

To the President of the Senate and the
Speaker of the House of Representatives

This is the fourth report on the loan guarantee for an alternative fuels demonstration project awarded to Great Plains Gasification Associates. The report is required by the Department of Energy Act of 1978--Civilian Application (Public Law 95-238). We reviewed the status and management of the project, the Department of Energy's and Great Plains' analyses of the project's economics, and the Department's incurred cost audits. Except where noted, the report discusses matters relating to these issues through May 31, 1983.

We are sending copies of this report to the Director, Office of Management and Budget; the Secretary of Energy; and other interested parties.

for 
Comptroller General
of the United States

D I G E S T

In January 1982 the Department of Energy (DOE) awarded a loan guarantee to Great Plains Gasification Associates--a partnership of five companies--to build the Nation's first commercial-scale plant producing synthetic natural gas from coal. The Great Plains project, being built in Mercer County, North Dakota, consists of a gasification plant, a coal mine, and a pipeline connecting the plant to an interstate network of natural gas pipelines. (See p. 1.)

The Department of the Treasury's Federal Financing Bank agreed to loan Great Plains up to \$2.02 billion of the total estimated cost of \$2.76 billion to build the project. Great Plains will finance the remainder from its own resources. (See p. 1.)

This is the fourth in a series of semiannual reports on the Great Plains project required by the Department of Energy Act--Civilian Applications (Public Law 95-238). GAO reviewed

- the status of the project in terms of how well the construction schedules were being met and how much has been spent,
- the economic viability of the project,
- selected aspects of the project's management, and
- DOE's monitoring of the project.

PROJECT CONSTRUCTION SLIGHTLY BEHIND
SCHEDULE--COSTS ARE LESS THAN EXPECTED

As of May 31, 1983, construction on the plant was about 3 weeks behind schedule--an improvement over the schedule slippage GAO reported as of December 31, 1982. Coal mine development was almost on schedule, and pipeline construction was ahead of schedule. Initial gas production is scheduled to begin during August 1984 with full gas production scheduled for December 1984--the inservice date. Great

Plains believes that the slippages at the plant and mine will not adversely affect the December 1984 date because it expects to accelerate construction. (See pp. 4 and 5.)

Great Plains has started an extensive program to ensure the December 1984 date is met. For example, plant operators are being hired and trained, and plans are being made to provide backup systems for critical components, such as boilers and air compressors. (See p. 6.)

DOE assessed the program and found it to be realistic and achievable. As a result, DOE believes that Great Plains should meet its December 1984 production schedule. (See p. 6.)

Costs incurred through May 31, 1983, were \$1.08 billion. This was \$125 million less than what Great Plains estimated would be spent by that time. About \$19 million of this amount resulted from reduced spending which was due to the schedule slippages. The remaining \$106 million was attributable to lower costs for materials and equipment, lower interest expenses, less than anticipated subcontractor costs, and higher than expected productivity by the work force. (See pp. 6 and 7.)

MARCH 1983 GREAT PLAINS
PROJECTION INDICATES MAJOR
CHANGE IN ECONOMIC VIABILITY

DOE requires Great Plains to annually submit a cash-flow report on the project's total economics. Great Plains' March 1983 cash-flow projection shows a much less optimistic financial picture than a projection made in January 1982, when the loan agreement was signed.

The 1983 projection shows

- a \$382-million loss through 1996 compared with a \$2.2-billion profit previously projected;
- no distribution of funds to the partners through 1996 compared with a \$1.5-billion distribution projected earlier; and
- annual losses during the first 8 years the plant operates compared with 3 years in the 1982 report. (See pp. 9 and 10.)

As a result of the projected decrease in distribution of funds, the partners claim they could, under the terms of the loan agreement, end their participation in the project. In March 1983, however, the partners notified DOE they would not do so at that time. (See p. 10.)

GAO found that the decreases in net income in the 1983 projection mainly resulted because the assumed prices of the synthetic gas were significantly lower than those used in 1982. These prices are set by a formula which is tied to the future price of other energy products. (See pp. 11 and 12.)

Although Great Plains recognizes that the project's economic viability may be attractive over the life of the project, it is concerned that, during the early years of operations, the project could sustain substantial losses and that the partners' stockholders would not be willing to risk these losses for the possibility of a favorable return over a longer period. To alleviate this concern and because the project's financial viability is closely linked to future energy prices, Great Plains has been discussing the possibility of requesting price supports from DOE or the U.S. Synthetic Fuels Corporation. (See p. 16.)

In its March 1983 analysis, Great Plains did not, nor was it required to, consider the impact of taxes. Although the Great Plains' partners do not directly benefit from taxes, their parent companies do--assuming they are profitable enough to take full advantage of them. GAO does not know, however, the current tax status of the parent companies. (See p. 12.)

When taxes are considered, the economic viability of the project could be more positive than Great Plains' estimates. For example, although Great Plains indicated that the partners would recover their investment 16 years after the plant begins operating, GAO found that the investment could be recovered within 2 years if taxes are considered. In addition, the partners expect to put \$841 million into the project during the first 8 years it operates. During the same time period, however, the parent companies' tax

liability could be reduced by \$921 million. If Great Plains ends its participation, some tax benefits previously taken would have to be repaid to the Government. (See pp. 12 to 15.)

ENVIRONMENTAL AND AUDIT ISSUES

Great Plains has developed procedures to assure that all Federal, State, and local environmental permit requirements are met. GAO found that Great Plains has given high priority to environmental issues and has met its permit requirements. Great Plains has established an environmental program to closely monitor and control both air and water quality throughout the construction and operation of the facility. (See pp. 17 and 18.)

DOE is developing a supplemental environmental program to provide the Government and the public additional data not now available on pollutants and emissions generated by this synthetic fuel process. Great Plains will implement this program and fund its \$12-million cost as part of the project's construction budget. (See p. 18.)

DOE's Office of the Inspector General has completed an audit of the eligibility of costs that Great Plains incurred from the beginning of the project through November 1982. Of the \$712 million of costs audited, the Inspector General questioned the eligibility of \$4 million which included interest costs, donations, and consultant fees. Ultimately, DOE determined that, as a result of legal interpretations of the eligibility of costs as defined in the loan agreement, only \$86,752 was ineligible. (See p. 19.)

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GAO requested and received comments from DOE and ANG Coal Gasification Company (ANG), the Great Plains project administrator. DOE had no formal comments but did suggest some editorial changes. (See app. I.) ANG's biggest concern was with the treatment of taxes and their effects on the project's economics. While recognizing that tax benefits could enhance the economics, ANG stated that care must be taken to avoid characterizing tax benefits as recovery of equity as long as the benefits

may have to be repaid to the Government. ANG also pointed out that the partners risk additional losses if gas prices go below those used in its March analysis. (See app. II.) In preparing this report, GAO addressed ANG's concerns and incorporated other changes as appropriate.

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ABBREVIATIONS

ANG	ANG Coal Gasification Company
DOE	Department of Energy
GAO	General Accounting Office
NEPP IV	National Energy Policy Plan IV
OIG	Office of Inspector General

CHAPTER 1

INTRODUCTION

The Department of Energy Act of 1978--Civilian Applications (Public Law 95-238)--authorizes the Department of Energy (DOE) to provide loan guarantees for alternative fuel demonstration projects. It also requires the Comptroller General of the United States to audit recipients of the guarantees and report to the Congress every 6 months from the date of enactment (Feb. 25, 1978). The Secretary of Energy awarded the first loan guarantee under the act to the Great Plains Gasification Associates, Detroit, Michigan, on January 29, 1982, for up to \$2.02 billion or about 75 percent of the estimated \$2.76-billion cost for a project to produce synthetic natural gas from coal.¹

The Department of the Treasury's Federal Financing Bank also agreed to lend Great Plains up to \$2.02 billion to build the project. Great Plains will finance the remainder with its own equity. As of May 31, 1983, Great Plains had borrowed \$703 million, and Great Plains had contributed \$348 million. The loan and guarantee are "nonrecourse," meaning that DOE's recourse is limited to the project assets if Great Plains defaults.

The Great Plains coal gasification plant will be the Nation's first commercial-scale plant producing synthetic natural gas from coal. The facility, being built in Mercer County, North Dakota, consists of three components: a gasification plant, a lignite coal surface mine, and a pipeline connecting the plant to an interstate network of natural gas pipelines. The synthetic gas is produced through a process that uses crushed lignite coal. Smaller pieces of coal not used in the process will be sold to a steam-powered, electric-generating plant, owned by Basin Electric Power Cooperative, located adjacent to the coal gasification plant. Basin Electric shares in the development cost of the coal mine and related facilities. Initial gas production is scheduled to begin during August 1984, with full gas production scheduled for December 1984--the inservice date.

PROJECT COST AND OWNERSHIP

As of May 31, 1983, the project's estimated cost at completion was \$2.76 billion. This included \$1.75 billion to construct the gasification plant, coal mine, and pipeline; \$307 million for financing costs during construction; and about \$702 million for contingencies. Of the total, the Federal Financing Bank can lend, and DOE can guarantee, up to \$2.02 billion. Great Plains agreed to contribute up to \$740 million of its own equity.

¹Our previous reports are: EMD-82-55, Mar. 6, 1982; GAO/EMD-82-117, Sept. 14, 1982; and GAO/RCED-83-112, Apr. 8, 1983.

Great Plains Gasification Associates--a partnership of five companies--owns the project. The partners and their percentage of equity are as follows.

	<u>Percent of equity</u>
Tenneco SNG Inc. (a subsidiary of Tenneco, Inc.)	30
ANR Gasification Properties Company (controlled by American Natural Resources Company)	25
Transco Coal Gas Company (controlled by Transco Companies, Inc.)	20
MCN Coal Gasification Company (a subsidiary of MidCon Corporation, formerly Peoples Energy Corporation)	15
Pacific Synthetic Fuel Company (a subsidiary of Pacific Lighting Corporation)	<u>10</u>
Total	<u>100</u>

PROJECT MANAGEMENT AND OVERSIGHT

Great Plains appointed the ANG Coal Gasification Company (ANG),² Detroit, Michigan, as project administrator. ANG is responsible for the day-to-day planning, engineering, designing, and construction of the gasification plant, pipeline, and mine. Great Plains provides overall direction to ANG through a management committee composed of representatives from each of the partners.

The Lummus Company and Kaiser Engineers, Inc., are the prime contractors for engineering, procurement, and construction of the gasification plant. The Coteau Properties Company, a subsidiary of North American Coal Corporation, is responsible for developing and operating the coal mine. The Michigan Wisconsin Pipe Line Company is providing construction management services for the pipeline.

At the Federal level, DOE's Office of Oil, Gas, Shale, and Coal Liquids, Office of the Assistant Secretary for Fossil Energy, is responsible for monitoring the Great Plains project. DOE headquarters delegated responsibility to DOE's Chicago Operations Office for the day-to-day monitoring of the project, which includes determining that a reasonable assurance of debt repayment exists.

²ANG is a wholly owned subsidiary of American Natural Resources Company.

OBJECTIVES, SCOPE, AND METHODOLOGY

Our objectives were to (1) update information on the status of the project as of May 31, 1983, (2) evaluate DOE's and Great Plains' economic analyses, (3) assess ANG's environmental compliance and operational startup plans, and (4) review DOE's monitoring, including the Office of the Inspector General's audit of incurred costs. Our review was conducted between March and July 1983.

The information provided is based partly on interviews with DOE headquarters' officials and officials in Grand Forks, North Dakota; Oak Ridge, Tennessee; and Chicago, Illinois; ANG officials in Detroit, Michigan; and Mercer County, North Dakota; and North Dakota State and county officials. We also reviewed (1) Great Plains' internal reports; (2) Great Plains' monthly, quarterly, and annual reports submitted to DOE; (3) DOE's reports; (4) DOE's plans and procedures for monitoring economic, environmental, and operational startup activities of the project; (5) ANG's policies, plans, procedures, and reports; (6) DOE's Office of the Inspector General's audit plans, programs, working papers, and reports on incurred costs; and (7) the reports of Arthur Andersen & Co., the public accounting firm for the project.

We did not verify the data reported by Great Plains to DOE and State and county governments. However, we interviewed DOE and State and county officials to determine the extent to which they tested and verified the data.

We also assessed DOE's and ANG's computer models, which generate data concerning the project's economic viability. We found that the data produced by both models were similar except that DOE's model includes tax assumptions and Great Plains' does not. We reviewed DOE's tax assumptions and compared them with existing tax laws. We did not, however, obtain information on the tax status of each of the parent companies of the Great Plains' partners.

In addition, we analyzed the gas price projections Great Plains used in its March 1983 cash-flow report. To compare these projections, we increased and decreased Great Plains prices by 3 percent a year, compounded over the life of the project, to determine how changing gas prices effect the project's profitability. Although the 3-percent fluctuation we used to illustrate the sensitivity of changes in gas prices was arbitrary, we believe it is reasonable because of the fluctuations of energy prices over the last 10 years and because it approximates the range of other published estimates. Except as noted, our review was conducted in accordance with generally accepted government audit standards.

CHAPTER 2

PROJECT STATUS AS OF MAY 31, 1983

Progress on the coal gasification plant was about 3 weeks behind schedule on May 31. ANG officials expect to overcome the slippage by accelerating construction during the summer of 1983, and they believe that the slippage will not adversely affect the scheduled December 1984 inservice date.

Great Plains reported to DOE that, as of May 31, 1983, total project costs amounted to \$1.08 billion--\$125 million less than Great Plains estimated would be spent as of that date. Funds received as of May 31 totaled \$1.05 billion. Great Plains borrowed \$703 million of this amount from the Federal Financing Bank, and the Great Plains partners contributed \$348 million in equity.

PHYSICAL PROGRESS

As of May 31, 1983, the plant was 80.93 percent complete, compared with a planned 83.40-percent target for that date. The coal mine was about 59.3 percent complete, compared with a planned 61.1-percent target. Great Plains does not report the physical progress of the pipeline in terms of percentages but reported it was ahead of schedule.

Gasification plant progress

The schedule slippage of the gasification plant has decreased since our last report.¹ As of December 31, 1982, the plant had been about 4 weeks behind schedule. As of May 31, 1983, it was about 3 weeks behind schedule. Great Plains reports the extent of completion using a composite of weighted-value percentages of completion of the three major activities involved in the plant as follows:

<u>Activity</u>	<u>Weighted percentage of total plant</u>	<u>Planned percentage complete</u>	<u>Actual percentage complete</u>	<u>Percentage actual ahead (behind) planned</u>
Engineering	11.20	10.78	11.17	0.39
Procurement	42.10	41.80	41.04	(0.76)
Construction	46.70	30.82	28.72	(2.10)
Overall	<u>100.00</u>	83.40	80.93	(2.47)

The plant's components were in varying stages of completion. The core of the facility--the building and equipment used in gasifying coal--was 55 percent complete, while the steam

¹GAO/RCED-83-112, Apr. 8, 1983.

supply and distribution system was 27 percent complete. Off-site development (access roads) was 100 percent complete.

To alleviate the plant's overall slippage, ANG reported that it was increasing the work force and giving special emphasis to those areas with schedule problems. Schedule slippages were reported in some subcontract, mechanical, piping, structural/architectural, and electrical activities. The slippages occurred primarily because various materials, equipment, and commodities were delivered late and most major subcontractors were about 1 month behind schedule. However, ANG reported that, as of May 31, delays in delivery of critical equipment and materials were no longer significantly hampering construction progress. ANG also reported that an increased level of effort by subcontractors continues to be a very critical portion of the project's planned progress. ANG plans to closely monitor subcontractor progress.

Coal mine progress

Development of the coal mine was 1.8 percent behind schedule. The following table shows the weighted-value percentages of completion for it:

	Weighted percentage of total <u>mine</u>	Planned percentage <u>complete</u>	Actual percentage <u>complete</u>	Percentage actual ahead (behind) <u>planned</u>
Engineering	15.0	11.8	11.2	(0.6)
Procurement	20.0	10.8	9.8	(1.0)
Construction	<u>65.0</u>	<u>38.5</u>	<u>38.3</u>	<u>(0.2)</u>
Total	<u>100.0</u>	61.1	59.3	(1.8)

Great Plains reported that engineering was behind schedule primarily because fewer staff days were expended than Great Plains had projected. Procurement was reported behind schedule because delivery of some equipment, such as water pumps and a bulldozer, was deferred. Construction was behind schedule primarily because the acquisition of a loading shovel was delayed. According to ANG, the above slippages will not affect Coteau's ability to meet its scheduled March 1, 1984, date for delivering coal to the gasification plant.

Pipeline progress

Great Plains plans to transport its gas through an interconnecting series of pipelines. The gas will be transported through a 34-mile pipeline from the gasification plant to the existing interstate pipeline of the Northern Border Pipeline Company. The Michigan Wisconsin Pipe Line Company is responsible for design services and construction management of the 34-mile pipeline, which is expected to cost \$18.2 million. The Welded Construction Company is constructing the pipeline; construction began in May 1983 and was completed in August 1983.

OPERATIONAL STARTUP

Great Plains has an extensive transition program to assure that the December 1984 inservice date is met. Priorities have been established to test and accept the facility on a system-by-system basis and turn it over to the operations staff in an orderly manner. To accomplish this transition, ANG developed a plan which includes construction and operation coordination, startup schedules, spare parts availability, preparation of manuals, and hiring and training of personnel.

ANG also established a task force consisting of the plant contractor and ANG operations and construction personnel. The task force identified two systems--the boiler and air compressors--that may not be completed on time. However, ANG plans to use substitute equipment to ensure it meets its schedule. Another ANG task force established a spare parts system to ensure that critical parts are available when needed.

In addition, ANG is developing its operator, process, and supervisory manuals. The manuals furnish information on the various gasification plant processes and equipment and include startup, normal operating, shutdown, and emergency procedures. ANG foresees no difficulty in completing the manuals to meet its training and operating requirements.

ANG has also been hiring and training staff to operate the gasification plant. As of May 31, 1983, ANG had recruited 290 of the 792 planned operating personnel and established training programs for all levels of employees in each department. Before December 1, 1984, it plans to provide about 204 courses to its employees. As of May 31, 1983, training had been given to instrument technicians and operational supervisors. Some supervisors have been trained at a South African gasification plant, which uses technology similar to Great Plains'.

To evaluate ANG's operational startup activities, DOE and its technical support contractor visited the project site and assessed the progress reported. They concluded that the startup schedule is realistic and achievable. Consequently, DOE believes that, barring unforeseen difficulties, ANG should meet its December 1984 inservice date.

PROJECT COSTS

Great Plains had estimated cumulative project costs as of May 31 would be \$1.21 billion, but actual costs incurred were \$1.08 billion. Total expenditures were \$125 million less than Great Plains estimated as of May 31, 1983. Of the \$125-million difference, \$19 million was attributed to reduced funding requirements because of the schedule slippages. The remaining \$106 million was attributed to (1) lower costs for materials, commodities, and equipment; (2) lower than expected interest expenses resulting from a more favorable interest rate environment; (3) some subcontracts being awarded at lower amounts than

originally budgeted; (4) higher than expected labor productivity in certain construction areas, such as electrical distribution and waste treatment; and (5) inflation rates that were lower than originally estimated.

Funds received totaled \$1.05 billion. Of that amount, the Federal Financing Bank loaned \$703 million, and the partners contributed \$348 million in equity.

CHAPTER 3

PROJECT ECONOMIC VIABILITY

In March 1983, Great Plains provided DOE a cash-flow projection which showed a much less optimistic picture of the project's economic viability than had been anticipated when the loan agreement was signed in January 1982. The March projection showed that, by 1996 rather than realizing net income of about \$2.2 billion, the project would incur a \$382-million loss. The main reason for this change is that the estimated synthetic gas prices used in the 1983 projection were significantly lower than those used in 1982.

The projection also indicated that income would not be sufficient for the partners to recover the equity they contributed during the first 10 years of operations. As a result, the partners could, according to Great Plains, terminate their participation. However, the partners notified DOE in March 1983 that they would not do so at that time.

In its March 1983 analysis, Great Plains did not--nor was it required to--address the effects of taxes on the partners or their parent firms. Including the various tax credits and benefits that could be taken results in a significantly improved financial picture over the next 20 years. Our analysis of Great Plains' March 1983 data showed that the partners could obtain a significant return on their investment over 20 years if tax factors are considered and if the parent companies are profitable enough to take full advantage of them.

Since the project's ultimate financial success is closely linked to future energy prices, the parent companies, as publicly owned corporations, are concerned about undertaking the risk of significant losses during the early years of operations for the possibility of a favorable return over a longer period of time. To alleviate this risk, Great Plains is discussing the possibility of obtaining price supports from DOE or the U.S. Synthetic Fuels Corporation.

ECONOMIC ANALYSES ARE REQUIRED TO PROTECT THE GOVERNMENT'S INTEREST

DOE is required by law to continually assess the project's economics and determine there is reasonable assurance the loan will be repaid.¹ DOE may withdraw its guarantee on money not already borrowed if it determines there no longer is reasonable assurance that the loan will be repaid.

As part of the loan agreement, DOE requires Great Plains to submit a variety of economic data including a cash-flow projection showing estimated future revenues, expenses, and similar

¹Section 19(c)(3) of the Federal Nonnuclear Energy Research and Development Act of 1974, as amended by Public Law 95-238.

information. The projection made in January 1982, when the agreement was signed, indicated a favorable economic outlook for the project.

DOE's analysis of the project's economics before signing the loan agreement indicated that the plant would be in a positive cash-flow position after 3 years of operations. DOE concluded that some risk existed because of the uncertainty of the plant's performance and unforeseeable future economic events. Nevertheless, DOE determined that there was reasonable assurance that Great Plains could repay the loan.² In addition, since August 1982 DOE has assessed the project's economics. According to DOE officials, these analyses show that under varying conditions Great Plains could repay the loan.

MARCH 1983 GREAT PLAINS' PROJECTION INDICATES
MAJOR CHANGE IN ECONOMIC VIABILITY

Great Plains' March 1983 cash-flow projection indicated major changes in the project's future economic viability as compared to the projection made when the loan agreement was signed. The 1983 projection indicated much lower net income, more years of losses, and substantially reduced distribution of funds back to the partners. As a result of the projected distributions, the partners could, according to Great Plains, terminate participation in the project. The projection also indicated a need to provide substantially more funds than had been anticipated to keep the project solvent. These changes were caused largely by a decrease in the projected sales prices of the synthetic natural gas to be produced by the project.

Great Plains' projection included a detailed analysis of the project's financial situation based on future "mid-case" energy prices as forecasted in DOE's preliminary National Energy Policy Plan IV (NEPP IV). The projection is the result of a computerized economic model, which includes assumptions for capital requirements, operating efficiencies, synthetic natural gas prices, by-product revenues, coal prices, operation and maintenance costs, debt repayment expenses, partnership income, source and use of partnership funds, and cash flows.

Projected net income down by
\$2.6 billion; distribution to
partners down by \$1.5 billion

Great Plains' 1983 projection indicates much lower amounts of net income and distributions of funds to the partners as compared with the 1982 projection. In addition, the 1982 projection indicated losses in the first 3 years while the 1983 projection indicated losses for the first 8 years. The table

²The analysis is described in more detail in our report "Status of the Great Plains Coal Gasification Project--Aug. 1982," GAO/EMD-82-117, Sept. 14, 1982.

below shows the differences between these projections through the year 1996, the last year covered by both projections.

<u>Projection</u>	<u>Cumulative net income</u>	<u>Cumulative distributions</u>
	million	
1982	\$2,233	\$1,523
1983	<u>(382)</u>	<u>-</u>
Change	(2,615)	(1,523)

The 1983 projection, however, covered an additional 4 years--from 1997 through 2000. During these 4 years, the projection shows that the project would realize cumulative net income of \$1.3 billion and cumulative distributions to the partners of \$942 million. This is largely due to the estimated increases in gas prices during those years.

Partners state they could
withdraw from the project

Changes in the projected net income and distributions during the first 10 years of operation (1985-94) are important. The loan agreement permits the partners to terminate their participation before the facility's December 1984 inservice date under certain conditions. One condition is that the project will not generate sufficient funds for Great Plains to

- pay the principal and interest on the Federal loan when due,
- make distributions to the partners during the first 10-years of operations that at least equal their contributed equity as of 1 year after the facility's inservice date, and
- repay any other permitted debt by the end of the 10-year period.

The 1982 projection indicated that during the first 10 years cumulative net income and distributions would be more than adequate to repay the contributed equity. However, the 1983 projection indicated cumulative losses of \$773 million and no distributions for the first 10 years. Great Plains stated that additional losses may occur if energy prices go below those used in the 1983 projection.

The partners all notified DOE in March 1983 that they did not intend at that time to exercise their right to terminate even though they had some doubt that the equity they contributed would be repaid during the first 10 years the plant operates.

Projected no-interest loans by partners up substantially

The loan agreement provides that, after the plant's in-service date, Great Plains will maintain a positive cash-flow position at all times. In its 1982 projection, Great Plains indicated the partners would have to provide \$86 million of no-interest loans to enable it to do so during the first 3 years of operations. In contrast, its 1983 projection indicated they would have to provide \$841 million of such loans for 8 years--a \$755-million increase over the 1982 projection. Without these additional funds, the project would be insolvent.

An ANG official advised us that the partners would provide no-interest loans, rather than additional equity contributions, should they decide it prudent to keep the project solvent. These loans can be recouped sooner because the loan agreement restricts the amount of distributions Great Plains can make to partners. The agreement also prohibits use of bank loans and interest on partners' loans after the inservice date.

Cause of changes: lower prices for synthetic natural gas

The forecasted large decreases in net income are due almost entirely to decreases in projected revenues--increases in expenses were not significant. Of the \$2.6-billion decrease in net income, 94 percent resulted from lower revenues and only 6 percent from increases in expenses. The reduction in revenues, in turn, occurred because the projected sales prices of the gas were significantly lower than those projected in 1982. The following table shows an example of differences for 3 years:

<u>Year</u>	<u>1982 projection^a</u>	<u>1983 projection^a</u>
	(per million Btu's ^b)	
1985	\$10.34	\$ 6.61
1990	15.48	8.58
1995	22.69	14.59

^aCurrent year dollars--not discounted.

^bBritish thermal units.

The projected prices were lower in 1983 than in 1982 because of changes in factors in the pricing formula Great Plains' uses to determine the selling price of its synthetic gas. The price of the gas is not fixed but will be controlled by gas purchase contracts which contain a pricing formula. The formula sets a base price for the gas of \$6.75 per million Btu's in 1980 dollars. The \$6.75 base price varies quarterly on the basis of changes in the producers' price index and changes in the

producers' price index of No. 2 fuel oil³. However, the formula sets various "caps" on the prices such as the following:

- During the first 5 years of production, the price cannot exceed the unregulated price of No. 2 fuel oil.
- From the 6th to 10th year, the price will be the greater of the average prices paid by the pipeline affiliates for the highest 10 percent of domestic natural gas or for Canadian and Mexican gas but in neither case higher than the unregulated price of No. 2 fuel oil.
- After 10 years, the price will be based on the price of unregulated domestic natural gas. If gas prices are regulated at that time, then the price paid for Canadian and Mexican gas will set the ceiling.

Great Plains used DOE's preliminary NEPP IV forecasts in deriving the sales prices used in its March 1983 projection. DOE's forecast indicated lower rates of inflation and lower prices of No. 2 fuel oil and domestic natural gas than Great Plains used in its 1982 projection. Great Plains also assumed lower gas prices would occur when natural gas prices are deregulated.

TAX FACTORS ENHANCE PROJECT'S ECONOMICS

Great Plains' March 1983 projection provides only a limited analysis of the project's economic viability since it does not consider tax implications, which may accrue to the parent companies of the partners. However, DOE does not require that these tax implications be included. Our assessment of Great Plains March 1983 data shows that, even given the large projected decreases in income, the partners could realize a significant return on their investment if tax implications are considered. Although the Great Plains' partners do not directly benefit from taxes, their parent companies do--assuming they are profitable enough to make use of them. We do not know, however, the current tax status of the parent companies.

We believe that after-tax cash flow provides a different view of the project's economics than before-tax net income.⁴ During the first few years of operations, the parent companies could receive tax benefits from both depreciation and operating

³The producers' price index is compiled by the Department of Labor's Bureau of Labor Statistics. It reflects the average change in the 1967 price of 2,000 commodities.

⁴Throughout this report, we refer to (1) equity which is the partners "out of pocket" investment, (2) net equity which is equity after recognizing the associated tax benefits, (3) net income before taxes, and (4) after-tax cash flow which is net income adjusted for depreciation, income taxes, etc.

losses, which could be used to offset taxable income, if any, from other businesses. A before-tax analysis ignores these benefits. Similarly, during the project's latter years, when income is projected to be increasing, the tax liability is again ignored, which could overstate the project's financial picture.

The tax considerations omitted from Great Plain's projection are substantial. The projection estimated that, during the 1981 to 1984 construction period, the partners could contribute \$517 million of equity. However, they do not show that, during the same period, the partners could reduce their combined tax liability by \$400 million and could recover over 70 percent of their contributed equity. These benefits--which flow back to the parent companies as opposed to being used by the Great Plains partnership--result from investment tax credits, energy tax credits, and tax writeoffs associated with interest during construction. Should Great Plains stop construction, most of these tax benefits would have to be repaid to the Department of the Treasury.

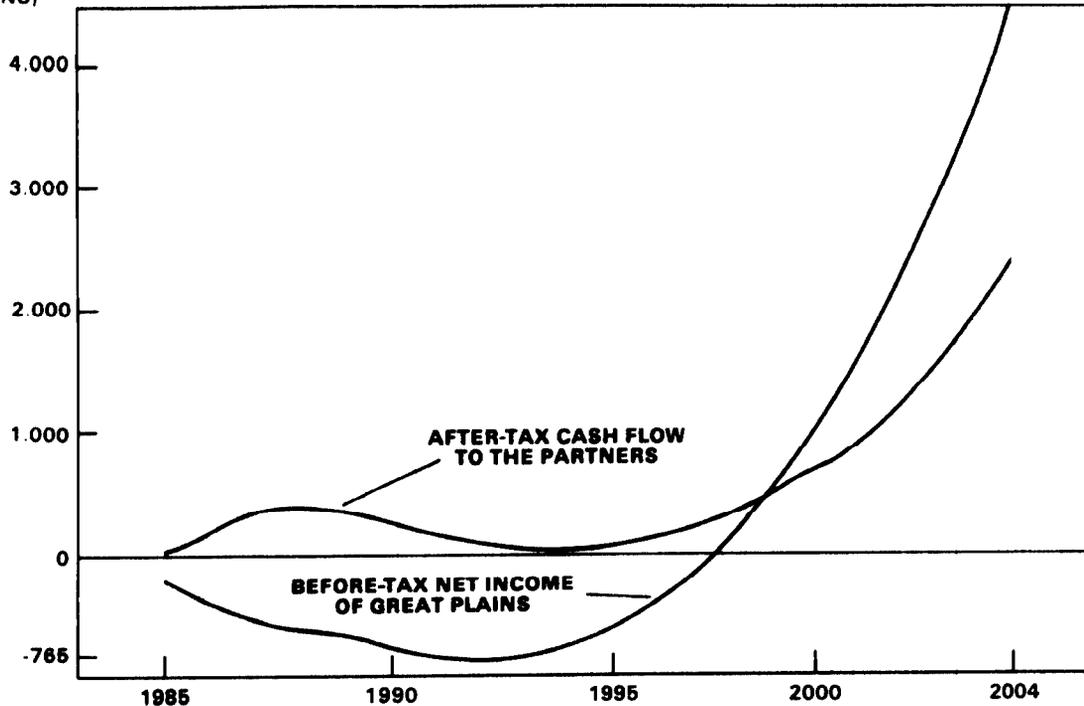
Tax benefits are also available after the project becomes operational. To the extent that losses are incurred, they can offset the parent companies' profits, if available. At the current marginal corporate tax rate, this would reduce the parent companies' tax liability by 46 percent of the taxable losses. However, if Great Plains ends its participation in the project after the plant begins operating, the parent companies could lose some tax benefits previously taken.

Excluding after-tax cash flow in analyzing this project has two impacts. First, since equity is not adjusted in the Great Plains projections by the offsetting tax benefits during construction to arrive at a net equity investment, the analysis of time required to pay back equity and return on investment is seriously distorted. For instance, Great Plains forecasts it will take 16 years for the partners to recover their \$517-million investment in the project. We found that their net equity of \$117 million could be recovered within 2 years of the plant's operation if after-tax cash flow is considered. In addition, the partners expect to put \$841 million into the project during the first 8 years it operates. During this same time period, however, the parents' tax liabilities could be reduced by \$921 million. Second, the choice of net income before taxes as the unit of analysis instead of after-tax cash flow creates a less optimistic financial outlook for the project. The following graph illustrates these two concepts.

CUMULATIVE
CURRENT DOLLARS
(MILLIONS)

CUMULATIVE NET INCOME AND AFTER-TAX CASH FLOW

(Excludes Abandonment Tax Liability)



The cumulative before-tax net income curve we developed in our analysis shows an estimated cumulative loss of \$765 million for the first 10 years of operations, which is comparable to Great Plains' estimate of a \$773-million loss. However, the cumulative after-tax cash flow curve shows that the cash flow to the partners over the first 10 years could be \$50 million and that this positive cash flow increases throughout the remaining life of the project.

The impact of using after-tax cash flow versus before-tax net income can be illustrated when applied to Great Plains' March 1983 submission as follows:

<u>Equity investment at December 1984 using:</u>	<u>Amount</u>	<u>Years to pay back equity</u>
Before-tax net income	\$517 million	16.0
After-tax cash flow	117 million	1.6

In commenting on the draft of this report, ANG pointed out that, after the partners recover the \$117-million net equity, the cumulative after-tax cash flow decreases for the next several years before increasing again. However, we found, as shown in the above graph, that the cumulative after-tax cash flow to the partners is always positive.

To measure the sensitivity of the project's finances to future gas prices, we used DOE's model and various gas price levels and calculated the effect on the project's viability.

Using Great Plains' March 1983 gas price projection, we found the partners could receive an average annual 20-percent return on investment over the first 20 years of operations. We also used the NEPP IV high- and low-case gas price projections and found the partners could realize an average annual return of as much as 26.7 percent or as low as 6.9 percent over the first 20 years of operations.

In addition, we increased and decreased the prices Great Plains used in its March 1983 projection consistently by 3 percent a year. We found that the partners could realize an average annual return on investment of as high as 27.4 percent or as low as nothing at all over the first 20 years that the plant operates. These examples illustrate that the project's ultimate financial viability is extremely sensitive to future energy prices.

SUBSEQUENT EVENTS

DOE has been analyzing the reasonableness of Great Plains' March 1983 cash-flow projection. As of May 31, 1983, DOE had not completed its full assessment. Its preliminary conclusion was that Great Plains indicated an overly conservative and pessimistic future for the project. DOE's primary reason for this conclusion was that Great Plains did not fully indicate the benefits accruing to the partners, whose gains and losses are affected by tax laws and regulations.

DOE, in making its full assessment, will perform economic analyses using its own computer model, which measures the impact of about 36 project variables. DOE's model contains most of the factors contained in the Great Plains model, but it also considers the tax implications that are available to the parent companies. In addition, DOE is using the output of a computerized model maintained by Fluor Corporation to compare with its own. Fluor's model is more general than DOE's or ANG's model because it is not designed specifically for this project, and it is based on experience Fluor gained at a South African coal gasification plant which uses technology similar to Great Plains. In addition, DOE has contracted with a law firm to prepare an analysis of the gains/losses to the parent companies after they receive investment credits and tax benefits.

DOE has continued to approve disbursements of Federal loan funds. According to a DOE official, DOE has done so because:

- Great Plains' March projection shows it can repay the loan and that the partners will continue contributing funds to the project.
- The partners have not voted to terminate their participation and have continued to make equity contributions.
- DOE's analyses indicate the project's economics are more favorable than indicated by Great Plains, after taking into account tax benefits available to the partners.

--DOE's monitoring of the project's costs and schedule and startup and operational plans indicate no significant problems which would preclude achieving the December 1984 inservice date.

Great Plains is discussing the possibility of obtaining additional Federal assistance for the project. According to ANG officials, the long-term economic viability of the project is attractive, but the parent companies, as publicly owned corporations are concerned about undertaking the risk of substantial losses during the early years of operations for the possibility of a favorable return over a longer period of time. To alleviate this concern, Great Plains has met with both DOE and the U.S. Synthetic Fuels Corporation to discuss the possibility of obtaining price supports for its synthetic gas.

CONCLUSIONS

Great Plains' March 1983 projection is less optimistic than a similar analysis prepared in January 1982 when the loan agreement was signed. However, if tax implications are considered, the project's economics are enhanced. We believe taxes need to be considered to realistically assess the project's economic viability and return on investment. DOE is meeting this need by recognizing the impact of taxes when assessing Great Plains' ability to repay its loan.

DOE AND ANG COMMENTS

We requested and received comments on the report from DOE and ANG officials. DOE had no formal comments but did suggest some editorial changes. (See app. I.) In preparing the final report, we incorporated these changes as appropriate. ANG's biggest concern was with the treatment of taxes and their effects on the project's economics. While recognizing that tax benefits could enhance the economics, ANG stated that care must be taken to avoid characterizing tax benefits as recovery of equity as long as the benefits might have to be repaid to the Government. ANG also point out that the partners risk additional losses if synthetic gas prices go below those used in its March analysis. In preparing the final report, we addressed ANG's concerns and incorporated other suggested changes as appropriate. (See app. II.)

CHAPTER 4

ENVIRONMENTAL AND AUDIT ISSUES

Our past reports focused primarily on ANG's management and DOE's monitoring of the project's construction. An equally important aspect in the project's development is its environmental impacts. Recognizing the importance of those impacts, both ANG and DOE have pursued a comprehensive program to assure compliance with Federal, State, and local permitting requirements to mitigate any adverse environmental impacts. In addition, because limited information is available on pollutants and effluents from this type of technology, DOE required Great Plains to supplement its planned environmental activities and gather additional data about this synthetic fuel process.

Another matter on which we previously reported was the need for DOE to audit incurred costs to determine that loan guarantee funds are spent only for eligible project costs. DOE's Office of the Inspector General audited project costs totaling \$712 million and questioned \$4 million. Ultimately, only \$86,752 was determined to be ineligible.

ENVIRONMENTAL ASPECTS OF PROJECT ARE BEING ADDRESSED

An important concern to DOE and ANG is the impact this synthetic fuel process may have on the environment. Because of this concern, the project's environmental impact statement, loan agreement, and environmental monitoring plan each address environmental issues. In addition, at DOE's request, ANG is funding a supplemental environmental program to be used as a basis to obtain and study data on pollutants and emissions from this synthetic fuel process.

In the early 1970's, ANG developed an environmental impact statement which addressed how a facility such as the gasification project could impact the surrounding environment. The impact statement describes the project, estimates the environmental impacts of construction and operations, describes unavoidable adverse effects, and examines possible alternatives for mitigating them. The impact statement also establishes environmental-monitoring programs for air quality, water quality, and biological systems that are to be carried out during preconstruction, construction, and operation phases of the plant.

The loan agreement generally describes the environmental aspects of the agreement between DOE and Great Plains, and it specifies that Great Plains will comply in all material respects with the environmental-monitoring plan.

The environmental-monitoring plan provides the framework for all of Great Plains' environmental activities. It addresses permitting requirements and specifies the programs to be carried out at the gasification plant and Coteau mine. Areas covered

include (1) air quality, (2) surface and ground water quality, (3) solid and hazardous waste disposal, (4) deep well discharge, (5) odor monitoring, and (6) industrial hygiene monitoring and medical surveillance. The plan also establishes monthly, quarterly, and annual reporting requirements by ANG to Federal and State agencies.

In managing its environmental programs, ANG has obtained the required permits for constructing and operating the gasification plant. Its management has been such that not one significant environmental violation has occurred.

In addition, Coteau is conducting environmental programs for the coal mine and future land reclamation. Coteau monitors air quality, water quality, vegetation, and fish and wildlife. Although Coteau has full responsibility for the mine, ANG's environmental staff is responsible for auditing these environmental activities. Monthly status reviews of mine-related permits and environmental studies are included in ANG's audits. As of May 31, 1983, no environmental problems had been identified that might adversely affect Coteau's ability to deliver coal on schedule.

According to Government officials we talked to, ANG has met all Federal, State, and local permit requirements. Government officials at all levels we talked with concerning ANG's attention to environmental issues were pleased with the priority ANG has given to these issues. ANG seems to be effectively managing all aspects of its environmental programs.

DOE has an environmental-monitoring staff that keeps abreast of ANG's environmental efforts. To assess these efforts, DOE's staff visits the project site, meets with ANG officials, and examines and discusses environmental conditions and requirements with responsible Federal, State, and local agencies. On the basis of its assessment of ANG's environmental activities, DOE believes that ANG's efforts seem adequate to allow it to deal with environmental problems that could arise.

In addition, DOE is developing a supplemental program to gather data on pollutants and emissions, which may result from this synthetic fuel process. This program is expected to be an invaluable tool not only for Great Plains and DOE but also for developers of future synthetic fuel projects. Although ANG is responsible for implementing the program once the plant begins operating, its cost will be funded by Great Plains under a \$12-million budget that is part of the project's construction budget of \$2.7 billion. DOE believes that Great Plains' compliance with the supplemental program will provide not only the Government but also the public with valuable information, which is not currently available about pollutants and emissions caused by this synthetic fuels process.

DOE AUDITS OF COSTS

In a previous report,¹ we recommended that DOE initiate audits to determine the eligibility of costs incurred by Great Plains. In response to our recommendation, DOE's Office of the Inspector General (OIG) began an audit in November 1982.

As of May 31, 1983, OIG had completed two audits. In its first report, dated March 9, 1983, OIG concluded that it could place considerable reliance on the audits conducted by the various audit groups to provide adequate coverage of incurred costs. OIG concluded that it only needed to supplement that audit effort with audits in selected areas. OIG then audited costs incurred from the inception of the project through November 30, 1982. In its April 15, 1983, report, OIG recommended that DOE accept as eligible \$646 million of the \$712 million claimed by Great Plains. The report reserved judgment on \$62 million, pending completion of audits by other groups. OIG questioned the eligibility of about \$4 million which included interest costs, donations, and consulting fees. However, ultimate responsibility for determining which costs are eligible rests with DOE's contracting officer. In a letter dated June 30, 1983, DOE's contracting officer notified ANG that only \$86,752 of the \$4 million was ineligible. According to DOE, the difference resulted from legal issues which the contracting officer had to consider concerning the interpretation of eligibility of costs as defined in the loan agreement.

We found that the audit plans, programs, and working papers that OIG prepared are adequate in scope and detail, and the reports issued are clear and concise. The working papers contain support for the conclusions and recommendations reached. The reports have been submitted to the appropriate DOE officials for action, and OIG has plans for following up on its recommendations during its next audit.

As discussed in our prior reports, extensive audit coverage is available on all aspects of this project.² On the basis of our previous audit work, we believe OIG can rely on the ongoing audit efforts of these other groups in determining the scope of its own audit plans.

OIG officials told us they plan to audit costs incurred every 6 months. Their next audit will cover costs incurred during the period December 1, 1982, through May 31, 1983.

¹GAO/EMD-82-117, Sept. 14, 1982.

²GAO/EMD-82-117, Sept. 14, 1982, and GAO/RCED-83-112, Apr. 8, 1983.



Department of Energy
Washington, D.C. 20585

11 AUG 1983

Mr. J. Dexter Peach
Director, Resources, Community and
Economic Development Division
U.S. General Accounting Office
Washington, D.C. 20548

Dear Mr. Peach:

The Department of Energy (DOE) appreciates the opportunity to review and comment on the GAO draft report entitled "Status of the Great Plains Coal Gasification Project-Summer 1983." DOE has no formal comments. Comments of an editorial nature have been provided directly to members of the GAO audit staff.

Sincerely,

Martha O. Hesse
Assistant Secretary
Management and Administration

**ANG Coal Gasification Company**

Project Administrator—Agent

Great Plains Gasification Associates

600 Renaissance Center, Suite 1100

Detroit, Michigan 48243

August 10, 1983

RODNEY E. BOULANGER
Vice President,
Treasurer and Secretary

Mr. J. Dexter Peach
Director
United States General Accounting Office
441 G Street - Room 4915
Washington, D.C. 20548

Dear Mr. Peach:

Enclosed is a marked draft of the General Accounting Office's semiannual report on the status of the Great Plains coal gasification project. The copy has been marked to reflect our comments.

Our biggest concern is the treatment in the report of tax benefits and the risk of lower energy prices in describing the economic outlook of the project. While it is true that tax benefits can enhance the economics of the project, care must be taken to avoid characterizing tax benefits as recovery of equity as long as the benefits are subject to recapture. Equity is not recovered until it is returned to the sponsors without a liability.

Thank you for the opportunity to comment on the report. A copy of our comments will be supplied to Mel McCombs and we will be ready, at his convenience, to answer any questions.

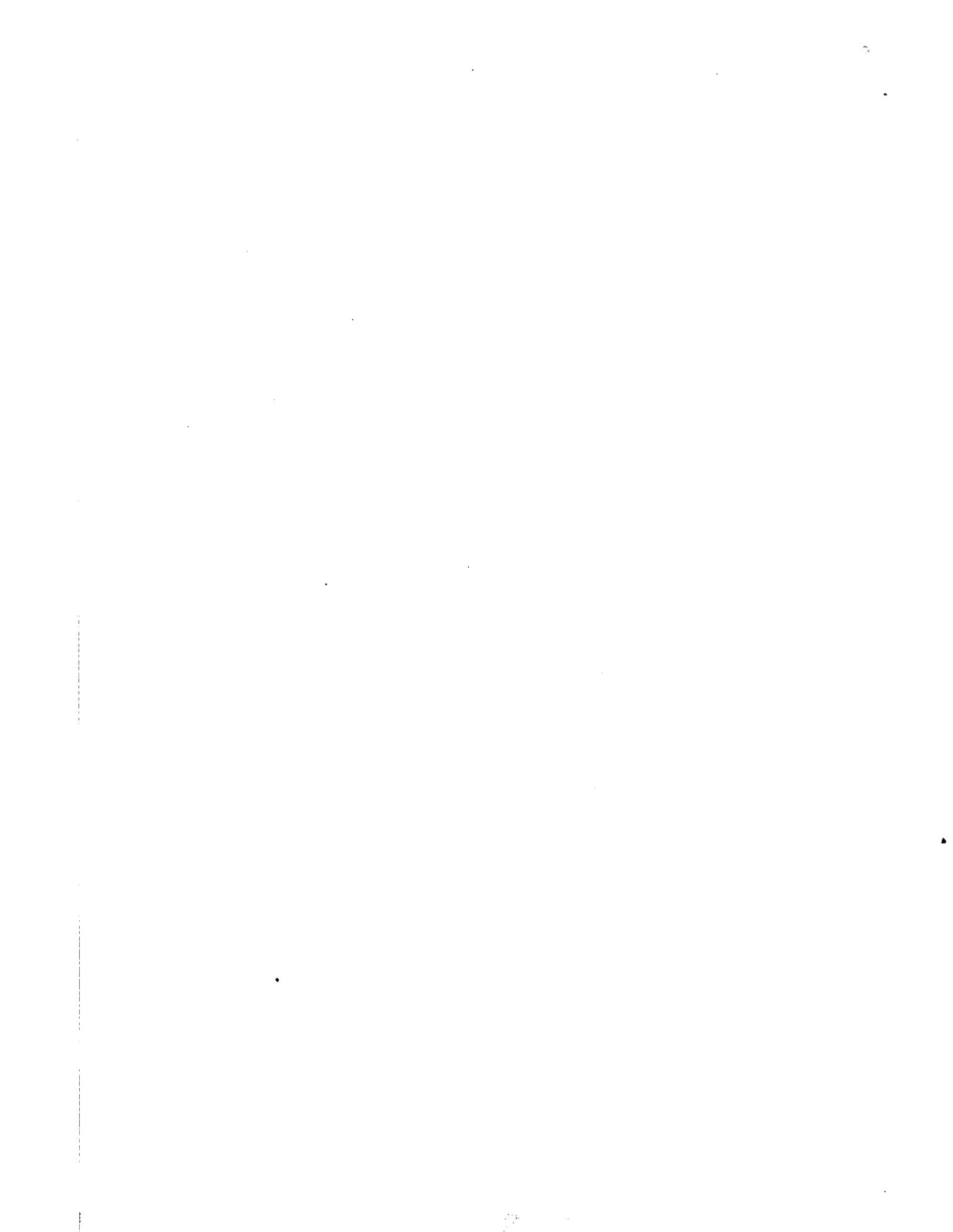
Sincerely,

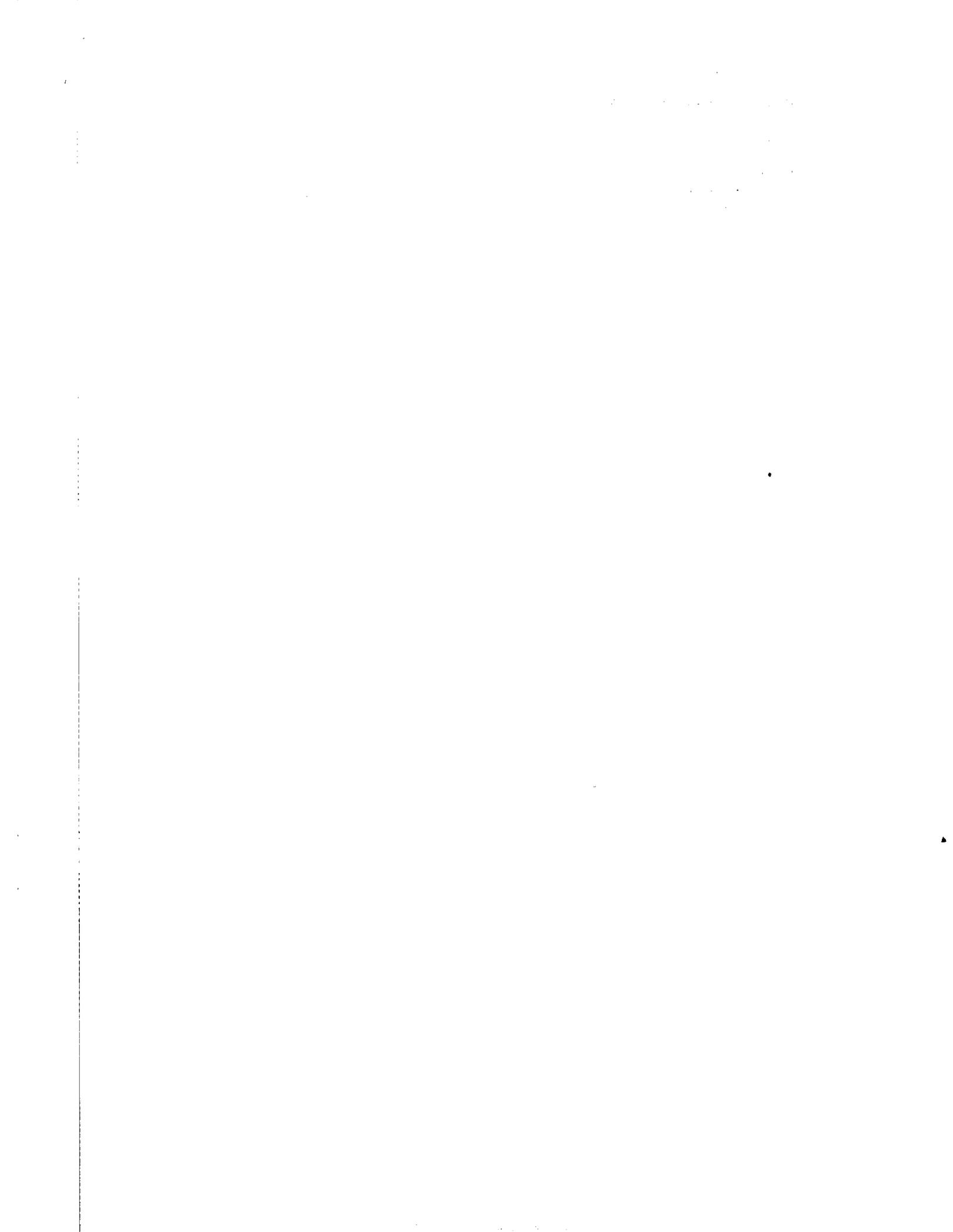
A handwritten signature in cursive script that reads "Rodney E. Boulanger".

Enclosure

cc: Mr. Mel McCombs

(301616)





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