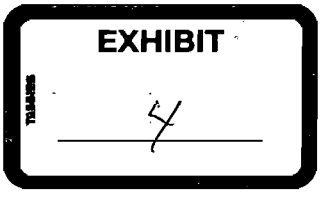
Direct Testimony

Witness Robert Weir

Before the Public Service Commission of
The State of North Dakota

In the Matter of the Application of
Dakota Gasification Company
For A Certificate of Corridor Compatibility and a Route Permit for
Reconstruction of DGC's CO_2 Pipeline Across Lake Sakakawea

Case No. PU-07-184
June 12, 2007



1.	**Q.**	Mr. Weir, could you introduce yourself to the Commission and the others present at this hearing today?
	A.	My name is Robert Kaleb Weir. I am the Project Manager employed by Dakota Gasification Company. My business address is: Dakota Gasification Company 420 County Road 26 Beulah, North Dakota 58523.
2.	**Q.**	Mr. Weir, could you provide an outline of your educational and professional qualifications?
	A.	I have a Bachelor of Science degree in Civil Engineering from South Dakota State University. I am a registered professional engineer.
3.	**Q.**	Mr. Weir, could you tell us something about the applicant in this case, Dakota Gasification Company?
	A.	Dakota Gasification Company is a wholly owned subsidiary of Basin Electric Power Cooperative. Dakota Gasification Company is a North Dakota corporation and owns and operates the Great Plains Synfuels Plant, which is located near Beulah, North Dakota.
4.	**Q.**	Mr. Weir, could you provide a description of the Great Plains Synfuels Plant?
	A.	The synfuels plant is a coal gasification plant which uses a Lurgi coal gasification process to gasify lignite coal into gases and liquids. The plant consumes approximately 17,000 tons of lignite per day. When production is dedicated to synthetic gas production, the plant produces approximately 160 million standard cubic feet per day (**mmscf/d)** of synthetic natural gas. As byproducts, the plant produces a crude combination of krypton/xenon gas, liquid nitrogen, cresylic acid, phenol, ammonium sulfate and carbon dioxide. As a co-product, the plant is capable of producing up to 1,200 tons of anhydrous ammonia per day.
5.	**Q.**	Could you tell us a little about the plant's production of carbon dioxide?
	A.	Carbon dioxide is recovered at the synfuels plant using a Rectisol process that captures carbon dioxide with a purity of 95%. The carbon dioxide is compressed using three identical MAN Turbo AG compressors in parallel. These 19,500 horse power compressors increase the carbon dioxide pressure from about 7 per square inch gauge (**psig**) to nearly 2,700 psig. Each compressor has a flow capability of 57 mmscf/d. The synfuels plant currently captures approximately 49% of the carbon dioxide it previously emitted to the

		atmosphere.
6.	**Q.**	Why does Dakota Gasification Company capture this carbon dioxide at the plant?
	A.	Dakota Gasification sells the compressed carbon dioxide to two companies in Saskatchewan, EnCana Oil & Gas Partnership and Apache Canada Ltd., which use this carbon dioxide for enhanced oil recovery (**EOR**) at their Weyburn oil field and Midale oil field, respectively.
7.	**Q.**	Mr. Weir, how is this compressed carbon dioxide transported to Saskatchewan?
	A.	Dakota Gasification Company owns and operates a pipeline which delivers the compressed carbon dioxide from the Great Plains Synfuels Plant to the U.S./Canadian border where the pipeline interconnects with the Souris Valley Pipeline. The Souris Valley Pipeline is a pipeline owned by Souris Valley Pipeline Company, a company organized under the laws of Canada and a wholly owned subsidiary of Dakota Gasification Company. The Souris Valley Pipeline is operated by Dakota Gasification Company.
8.	**Q.**	Could you provide us with a general description of the pipelines?
	A.	The pipelines traverse approximately 167 miles in North Dakota and extend 38 miles in Saskatchewan, Canada, for a total length of 205 miles. Compressor stations at the Synfuels Plant-site and Tioga, North Dakota are used to boost the pressure of the carbon dioxide to approximately 2,700 psig to ensure delivery to the Weyburn and Midale oil fields at the contractually specified minimum of 2,200 psig. The pipeline is constructed of steel. The segment from the Synfuels Plant to the Tioga, North Dakota, area consists of 14-inch outside diameter pipeline. The segment from Tioga to the U.S./Canadian border and continuing to the delivery point at the Weyburn and Midale oil fields consists of 12-inch nominal diameter pipeline. The pipeline passes through the heart of North Dakota oil country and is nearby significant oil fields in Montana. Eleven tap points were installed on the pipeline. These taps would allow take off of carbon dioxide from the pipeline for a potential customer or customers without forcing a shutdown of the pipeline. The first tap is located near Killdeer, North Dakota and the last tap is located in Canada. The remaining taps are interspersed from the Little Missouri River to the North Dakota/Saskatchewan border.
9.	**Q.**	Mr. Weir, I am showing you a document that has been identified by the hearing officer as Exhibit ___. Do you recognize it sir?

	A.	Yes, that is the Consolidated Application of Dakota Gasification to the North Dakota Public Service Commission for a Certificate of Corridor Compatibility and Route Permit for Dakota Gasification Company's Carbon Dioxide Pipeline reconstruction project, including the attachments.
10.	**Q.**	Mr. Weir, what is the scope of your responsibilities at Dakota Gasification Company with respect to this project?
	A.	I am the project manager for this project and I have overall responsibility for the project.
11.	**Q.**	Mr. Weir, could you describe the proposed project that created the need for this proceeding?
	A.	Dakota Gasification Company has determined that it would be prudent to improve the pipeline's crossing of Lake Sakakawea. Given the protracted drought conditions in the Upper Missouri River watershed, coupled with the management of the reservoir by the United States Corps of Engineers, the level of the reservoir has dropped thirty feet since the pipeline was installed in the year 1999. Specifically, Dakota Gasification Company is concerned the pipeline may become exposed and could become a hazard to the public.
12.	**Q.**	Could you outline the extent of the area subject to disturbance as a result of the re-construction of the crossing?
	A.	The construction right-of-way (**ROW**) width will be 200 feet for the lake crossing. In addition, staging areas on either side of the lake will be required for construction. Existing roads will be used to access the construction ROW and staging areas. The permanent ROW width will be fifty feet.
13.	**Q.**	Where will the new line be placed and what will happen to the old pipeline following replacement?
	A.	To reduce any risks associated with the integrity of the pipeline at the lake crossing, Dakota Gasification Company plans to locate the replacement pipeline one hundred feet west of the existing line and provide six feet of cover. Once the new line is in place, the abandoned portion of the line will be removed from the lake.
14.	**Q.**	Could you describe the method of construction?
	A.	The "controlled depth tow" method of construction will be used where

		pipe sections are welded on-shore and pulled into place. (Our application stated we would use the "lay barge" method.) Heavy equipment to be used in the excavation activities for the lake crossing will consist of a barge-mounted dragline, tow boat, anchor/fuel barge and hydrographic survey boat. The trench will be excavated in the lake bottom to provide six feet of cover. Centerline alignment of the trench will be maintained using a shore-based laser, while range positions will be monitored using a shore-based electronic measuring device. The trench depth will be checked using hydrographic surveying equipment. During excavation, 200 feet of silt curtain will be placed on each side of the excavation/soil storage area to mitigate the movement of silt. The materials to be excavated will comprise approximately 78,000 yards, based on a four-foot wide trench bottom, 2.5:1 side slope, eight-foot trench depth, and a length of 11,000 feet. The material will be placed on the west side of the excavation. Once the pipe is in place on the trench bottom, excavated material will be returned to the trench in "plugs" spaced approximately 250 feet apart. The plugs are for the purpose of fixing the pipe in proper orientation and to prevent movement or displacement during subsequent backfilling operations. The trench will then be backfilled using the excavated spoil material. Once the new line is backfilled, the abandoned portion of the pipeline (11,400 feet) will be pulled from the lake with the use of a 100-ton winch.
15.	**Q.**	Mr. Weir could you describe the specifications for the pipeline?
	A.	The pipe size, material, and thickness will be the same as the current lake crossing, 0.500-inch wall bevel end 14 inches API 5L Gr. X65 seamless pipe. All pipe and field joints will be coated with fusion bonded epoxy (16 mils), and abrasion resistant epoxy (44 mils), and a two-inch concrete jacket weight coating. Field welds will be 100 percent radio graphed. The pipeline will be hydrostatically tested in accordance with applicable regulations to establish the maximum allowable operating pressure of 2,700 psig. Testing will be conducted for a minimum of eight hours (our application stated 24 hours) and will include a leak test. As I mentioned, the line will be located 100 feet to the west of the existing line and have a minimum cover in the lake bed of six feet. The length of replacement line will be approximately 11,400 feet and will be tied into the existing line with four 45° elbows as indicated in Figure 1.1 in our application.
16.	**Q.**	Mr. Weir, is the gas that is transported by the pipeline a pure stream of carbon dioxide?

	A.	No, the stream is not 100% carbon dioxide. As outlined in Table 1-1 of Dakota Gasification Company's application, the typical analysis of the stream is a composition of 95.95% of carbon dioxide.
17.	**Q.**	Does this stream contain any hydrogen sulfide?
	A.	Yes, on average, the stream contains approximately 0.80% hydrogen sulfide, but the hydrogen sulfide content from time-to-time may jump to a maximum as high as 2%.
18.	**Q.**	What about the balance of the stream?
	A.	The balance is made up of very small percentages of various hydrocarbons such as ethane, methane, propane, ethylene and various types of butane. In fact, prior to our diverting, compressing, transporting and selling this stream for EOR, this stream was combusted in our boilers. While the percentage of hydrocarbons is quite small, given the large volume of the stream, it was economic to use this stream for these hydrocarbons in our boilers for fuel.
	Foss:	Thank you, Mr. Weir. I have no further questions at this time.

LIST OF EXHIBITS

Consolidated Application of Dakota Gasification Company to the North Dakota Public Service Commission for a Certificate of Corridor Compatibility and Route Permit for Dakota Gasification Company's Carbon Dioxide Pipeline Reconstruction Project

CONSOLIDATED APPLICATION
TO
NORTH DAKOTA PUBLIC SERVICE COMMISSION
FOR
CERTIFICATE OF CORRIDOR COMPATIBILITY/ROUTE PERMIT
FOR THE DAKOTA GASIFICATION COMPANY
CO_2 PIPELINE LAKE SAKAKAWEA CROSSING PROJECT
(Case Number PU-07-184)

By

DAKOTA GASIFICATION COMPANY
Bismarck, North Dakota

May 2007

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1.0 DESCRIPTION OF FACILITY

1.1 Type

Dakota Gasification Company (DGC) owns and operates a pipeline which delivers carbon dioxide (CO_2) from the Great Plains Synfuels Plant located near Beulah, North Dakota, in Mercer County, to the U.S./Canadian border where it interconnects with the Souris Valley Pipeline. The CO_2 is used in Canada for enhanced oil recovery (EOR).

The pipeline traverses approximately 167 miles in North Dakota and 38 miles in Saskatchewan, Canada, for a total length of 205 miles. Compressor stations at the Synfuels Plant-site and Tioga, North Dakota are used to boost the pressure of the gas to approximately 2,700 pounds per square inch gauge (psig); to ensure delivery to the Weyburn and Midale oil fields at a minimum of 2,200 psig. All the pipeline is constructed of steel. The segment from the Synfuels Plant to the Tioga, North Dakota, area consists of 14-inch outside diameter pipeline. The segment from Tioga to the U.S./Canadian border and continuing to the delivery point at the Weyburn and Midale oil fields consists of 12-inch nominal diameter pipeline.

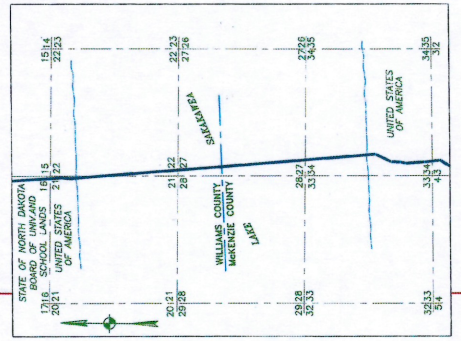
The pipeline and associated facilities are designed, constructed, operated, and maintained in strict accordance with the requirements of the U.S. Department of Transportation Pipeline Safety Regulations Code of Federal Regulations (CFR) Title 49, Part 195, Transportation of Hazardous Liquids by Pipeline, as well as other applicable codes, regulations, and standards in the United States and Canada.

Figure 1.1 shows the general location where the pipeline crosses Lake Sakakawea. For the initial lake crossing the pipeline was trenched with a minimum cover of four feet to a lake bottom elevation of 1,805 feet. Below elevation 1,805, the line was laid on the bottom of the lake. Since the installation of the pipeline crossing in 1999, the lake level has dropped substantially (30 feet).

To reduce any risks associated with the integrity of the pipeline at the lake crossing, DGC is proposing to relocate the CO_2 line 100 feet west of the existing line and provide six feet of cover. Once the new line is in place, the abandoned portion of the line will be removed from the lake. Figure 1.1 shows the location of the proposed line and the location of work areas required for construction.

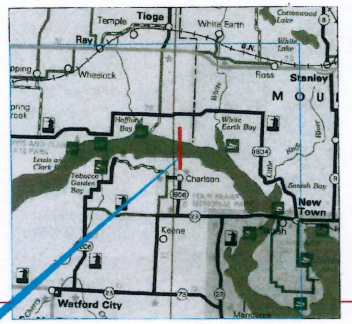
1.2 Product

The CO_2 is a byproduct of the Synfuels Plant. At full production rate, this stream amounts to approximately 240 million standard cubic feet per day (scfd). DGC is capable of delivering 165 million scfd of CO_2 to Canada. Rates normally average 150 million scfd. The composition of the CO_2 stream is shown in Table 1-1. The stream consists of approximately 96 percent CO_2 with expected variations.



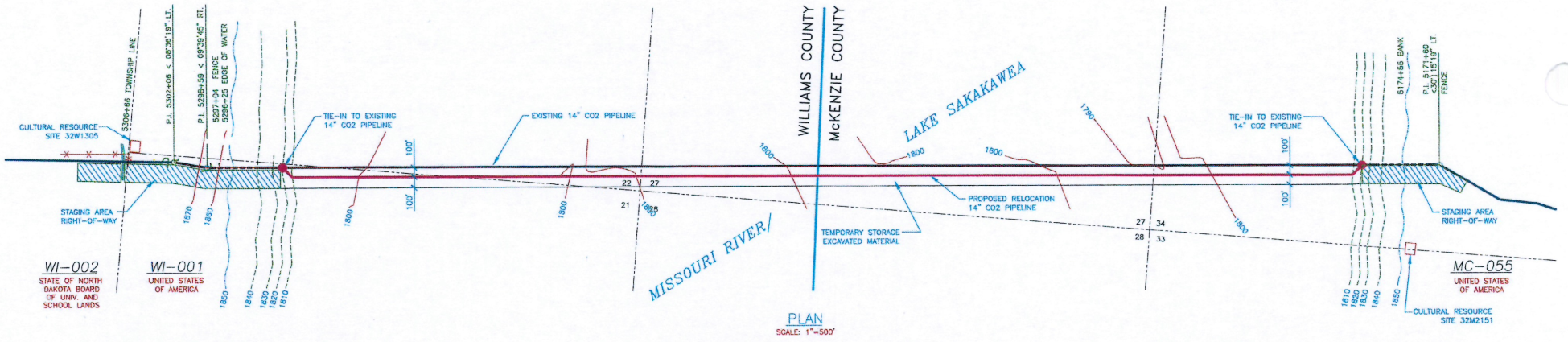
LOCATION MAP
SCALE: 1"=1000'

CORRIDOR BOUNDARY

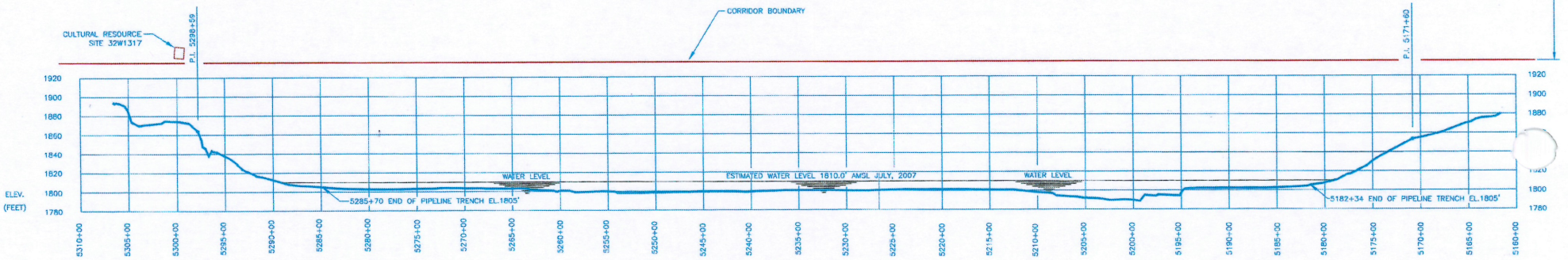


AREA OF CROSSING

AREA MAP
N.T.S.



PLAN
SCALE: 1"=500'



PROFILE
HORIZONTAL SCALE: 1"=500'
VERTICAL SCALE: 1"=50'

REFERENCE DRAWINGS	
DESCRIPTION	DRAWING NO.
ALIGNMENT SHEET	D7400-023-C

REV	ISSUE DATE	DESCRIPTION	DWN	CHK	APP	APP	APP
0	4/4/08	ORIGINAL DESIGN	CJA	RN	MAL		

THIS DRAWING IS THE PROPERTY OF THE DAKOTA GASIFICATION CO AND MAY NOT BE COPIED OR USED WITHOUT PRIOR AUTHORIZATI

DAKOTA GASIFICATION COMPANY
P.O. BOX 1149
BEULAH, ND 58523

CO_2 PIPELINE U.S. – 7400 ARE
LAKE SAKAKAWEA CROSSING
FIGURE 1.1

DWG. NO: D7400-129-C SCALE: AS NOTED
LOC. NO: D00024031

TABLE 1-1
Composition of CO_2 Product

Component	Mole Percentage
Carbon Dioxide	95.95
Ethane	1.22
Methane	1.13
Hydrogen Sulfide	0.80
Carbon Monoxide	0.22
Propane	0.22
Ethylene	0.19
Propylene	0.11
Hydrogen	0.06
n-Butane	0.03
i-Butane	0.05
Butenes	0.03

Note: Average molecular weight = 43.36.
Moisture content may be assumed to be 0 percent. Hydrogen sulfide content may vary up to a maximum of 2.0 percent by volume.

1.3 Size and Design

1.3.1 Right-of-Way and Construction

The construction right-of-way (ROW) width will be 200 feet for the lake crossing. In addition, staging areas on either side of the lake will be required for construction. Figure 1.1 shows the construction ROW and staging areas. Existing roads will be used to access the construction ROW and staging areas. The permanent ROW width will be fifty feet.

The "lay barge" method of construction will be used where all pipe laying operations are conducted from a barge. Heavy equipment to be used in the excavation activities for the lake crossing will consist of a barge-mounted dragline, tow boat, anchor/fuel barge, and hydrographic survey boat.

The trench will be excavated in the lake bottom to provide six feet of cover. Centerline alignment of the trench will be maintained using a shore-based laser, while range positions will be monitored using a shore-based electronic measuring device. The trench depth will be checked using hydrographic surveying equipment. During excavation, 200 feet of silt curtain will be placed on each side of the excavation/soil storage area to mitigate the movement of silt. The materials to be excavated will comprise about 78,000 yards, based on a four-foot wide trench bottom, 2.5:1 side slope, eight-foot trench depth, and a length of 11,000 feet. The material will be placed on the west side of the excavation. Once the pipes are in place on the trench bottom, excavated material will be returned to the trench in "plugs" spaced approximately 250 feet apart. The plugs are for the purpose of fixing the pipes in proper orientation and to prevent movement or displacement during subsequent backfilling operations. The trench will then be backfilled using the excavated spoil material. Once the new line is backfilled, the abandoned

portion of the pipeline (11,400 feet) will be pulled from the lake with the use of a 100-ton winch.

1.3.2 Pipeline Specifications

The pipe size, material, and thickness will be the same as the current lake crossing, 0.500-inch wall bevel end 14 inches API SL Gr. X65 seamless pipe. All pipe and field joints will be coated with fusion bonded epoxy (16 mils), and abrasion resistant epoxy (44 mils), and a two-inch concrete jacket weight coating. Field welds will be 100 percent radiographed. The pipeline will be hydrostatically tested in accordance with applicable regulations to establish the maximum allowable operating pressure of 2,700 psig. Testing will be conducted for a minimum of 24 hours and will include a leak test.

The line will be located 100 feet to the west of the existing line and have a minimum cover in the lake bed of six feet. The length of replacement line will be approximately 11,400 feet and will be tied into the existing line with two 45° elbows at the locations shown in Figure 1.1.

1.4 Time Schedule

The proposed time schedule for construction of this project is as follows:

TABLE 1-2

Tank	Date
U.S. Army Corp of Engineers 404 Permit Submittal	04/20/07
PSC Route Permit Submittal	05/11/07
Right-of-Way Acquisition Complete	07/02/07
Construction Start Date	07/16/07
Construction Complete	10/12/07
Test Operations	10/15/07
In-service Date	10/17/07

2.0 STUDIES

Sensitive plant and wildlife potentially affected by the project were evaluated. Information related to sensitive species was obtained from several agencies including the U.S. Fish & Wildlife Services, North Dakota Game & Fish Department, and the U.S. Army Corps of Engineers (COE). Sensitive species potentially present along or near the proposed route include the interior least tern and piping plover. The tern and plover are known to nest and raise young on sandbars and long sparsely vegetated beaches of Lake Sakakawea; however, no active nesting has been documented near the proposed pipeline crossing at Lake Sakakawea.

Three sensitive fish species (pallid sturgeon, sicklefin chub, and sturgeon chub) potentially occur in aquatic habitats crossed by the proposed route (Lake Sakakawea). The proposed construction schedule for the Lake Sakakawea crossing (mid-July to late October) will avoid the spawning periods of these species.

Class I and Class III Cultural Resources Inventory Reports were submitted and approved by the State Historical Society when the pipeline crossing was initially installed. A copy of the Class III Cultural Resource Management Report for the Lake Crossing Area is enclosed in Attachment 1. This report inventoried cultural resources within the one-mile corridor on U.S. Army Corps of Engineers land in McKenzie and Williams Counties. Figure 1.1 shows the location of each site within the corridor. Site 32WI305 is the closest site but east of the existing pipeline and should not be impacted by any construction. Site 32MZ151 located on the south bank of Lake Sakakawea near the pipeline is the only site which could be potentially impacted from this project. Based on a preliminary review, the ROW for the pipeline crossing will be at least 200 feet away. To ensure the site is not disturbed, the area will be marked prior to any construction activities.

3.0 NEED FOR FACILITY

3.1 Analysis of Need Based on Present and Projected Demand, Including System Studies

Since the initial installation of the DGC Lake Sakakawea CO_2 pipeline crossing in 1999, the lake level has dropped significantly (30 feet). This project needs to be completed to ensure the integrity and safety of the existing pipeline by providing a minimum of six feet of cover over the pipeline where it crosses Lake Sakakawea. The continued operation of the CO_2 pipeline is vital to the operation of the Great Plains Synfuels Plant and the recovery of oil in the Weyburn and Midale oil fields. In addition, the CO_2 pipeline provides an environmentally sound means to reduce/capture CO_2 emissions by sequestering the CO_2 in deep geologic formations.

3.2 Description of Feasible Alternative Methods of Serving the Need

There are no other feasible alternatives.

3.3 Statement Justifying Deviations from the Most Recent Ten-year Plan

DGC filed a Ten-year Plan with the North Dakota Public Service Commission on November 14, 2006 for the entire pipeline. This project does not deviate from that plan.

4.0 LOCATION

The proposed pipeline corridor/route (Figure 1.1) is a 1.0 by 2.7 mile area and lies within both McKenzie and Williams Counties in northwestern North Dakota.

4.1 Policies and Commitments to Limit Environmental Impacts

In addition to the telemetry (SCADA) monitoring system, the proposed mitigative measures and proposed reclamation measures (Section 4.5), DGC also adheres to their General Safety and Health, and Environmental Commitment and Compliance Board policies (Figure 4.1) to limit environmental impacts.

Figure 4.1
Board Policy Nos. 11 and 12

ADOPTED: **LAST REVISION:**	**05-10-89**	Great Plains SYNFUELS	**BOARD POLICY 11**

11 – GENERAL SAFETY AND HEALTH

It is the policy of Dakota Gasification Company to comply with all federal, state and local safety and health standards. A strong safety and health program will be implemented to ensure that safe and healthful work places are provided to all employees, that safe work practices are employed, and necessary resources be committed to the program.

This policy will be implemented at all facilities and work sites and includes all employees.

ADOPTED: **LAST REVISION:**	**05-10-89**	Great Plains SYNFUELS	**BOARD POLICY 12**

12 – ENVIRONMENTAL COMMITMENT & COMPLIANCE

It is the policy of Dakota Gasification Company to maintain compliance with all federal, state and local environmental legislation and regulations. The Company recognizes the need to maintain a healthy environment for all employees and for citizens in the surrounding areas and commits its support to management in the pursuit of that need.

4.2 North Dakota Century Code, Section 49-22-09

Factors to be considered in evaluating application and designation of sites, corridors, and routes as outlined by the NDPSC (1995) are listed below. The commission shall be guided by, but is not limited to, the following considerations, where applicable, to aid the evaluation and designation of sties, corridors, and routes:

1. *Available research and investigations relating to the effects of the location, construction, and operation of the proposed facility on public health and welfare, natural resources, and the environment.*

   When the pipeline was initially permitted, separate Environmental Assessments (EAs) were prepared for the U.S. Forest Service (USFS) and the Bureau of Land Management (BLM) to address the federal lands crossed by the proposed route in compliance with the National Environmental Policy Act. In addition, a Section 404/10 Permit application was submitted to the U.S. Army Corps of Engineers (COE) for waters of the U.S. (Lake Sakakawea).

   The pipeline system has been studied to determine the effectiveness of pipeline safety systems including leak/rupture detection and automatic block valve closure at approximately 14 locations along the pipeline route. Safety systems are designed to mitigate the potential effects of releases from the pipeline by limiting the amount of pipeline product that can be released into the atmosphere in the event of an accidental release.

   Pipeline safety system evaluations have been conducted; this involved the determination of pipeline safety effectiveness relative to simulations of potential pipeline releases. Through the results of the accidental release simulations, DGC is able to document the effectiveness of pipeline safety systems and enhance the safety of the public and workers.

   Class I and Class III Cultural Resources Inventory Reports were submitted and approved by the State Historical Society when the pipeline crossing was initially installed. Attached is a copy of the Class III Cultural Resource Management Report for the Lake Crossing Area. This report inventoried cultural resources within the one-mile corridor on U.S. Army Corps of Engineers land in McKenzie and Williams Counties.

   The North Dakota Natural Heritage Inventory also provided database information regarding threatened, endangered, federal candidate, and state sensitive plant species. Information related to sensitive plants and animals was also obtained from published and unpublished literature and through consultation with the U.S. Fish and Wildlife Service (USFWS), North Dakota Game and Fish Department, USFS, and BLM.

2. *The effects of new energy conversion and transmission technologies and systems designed to minimize adverse environmental effects.*

   A telemetry (SCADA) system provides 24-hour monitoring of the pipeline and compressor operations, including pressures, temperatures, and flow rates. This telemetry system enhances immediate response capability to any potential

problems. The pipeline is designed to accommodate an instrumented internal inspection device to detect and record the type and location of corrosion or other defects for long-term monitoring of the pipeline integrity.

3. *The potential for beneficial uses of waste energy from a proposed energy conversion facility.*

   The CO_2 transported in the pipeline facility is a gasification process off-gas stream that is put to beneficial use for tertiary oil recovery. It was previously used as a low-Btu fuel at the Synfuels Plant and subsequently vented to the atmosphere.

4. *Adverse direct and indirect environmental effects that cannot be avoided should the proposed site or route be designated.*

   To the extent practicable, all effects of pipeline construction will be mitigated. All lands disturbed will be returned to their current land uses. No other permanent direct or indirect adverse effects are anticipated.

5. *Alternatives to the proposed site, corridor, or route that are developed during the hearing process and that minimize adverse effects.*

   There are no other corridors/routes that will meet the proposed project needs.

6. *Irreversible and irretrievable commitments of natural resources should the proposed site, corridor, or route be designated.*

   No irreversible or irretrievable commitments of natural resources are anticipated. All areas of natural vegetation within the ROW will be reclaimed with agency-recommended seed mixtures, lake water quality issues will be mitigated with controls, and no agricultural lands will be taken permanently out of production.

7. *The direct and indirect economic impacts of the proposed facility.*

   Several direct and indirect economic impacts will result from the proposed project. The project will provide an economic benefit to the Great Plains Synfuels Plant, a significant source of employment and income for North Dakota residents, and will stimulate the local economy through the spending of workers' wages and DGC purchases of goods and services. The temporary influx of workers for the construction period will impact markets for temporary accommodations in the area and increase local business activity.

8. *Existing plans of the state, local government, and private entities for other developments at or in the vicinity of the proposed site, corridor, or route.*

   Currently, DGC is not aware of other planned developments in the vicinity of the proposed route.

9. *The effect of the proposed site or route on existing scenic areas, historic sites and structures, and paleontological or archaeological sites.*

   The proposed corridor does encompass some historical sites as identified in the attached Class III Cultural Resources Inventory. The proposed route will avoid any such sites.

10. *The effect of the proposed site or route on areas that are unique because of biological wealth or because they are habitats for rare and endangered species.*

    Sensitive plant and wildlife potentially affected by the project were evaluated. Information related to sensitive species was obtained from several agencies including the U.S. Fish & Wildlife Services, North Dakota Game & Fish Department, and the U.S. Army Corps of Engineers (COE). Sensitive species potentially present along or near the proposed route include the interior least tern and piping plover. The tern and plover are known to nest and raise young on sandbars and long sparsely vegetated beaches of Lake Sakakawea; however, no active nesting has been documented near the proposed pipeline crossing at Lake Sakakawea.

    Three sensitive fish species (pallid sturgeon, sicklefin chub, and sturgeon chub) potentially occur in aquatic habitats crossed by the proposed route, specifically Lake Sakakawea. The proposed construction schedule for the Lake Sakakawea crossing (mid-July to late October) will avoid the spawning periods of these species.

11. *Problems raised by federal agencies, other state agencies, and local entities.*

    To date, no problems have been identified.

4.3 Proposed Route Location and Selection Criteria

The proposed corridor/route location for the DGC Lake Sakakawea CO_2 pipeline crossing is shown in Figure 1-1. The location and selection criteria were based simply on relocating, as close to the existing line as possible, the portion of the pipeline crossing which does not have adequate cover.

4.4 North Dakota Public Service Commission Criteria

Exclusion and avoidance areas as defined by the NDPSC have been inventoried for the designated one-mile corridor/route and are identified on Figure 1.1. The route alignment within the corridor avoids exclusion and avoidance areas. The criteria used to identify these areas are summarized in Sections 4.4.1 through 4.4.6.

4.4.1 Exclusion Areas

The following geographical areas will be excluded in the consideration of a route for a transmission facility (NDPSC 1995).

- *Designated or registered national: parks; memorial parks; historic sites and landmarks; natural landmarks; monuments; and wilderness areas.*

  None crossed.

- *Designated or registered state: parks; historic sites; monuments; historical markers; archaeological sites; and nature preserves.*

  None crossed.

- *County parks and recreational areas; municipal parks; and parks owned or administered by other governmental subdivisions.*

  None crossed.

- *Areas critical to the life stages of threatened or endangered animal or plant species.*

  None crossed.

- *Areas where animal or plant species that are unique or rare to this state would be irreversibly damaged.*

  None crossed.

4.4.2 Avoidance Areas

The following geographical areas will not be considered in the routing of a transmission facility unless the applicant shows that, under the circumstances, there is no reasonable alternative (NDPSC 1995). In determining whether an avoidance area should be designated for a facility, the NDPSC may consider, among other things, the proposed management of adverse impacts; the orderly siting of facilities; system reliability and integrity; the efficient use of resources; and alternative routes. Economic considerations alone will not justify approval of these areas. A buffer zone of a reasonable width to protect the integrity of the area shall be included unless a distance is specified in the criteria. As with exclusion areas, natural screening may be considered in determining the width of the buffer zone.

- *Designated or registered national: historic districts; wildlife areas; wild, scenic, or recreational rivers; wildlife refuges; and grasslands.*

  None crossed.

- *Designated or registered state: wild, scenic, or recreational rivers; game refuges; game management areas; management areas; forests; forest management lands; and grasslands.*

  None crossed.

- *Historical resources that are not specifically designated as exclusion or avoidance areas.*

  The Class III Cultural Resources Inventory Report identifies three cultural resource sites in the proposed corridor. Site 32WI305 is the closest site but east of the existing pipeline and should not be impacted by any construction. Site 32MZ151 located on the south bank of Lake Sakakawea near the pipeline is the only site which could be potentially impacted from this project. (Figure 1.1 shows the location of each site.)

- *Areas that are geologically unstable.*

  None crossed.

- *Areas within 500 feet of a farmhouse, rural residence, or place of business. This criterion will not apply to a water pipeline transmission facility.*

  None crossed.

- *Reservoirs and municipal water supplies.*

  Lake Sakakawea is an avoidance area DGC proposes to cross.

- *Water sources for organized rural water districts.*

  None crossed.

- *Irrigated land. This criterion will not apply to an underground transmission facility.*

  None crossed.

- *Areas of recreational significance that are not designated as exclusion areas.*

  Lake Sakakawea is an avoidance area DGC proposes to cross.

4.4.3 Selection Criteria

Several resources are specifically identified in the NDPSC selection criteria. Steps that DGC proposed to take to minimize impacts to the selection criteria are discussed in the following. More detailed discussions of measures to minimize impacts are presented in Section 4.5.

1) *Agricultural Production and the Agricultural Quality of the Cropland*

   None crossed.

2) *Family Farms, Ranches, and Rural Residences*

   None within 1,000 feet.

3) *Land Suitable to Irrigation*

None crossed.

4) *Surface Drainage and Groundwater Flow Patterns*

Watercourse banks will be stabilized with vegetation, riprap, bank stabilization materials, and/or sediment filters. Trench spoil will be prevented from re-entry into the water flow by placing it at least 10 feet from the stream bank. Berms will be constructed on slopes to control runoff and minimize erosion. Staging areas will be located a minimum of 50 feet from stream banks with hazardous storage sites and equipment refueling sites at least 100 feet from stream banks, thereby minimizing the potential for impacts to surface drainage flow.

5) *Noise-Sensitive Land Uses*

N/A

6) *Visual Effect on Adjacent Areas*

All disturbed lands will be reclaimed and placed back to original land use.

7) *Extractive and Storage Resources*

No extractive and storage resources will be impacted.

8) *Wetlands, Woodlands, and Wooded Areas*

N/A

9) *Communication Facilities*

Given that the proposed facility is an underground pipeline, it should have no impacts on either communication transmission or reception.

10) *Human Health and Safety*

All pipeline construction will be in strict conformance with U.S. Department of Transportation Pipeline Safety Regulations (CFR Title 49 Part 195). A telemetry system and internal inspection device is used to monitor the integrity of the pipeline and enhance response time to the pipeline in the event of an emergency. Water used for hydrostatic testing of the new pipeline will be chemical free and will be properly disposed of after testing has been completed.

In the unlikely event of an accidental release from the pipeline, CO_2 and small amounts of other minor constituents including H_2S will be released into the atmosphere. In the event of a pipeline rupture, block valves are used to isolate the affected section of pipe and thus limit the amount of

product released. Leaks are more difficult to detect and product could potentially be released over a longer period of time without detection. In order to predict the possible human health consequences that could potentially result from pipeline ruptures or leaks, DGC conducted a worst-case modeling exercise to determine the extent of the area in the vicinity of the pipeline that might be affected by ruptures or leaks. The modeling research results are summarized below.

The modeling results indicate that a catastrophic failure resulting in a hole as large as the pipeline itself presents the worst-case scenario in terms of highest concentrations of CO_2 or H_2S at the greatest distances. A full pipe diameter rupture could potentially produce concentrations of CO_2 considered to be immediately dangerous to life and health (IDLH) at a distance of 760 feet. Assuming that H_2S is approximately 0.89 mol percent of the pipeline product, a full diameter failure of the pipeline could potentially cause H_2S concentrations to be considered an IDLH at a distance of 1,940 feet from the rupture.

A statistical analysis was performed to assess the risks to an individual from accidental release of CO_2 and H_2S at certain locations or receptors identified along the pipeline route. CO_2 and H_2S total impact probabilities at receptors were estimated using data on the likelihood that an accident will occur anywhere along the pipeline, meteorological conditions, and the chance that an accident will be located within the predicted maximum threshold impact distance from a receptor. Only the H_2S 30-minute IDLH concentration of 100 ppm was predicted to reach a receptor, and the predicted probability of impact was 1 in 44,000. The probability of impact for the other thresholds did not exist since the threshold concentrations were not predicted to be observed at any receptors.

The total impact probabilities determined in this report only assess the probability of an impact at the receptor indicated. Variables such as the population density and frequency of visits at these receptors have not been included in these calculations since the distribution of these variables is unknown. Implicit in the impact probabilities is a population of 1.0 person-years (i.e. one person at the receptor for every minute during the year). Therefore, the actual CO_2 and H_2S exposure risks may be overstated for remote areas where population densities are low and receptor occupancy is not full-time. Conversely, the risks may be understated for receptors with high population densities and/or relatively long residence periods.

DGC has developed an Emergency Response Plan. The Plan addresses an accidental release of the operating pipeline and outlines pre-emergency planning and education, operational safety precautions, emergency response procedures, and associated agency coordination. DGC has distributed information regarding emergency preparedness and response to appropriate local agencies and the public residing adjacent to the pipeline.

11) *Animal Health and Safety*

Impacts to animal health and safety will be minimized through sound construction and operation practices. Surface water, typically utilized by animals, will be protected from contamination by locating staging areas a minimum of 50 feet from stream banks and hazardous substance storage areas and refueling sites a minimum of 100 feet from stream banks.

12) *Plant Life*

Impacts to plant life are limited to the disturbed portions of the ROW.

4.4.4 Policy Criteria

The NDPSC may give preference to an applicant that will maximize benefits that result from the adoption of the following policies and practices and, in a proper case, may require the adoption of such policies and practices (NDPSC 1995). Some of these practices may apply to the proposed project, and DGC has incorporated them where possible (e.g., utilization of existing and proposed ROWs and potential future commitment of a portion of the transmitted product for use in North Dakota).

- *Location and design;*

  The line will be located 100 feet to the west of the existing line and have a minimum cover in the lake bed of six feet. The length of replacement line will be approximately 11,400 feet and will be tied into the existing line with two 45° elbows at the locations shown in Figure 1.1.

  The pipe size, material, and thickness will be the same as the current lake crossing, 0.500-inch wall bevel end 14-inches API SL Gr. X65 seamless pipe. All pipe and field joints will be coated with fusion bonded epoxy (16 mils), and abrasion resistant epoxy (44 mils), and a two-inch concrete jacket weight coating. Field welds will be 100 percent radiographed. The pipeline will be hydrostatically tested in accordance with applicable regulations to establish the maximum allowable operating pressure of 2,700 psig. Testing will be conducted for a minimum of 24 hours and will include a leak test.

- *Training and utilization of available labor in this state for the general and specialized skills required;*

  DGC has had a longstanding commitment to North Dakota's people and economy, providing continuous employment for managerial, technical, and operating staff. For this project, DGC is utilizing North Dakota staff for project management and technical support. DGC will solicit bids from North Dakota-based companies for equipment and services whenever possible.

- *Economics of construction and operation;*

  DGC has attempted to maximize the economics by installing the new line as close to the existing line as possible and reducing the downtime for the CO_2 pipeline when the tie-ins are made.

- *Use of citizen coordinating committees;*

  None were believed appropriate for this type of pipeline project.

- *A commitment of a portion of the transmitted product for use in this state;*

  The pipeline is installed with fittings (mainline valves) to allow for the construction of lateral pipelines to serve potential future customers in North Dakota.

- *Labor relations;*

  Installation of the pipeline will be performed by companies subcontracted for the project. DGC requires that these companies comply with all appropriate federal, state, and local laws.

- *The coordination of facilities;*

  N/A

- *Monitoring of impacts;*

  During construction, DGC will provide silt control/monitoring in the lake and monitor revegetation (see Section 4.5).

- *Utilization of existing and proposed ROWs and corridors; and*

  The proposed pipeline parallels the existing pipeline and ROW.

- *Other existing or proposed transmission facilities.*

  None.

4.4.5 Design and Construction Limitations

The primary design and construction limitations considered are to provide a minimum of six feet of cover over the new pipeline and to minimize impact to the lake and the adjacent shore land.

4.4.6 Economic Considerations

DGC is committed to constructing the proposed pipeline as economically as possible while strictly adhering to the NDPSC criteria outlined in Section 4.0. The anticipated construction cost for installation of the pipeline project is $10.5 million.

4.5 General Mitigative Measures and ROW Preparation, Construction, and Reclamation Procedures

4.5.1 General Mitigative Measures

- Surveys for the interior least tern and piping plover are conducted annually by the COE. Based on discussions with the COE and USFWS, no nests have been recorded near the proposed route. If agency surveys indicate that active nests are present near (within 0.25 miles) the route, potential mitigation measures will be evaluated in coordination with the COE and USFWS.

- Pipeline construction across Lake Sakakawea will be completed during the period from early July to late October. This construction schedule will avoid spawning and migration periods of sensitive fish species (e.g., pallid sturgeon).

4.5.2 ROW Preparation, Construction, and Reclamation Procedure

4.5.2.1 Clearing and Site Preparation

The staging area right-of-way (ROW) will be cleared of obstructions and graded where necessary to permit construction equipment to operate safely. The extent of clearing and surface preparation will be restricted to the ROW and to the minimum area necessary for construction. Landowner easement provisions will be adhered to.

Shrubs will be removed from the ROW. The root systems of woody plants on the spoil side of the ROW will be preserved where possible. Where shrubs are large enough to interfere with construction equipment, additional clearing may be necessary. Cleared vegetative material may be chipped and spread over disturbed areas to serve as mulch, burned where permitted, placed in piles for wildlife habitat, or removed to disposal areas as specified by agencies with jurisdiction.

Trees will be cut and removed from the ROW, staging, or work areas and salvaged or disposed of according to landowner or agency requirements. Trees will be felled parallel to and within the construction ROW.

4.5.2.2 Grading

In some areas, cutting and filling may be necessary to permit safe construction activities. Cuts and fills will be limited to that necessary for trenching operations.

Topsoil will be preserved to the extent practical. Subsoil materials from cuts will be stockpiled for recontouring upon completion of trenching operations. Excess material will be shaped to blend with

adjoining lands and to provide a landform suitable for revegetation.

4.5.2.3 Trenching

Trenching on land will be completed with a backhoe. Where standard ditching is performed, the ditch spoil will be placed in one windrow, whether excavated with a wheel trencher, backhoe, or a combination. Where double ditching is required, the topsoil will be excavated and placed in a windrow separate from the ditch subsoil. Mixing of topsoil with subsoil will be prevented by stripping topsoil from either the full work area or from the trench and subsoil storage area (ditch plus spoil side method). All land trench areas will be restored to original contours.

4.5.2.4 Backfilling

After the pipe has been lowered into the trench and its position inspected and approved, the trench will be backfilled.

- With standard backfilling, the windrow of spoil material will be returned to the trench with a crown of soil, normally 12 inches, which compensates for settlement. Excess spoil will be spread in a thin layer over the ROW.

- Where topsoil is segregated, the windrow of subsurface soil will be returned to the trench leaving sufficient space for the return of the topsoil windrow.

4.5.2.5 Temporary Access Roads

Access to the ROW will normally be from existing public roads. Where public roads do not provide sufficient access to the ROW, temporary access roads may be required. No new permanent access roads will be required. The Contractor will be responsible for obtaining permission for utilizing private roads and trails. Upgrading existing trails or constructing new temporary access roads, if required, will be in accordance with the following guidelines:

- Temporary roads will be located where possible to avoid erosion prone areas, drainages, areas of woody cover, wetlands, or other sensitive areas and are subject to approval by DGC and the landowner, or appropriate agency.

- Temporary roads will be designed with culverts properly located to minimize erosion and sedimentation.

- Dust will be controlled, where required, by a suitable water sprinkling program or surfacing with dust-free materials.

4.5.2.6 Lake Sakakawea Crossing

The "lay barge" method of construction will be used where all pipe laying operations are conducted from a barge. Heavy equipment to be used in the excavation activities for the lake crossing will consist of barge-mounted dragline, tow boat, anchor/fuel barge, and a hydrographic survey boat. Other equipment will consist of that needed to transport, offload, position, and handle pipe, including welding machines, bulldozers, track hoes, motor graders, and miscellaneous service vehicles. Fuel will be provided in support vehicles designed for safety and for pollution control. Fuel reserves, other than that contained in the service vehicles, will not be stored on-site.

The trench will be excavated to provide six feet of cover in the lake bottom. Centerline alignment of the trench will be maintained using a shore-based laser, while range positions will be monitored using a shore-based electronic measuring device. The trench depth will be checked using hydrographic surveying equipment. During excavation, 200 feet of silt curtain will be placed on each side of the excavation/soil storage area to mitigate the movement of silt. The materials to be excavated will comprised of about 78,000 yards, based on a four-foot wide trench bottom, 2.5:1 side slope, eight-foot trench depth, and a length of 11,000 feet. The material will be placed on the west side of the excavation. Once the pipes are in place on the trench bottom, excavated material will be returned to the trench in "plugs" spaced approximately 250 feet apart. The plugs are for the purpose of fixing the pipes in proper orientation and to prevent movement or displacement during subsequent backfilling operations. The trench will then be backfilled using the excavated spoil material. Once the new line is backfilled, the abandoned portion of the pipeline (11,400 feet) will be pulled from the lake with the use of a 100-ton winch.

Bank erosion control measures will be implemented at both shorelines to prevent exposure of the pipes to damage and to prevent loss of material shoreline. The control measures will be implemented in the shoreline interval beginning at the water level at the time of construction and continuing to existing riprap. As required by the U.S. Department of Transportation, Office of Pipeline Safety, and in keeping with good industry practices, DGC will maintain the lake banks at the pipe crossing and augment the erosion control measures if erosion occurs.

4.5.2.7 Erosion and Sedimentation Control

Temporary erosion and sedimentation controls will be installed immediately after initial disturbance of the soil. They will be properly maintained on a daily basis throughout construction and reinstalled as necessary until replaced by permanent erosion controls or restoration is complete.

- Where appropriate, slope breakers will be installed to reduce runoff velocity and divert water off the construction ROW. These will be constructed of soil, silt fence, staked hay or straw bales, or sandbags depending on site conditions. The type and spacing will be determined based on slope, soil erodibility, ground cover, expected runoff, and capacity requirements.

- Sediment barriers will be used to stop or reduce the flow of sediment. These will be constructed of materials such as silt fence, staked hay or straw bales, or sandbags.

- Waterbody sediment barriers will be installed immediately after initial disturbance of the waterbody or adjacent upland. These will be installed along the edge of the construction ROW as necessary to contain spoil and sediment within the ROW. These sediment barriers will be removed during ROW cleanup.

Mulch will be applied to stabilize the soil surface; it will consist of straw, hay, erosion control fabric, or some functional equivalent. Mulch will be applied before seeding if restoration activity is interrupted for extended periods, such as when seeding cannot be completed due to seeding period restrictions.

4.6 Qualifications

Dakota Gasification Company:

Robert Weir	B.S. Civil Engineering 12 Years Experience	Project Manager
Rick Nelson	B.S. Civil Engineering M.S. Civil Engineering 30 Years Experience	Sr. Environmental Engineer
Mark Foss	Juris Doctorate 29 Years Experience	General Counsel

4.7 Maps

DGC requests that NDPSC Mylar map and aerial photograph requirements be waived for this application. A color map of the proposed project area is enclosed in Attachment 2.

ATTACHMENT 1

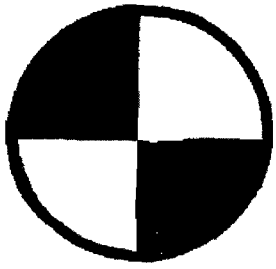
Cultural Resource Management Report

DAKOTA GASIFICATION COMPANY CO_2 PIPELINE, A CLASS III CULTURAL RESOURCES INVENTORY REPORT OF U.S. ARMY CORPS OF ENGINEERS LANDS IN McKENZIE COUNTY AND WILLIAMS COUNTIES, NORTH DAKOTA

Written By:
Byron L. Olson, M.A.
Project Archaeologist

Lucy H. Bambrey, M.A.
Principal Investigator

Prepared For:
ENSR Consulting and Engineering
1601 Prospect Parkway
Fort Collins, Colorado 80525



POWERS ELEVATION CO., INC.

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(303) 321-2217
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Date:
May 4, 1998
Project 96-ND-11d

Archaeology Department

DAKOTA GASIFICATION COMPANY CO_2 PIPELINE, A CLASS III CULTURAL RESOURCES INVENTORY REPORT OF U.S. ARMY CORPS OF ENGINEERS LANDS IN McKENZIE COUNTY AND WILLIAMS COUNTIES, NORTH DAKOTA

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Prepared By:
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P.O. Box 440889
Aurora, Colorado 80044

Date:
May 4, 1998
Project 96-ND-11d

ABSTRACT

The Dakota Gasification Company, Inc. plans to construct a CO_2 pipeline from its gasification plant near Beulah, North Dakota into Canada, north of Noonan, North Dakota. The pipeline will pass through U.S. Army Corps of Engineers (COE), Omaha District, owned lands located in Section 21, T154N, R95W, Williams County and Section 34, T154N, R95W, McKenzie County, North Dakota. There is approximately 11.8 total acres of COE lands that will be impacted by the pipeline. The environmental assessment for the project is being compiled by ENSR Consulting and Engineering, Fort Collins, Colorado. Powers Elevation Co., Inc. (Powers) was contracted by ENSR to perform a Class III cultural resources inventory of selected segments of the pipeline route, including the COE-owned lands. No new cultural resource sites or isolated finds were recorded in the project area. However, the pipeline will pass near site 32WI305 and it is recommended that temporary fencing be erected at the edge of the construction right-of-way so as to avoid inadvertent impacts to the site. Other than this, we recommend that the proposed project be allowed to proceed as planned.

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LIST OF FIGURES

Introduction: The Dakota Gasification Company, Inc. plans to construct a CO_2 pipeline from their gasification plant near Beulah, ND, into Canada, north of Noonan, ND. The pipeline will cross Lake Sakakawea and adjacent land owned by the COE in Sections 21 and 34, T154N, R95W, McKenzie and Williams Counties, ND (Figures 1-5).

The total length of pipeline on the shoreline land owned by the COE is approximately 3400 feet. Construction will impact a 75-foot-wide corridor and maximum impacts will affect approximately 5.9 acres.

An environmental assessment of the project is being prepared by ENSR Consulting and Engineering (ENSR), Fort Collins, CO. Powers was contracted by ENSR to conduct a Class III cultural resources inventory on all federally-owned land, including that under COE jurisdiction. This report presents the results of the inventory on COE-owned land.

Environment: The project is in the Garrison Study Unit of the *Archeological Component of the North Dakota Comprehensive Plan for Historic Preservation* (SHSND 1990). The reader is referred to this document for a general description of the regional environment.

The local environment consists of relatively flat land that gently slopes to the shores of Lake Sakakawea. On both the north and south shores, the inventoried corridor included areas that have been cultivated and areas in native vegetation (see photomosaics in Figures 3 and 4). The latter consisted generally of mixed short grasses with brushy minor drainages. Photographs of the north and south shore are provided in Figure 5.

Wave-cut scarps that range from about 0.5 m to over 1 meter high were present along both shorelines. No paleosols were observed in the subsurface exposures provided by these scarps.

Methods: The inventory was conducted by a two-person crew lead by Byron L. Olson of Powers on June 22, 1996, on the north shore of Lake Sakakawea and on July 9, 1996, on the south shore. A 150-foot-wide corridor was defined using the staked centerline. This corridor was searched on foot, using four straight transects, two on each side of the centerline.

Surface visibility was on the order of 10-20 percent barren ground in areas with native vegetation and 20-30 percent in cultivated areas. Gopher mounds provided localized areas with higher visibility and the wave-cut shorelines provided limited subsurface exposures. Surface visibility and field techniques were judged to be adequate to discover any significant cultural resources.

Inventory of Cultural Resources: A files search on a 6-mile-wide corridor encompassing the entire project was compiled in 1996 by Powers (Olson 1996). The search was conducted at the State Historical Society of North Dakota, Bismarck. The following, which covers COE-owned sections, are excerpts from this general search.

Previous Inventories: Previous cultural resource inventories that have been conducted on COE-

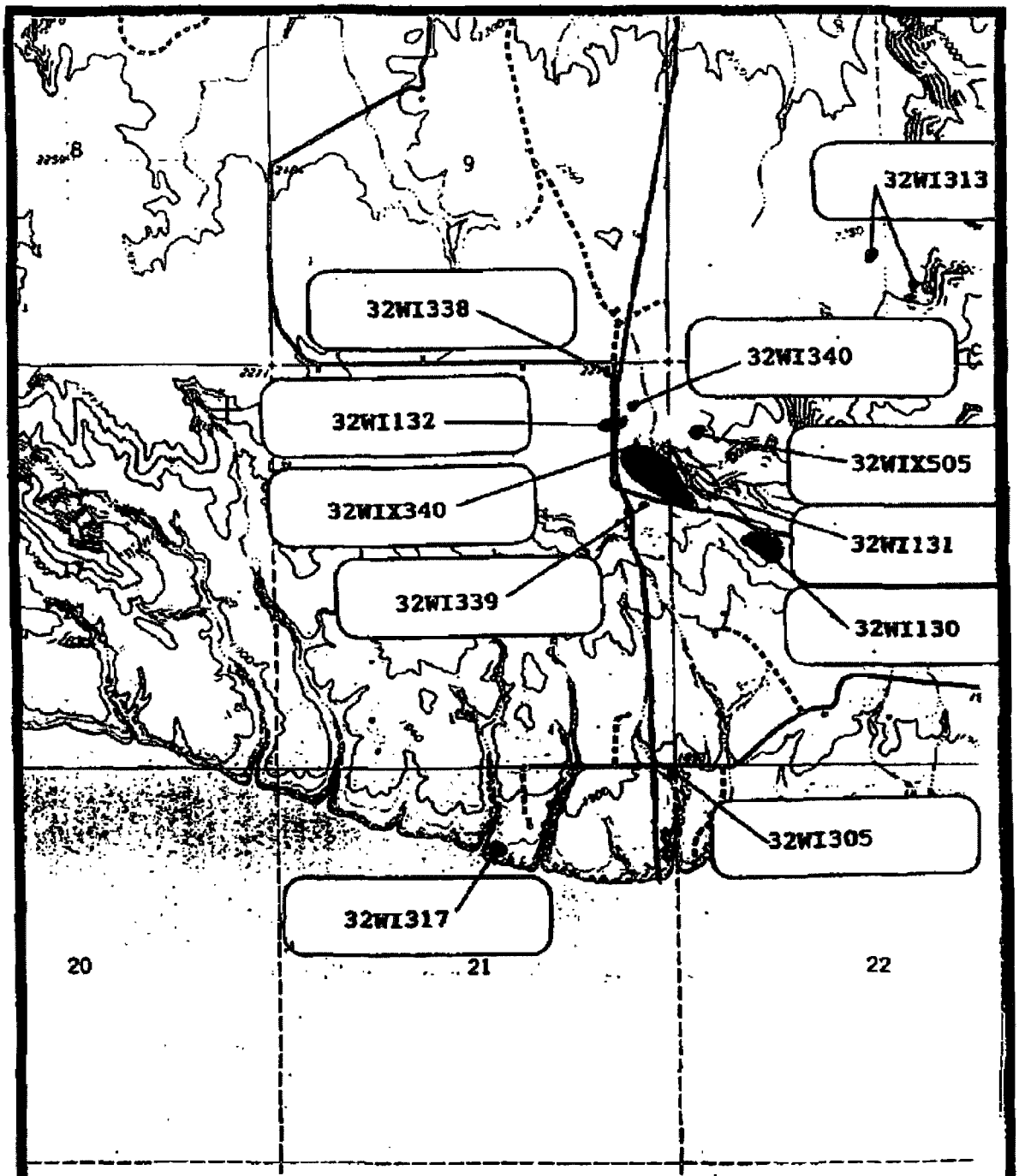

Figure 1. Topographic coverage of the Dakota Gasification pipeline in Section 21, T154N, R95W, Williams County, ND. The base map is the USGS 7.5' Charlson NW quadrangle.

1 1/2 0 1 Mile

1000 0 1000 2000 3000 4000 5000 6000 7000

1 0.5 0 1 KILOMETER

SCALE 1:24 000

NORTH

Powers Elevation Co., Inc.

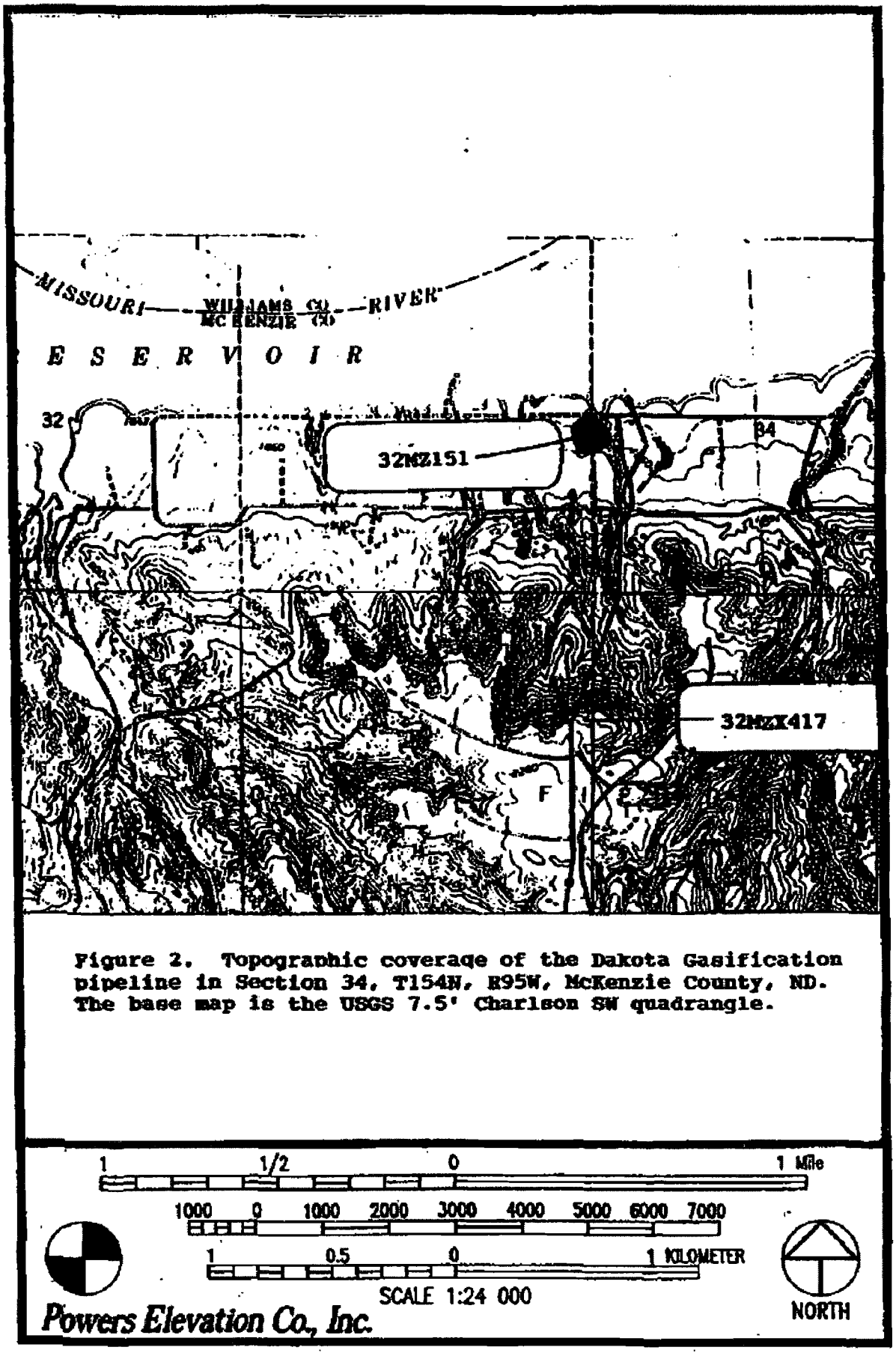

Figure 2. Topographic coverage of the Dakota Gasification pipeline in Section 34, T154N, R95W, McKenzie County, ND. The base map is the USGS 7.5' Charlson SW quadrangle.

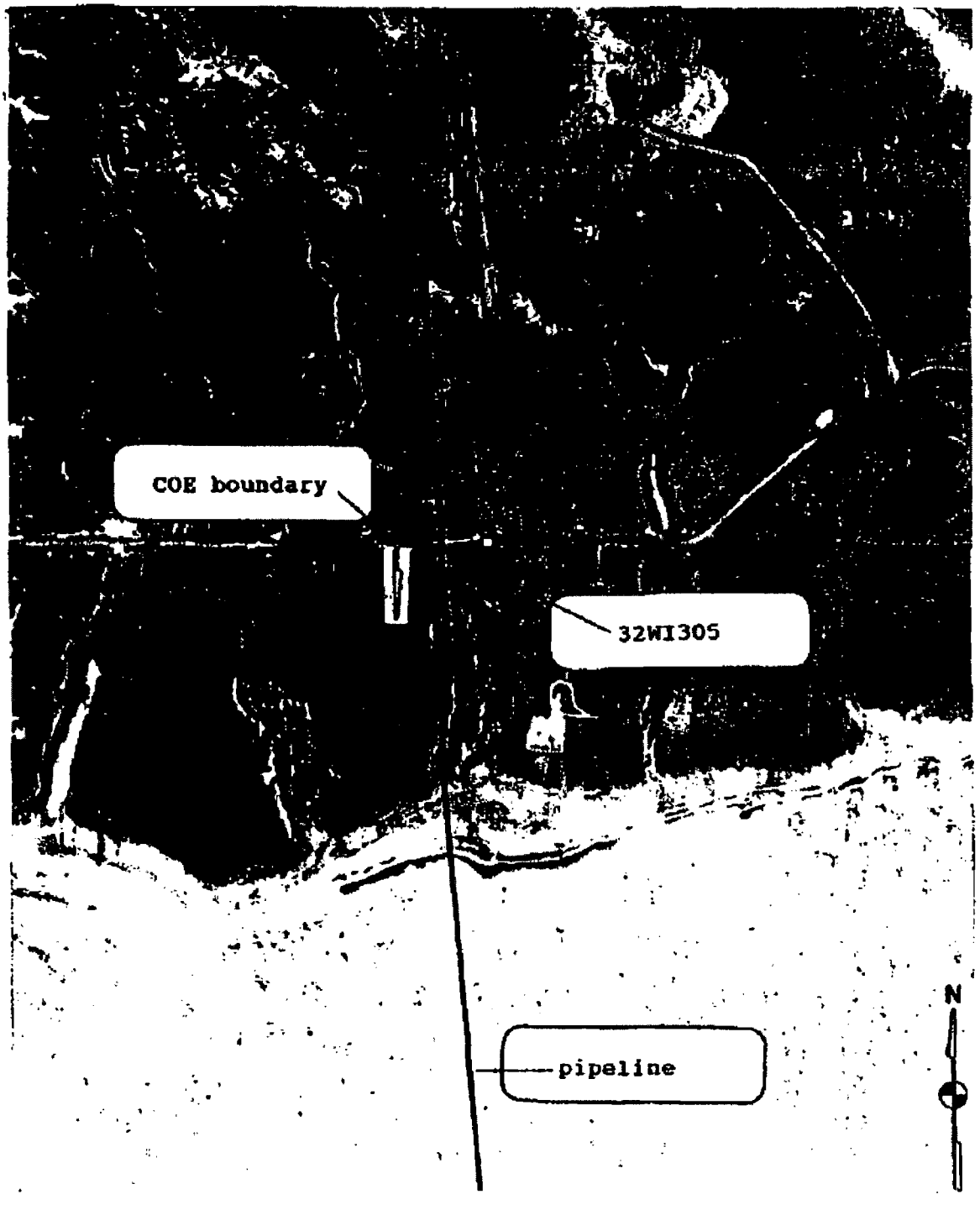

Figure 3. Photomosaic coverage of the Dakota Gasification pipeline in Section 21, T154N, R95W, Williams County, ND (north shore of Lake Sakakawea). Scale: 1" = 600'.

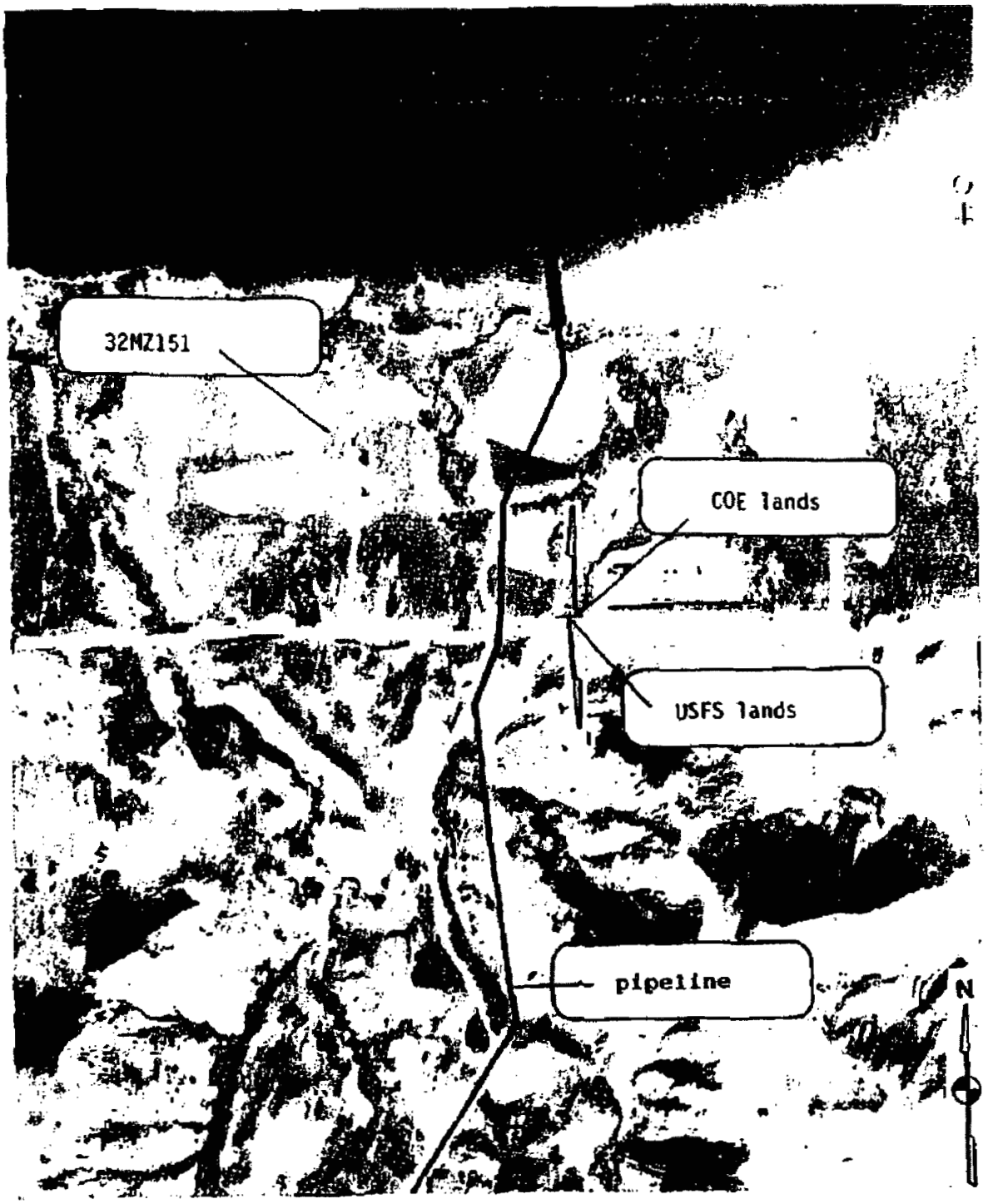

Figure 4. Photomosaic coverage of the Dakota Gasification pipeline in Section 34, T154N, R95W, McKenzie County, ND (south shore of Lake Sakakawea). Scale: 1" = 600'.

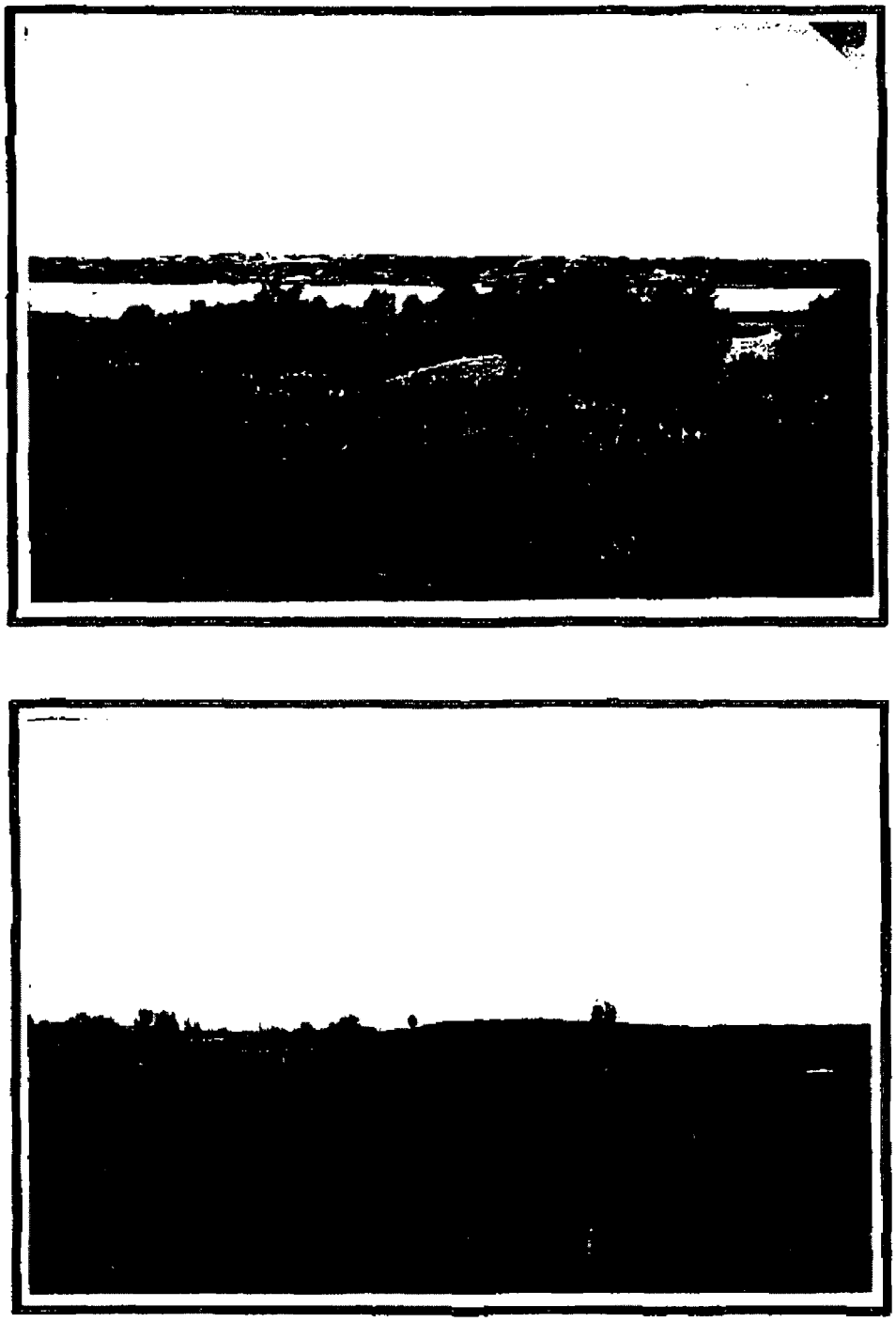

Figure 5. Photographs of the inventoried areas. Top: View of the north shore of Lake Sakakawea. Bottom: View of the south shore of Lake Sakakawea.

owned land in Section 21 T154N, R95W, Williams County and Section 34, T154N, R95W, McKenzie County, are summarized below. The area has been heavily inventoried with the majority of the searches related to oil field development and pipeline construction. Most pertinent to the present project are the Exxon pipeline inventory conducted by Metcalf and Schweigert (1987) and the Amerada Hess pipeline inventory conducted by Olson (1992). These two inventories partially overlap that done for the Dakota Gasification Company pipeline. No cultural resources on COE-owned land were recorded in either inventory.

Section 21, T154N, R95W, Williams County

Blikre, L.

1991 Century Geophysical Seismic Line for Oryx and Amarada Hess, Williams Co., Class III Cultural Resource Inventory, UW#1502.

Metcalf, M., and K. Schweigert

1987 Cultural Resource Investigations on the North Dakota Segment of the Exxon Company, USA Bairoil-Dakota CO_2 Pipeline Project, Golden Valley, Billings, Stark, Dunn, McKenzie, & Williams Co., Western North Dakota Vols 1 & 2.

Noisat, B., J. Cambell,, G. Moore, and K. Schweigert

1986 A Reconnaissance Survey and Preliminary Assessment of the Cultural Resources of Lake Sakakawea in Williams and McKenzie Counties, North Dakota, Vols. 1 & 2.

Olson, B.

1992 Amerada Hess Corporation, 10 Inch Natural Gas Pipeline Project Cultural Resources Inventory McKenzie and Williams Counties, North Dakota and Final Report.

Section 34, T154N, R95W, McKenzie County

Adamczyk, T.

1975 Archaeological Inventory Missouri River Reach Between Fort Benton, Montana, and Sioux City, Iowa.

Borchert, J.

1991 Texaco Charlson 3-D Seismic Project #30161 Corps of Engineers Property Cultural Resource Inventory McKenzie County, North Dakota UW#1473.

Floodman, M.

1987 Texaco, Inc. CMNUD #3-34 McKenzie County, North Dakota.

1983 Reservation Telephone Cooperative Buried Cable Survey Report, McKenzie Co., ND.

Friedman, P.
1983 Reservation Telephone Cooperative Buried Telephone Cable Letter, McKenzie Co., ND.

Hill, M.
1989 A Cultural Resources Inventory for the Proposed Charlson Dugout Stockpond on the McKenzie Ranger District in McKenzie County, North Dakota.

Larson, T.
1994 Larson-Tibesar Associates, Inc. Cultural Resources Inventory Report for a McKenzie County Electric, Underground Power Line, Texaco D234PL.

Kivett, M.
1948 Appendices A & B to Accompany Report on Historic Aspects of the Garrison Reservoir Area, Missouri River.

Kuehn, D.
1984 A Class I & II Inventory of the Proposed Aminoil USA Lake Sakakawea Crossing, (South Shore) McKenzie Co., ND.

Metcalf, G., and T. White
1953 Appraisal of the Archaeological and Paleontological Resources of the Garrison Reservoir, North Dakota, Supplement.

Metcalf, M., and K. Schweigert
1987 Cultural Resource Investigations on the North Dakota Segment of the Exxon Company, USA Bairoil-Dakota CO_2 Pipeline Project, Golden Valley, Billings, Stark, Dunn, McKenzie, & Williams Co., Western North Dakota Vols 1 & 2.

Metcalf, M., and C. Zier
1979 Texaco Tank Battery and Seven Short Pipelines Survey, McKenzie District, McKenzie County, ND.

Noisat, B., J. Cambell,, G. Moore, and K. Schweigert
1986 A Reconnaissance Survey and Preliminary Assessment of the Cultural Resources of Lake Sakakawea in Williams and McKenzie Counties, North Dakota, Vols. 1 & 2.

Olson, B.
1992 Amerada Hess Corporation, 10 Inch Natural Gas Pipeline Project Cultural Resources Inventory McKenzie and Williams Counties, North Dakota and Final Report.

Rippeteau, B.
1980 Texaco Oil Company CMNU A303X Well Pad Survey, McKenzie Co., ND.

Robson, L.
1980 Aminoil USA, Inc., Underground Oil Pipeline Survey, McKenzie Co., ND.

Savini, J.
1979 Texaco, Inc., Silurian Unit #6 Well #1, Well Pad and Access Route Survey, McKenzie Co., ND.

1979 Texaco, Inc., Silurian Unit #5 and #1 Well Pad and Access Route Survey.

Previously Recorded Cultural Resources: Previously recorded cultural resources on COE-owned land in Section 21, T154N, R95W, Williams County and Section 34, T154N, R95W, McKenzie County, are summarized below.

Section 21, T154N, R95W, Williams County

Site 32WI305: An archaeological cultural material scatter located in the NE NE NE, was recorded by Kuehn in 4-88.

Site 32WI317: An archaeological cultural material scatter located in the SW NW NE; was recorded by Blikre in 12-91.

Section 34, T154N, R95W, McKenzie County

Site 32MZX142: An archaeological isolate (projectile point) located in the SE SW SE, was recorded by Kuehn in 7-80.

Site 32MZX341: An archaeological isolate located in the SE SW SE, was recorded by Kuehn in 7-80.

Site 32MX12: An archaeological cultural material scatter located in the NE, was recorded by Kivett in 8-47.

Site 32MZ151: An architectural site including a log cabin and machinery located in NW NW SW and the NE NE SE of Sec. 33, was recorded by Simon in 4-80 & Schweigert in 10-83.

Pertinent to the Dakota Gasification project are three previously recorded sites, 32WI305, 32MZ12, and 32MZ151. All other recorded cultural resources are judged to be beyond the area of any potential effects.

Site 32WI305 is a lithic scatter in Section 21. It is located on a lobate land form created by ephemeral drainages that have cut into a terrace to the east and west of the site (Figure 1). Porcellanite flaking debris was found eroding from the lip of the terrace. At closest approach, the western edge of the site is about 20 m from the eastern edge of the Dakota Gasification Company

pipeline construction corridor (Figure 3). The inventoried corridor overlaps the site. No cultural material was found adjacent to the site in the area that will be impacted by construction.

Although the site will not be impacted by the project, temporary protective fencing placed at the edge of the construction corridor should be considered to avoid inadvertent impacts. An existing barbed wire fence protects the north side of the site.

No map or more precise location other than the northeast quarter of Section 34 is available for site 32MZ12. The northeast quarter of this section is now covered by Lake Sakakawea (Figure 2). Given the date when the site was recorded (1947), it is likely that the site was found before the reservoir was filled and is now inundated. The Dakota Gasification Company pipeline passes through the northeast quarter of the section, but whether or not site 32MZ12 will be impacted, is unknown. Given the uncertainty concerning the site location, its inundated setting, and the probability that it was eroded as the reservoir filled, no avoidance or additional archaeological work is recommended.

Site 32MZ151 is an architectural site in Section 34 with the remains of a log cabin, fencing, and machinery (Figure 2 and 4). The site was recommended as ineligible for the NRHP on the NDCRS site form by Schweigert in 1983. This recommendation should be reconsidered because there are few remaining log structures in McKenzie County. Those on USFS-owned land were systematically removed in the 1930s by the Civilian Conservation Corps.

The site is located about 150 m west of the Dakota Gasification Company centerline and is protected from the construction corridor by a brushy ravine. There will be no direct impacts to the site and inadvertent impacts are unlikely.

Fieldwork Results: No new cultural resource sites or isolated finds were recorded during the current inventory of COE land.

Recommendations: No new sites or isolates were recorded during the current inventory of COE land. However, the Dakota Gasification Company CO_2 pipeline will pass near previously recorded site 32WI305 and it is recommended that temporary fencing be erected at the edge of the construction right-of-way so as to avoid inadvertent impacts to the site. Other than this, we recommend that the proposed project be allowed to proceed as planned.

Lucy Hackett Bambrey 5/4/98
Lucy Hackett Bambrey Date
Principal Investigator

References Cited

Metcalf, M., and K. Schweigert

1987 Cultural Resource Investigations on the North Dakota Segment of the Exxon Company, USA Bairoil-Dakota CO_2 Pipeline Project, Golden Valley, Billings, Stark, Dunn, McKenzie, & Williams Co., Western North Dakota Vols 1 & 2. Metcalf Archaeological Consultants, Eagle CO. Report submitted to the Exxon Pipeline Company, Midland, TX.

Olson, B.

1992 Amerada Hess Corporation, 10 Inch Natural Gas Pipeline Project Cultural Resources Inventory McKenzie and Williams Counties, North Dakota and Final Report. Powers Elevation Co., Inc., Aurora, CO. Report submitted to ENSR Consulting and Engineering, Fort Collins, CO.

1996 Dakota Gasification Company CO_2 Pipeline Project, Mercer, Dunn, McKenzie, Williams, Mountrail, Burke, and Divide Counties, North Dakota Class I Cultural Resources Inventory. Prepared for ENSR Consulting and Engineering. Powers Elevation Co., Inc., Aurora, Colorado.

State Historical Society of North Dakota (SHSND)

1990 Archeological Component of the North Dakota Comprehensive Plan for Historic Preservation. State Historical Society of North Dakota, Bismarck, ND.

ATTACHMENT 2

Drawing No. D7400-129-C