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December 28, 2001

Ms. Dorothy Wideman
Executive Secretary
Michigan Public Service Commission
6545 Mercantile Way, Ste. 7
Lansing, MI 48911

Re: Case No. U-13225
Wolverine Pipe Line
Construction, Operation and Maintaining of Pipe Line for
Transportation of Liquid Petroleum Products
Prefiled Direct Testimony of Daniel M. Cooper

Dear Ms. Wideman:

Enclosed please find original and fifteen copies of Prefiled Direct Testimony of Daniel M. Cooper on behalf of Wolverine Pipe Line Company in the above-referenced matter. Also enclosed is Proof of Service upon the parties of record.

If there are any questions or comments, do not hesitate to contact me.

Very truly yours,

DYKEMA GOSSETT PLLC



Christine Mason Soneral

CMS/jmb

Enclosures

cc: Steve Woodburn
Paul O'Konski
Les Cole
Steven Koster
Daniel Cooper

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STATE OF MICHIGAN
BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

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In the matter of the application of WOLVERINE PIPE LINE COMPANY for authority under 1929 PA 16 to construct, operate and maintain a pipe line for the transportation of liquid petroleum products.))))))) <hr/>	Case No. U-13225
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**PREFILED DIRECT TESTIMONY
OF
DANIEL M. COOPER
ON BEHALF OF WOLVERINE PIPE LINE COMPANY**

Q₁ PLEASE STATE YOUR NAME, POSITION, AND BUSINESS ADDRESS.

A₁ My name is Daniel M. Cooper. I am the President of HT Engineering, Inc. ("HTE"). My business address is 802 Merritt Street, SE, Grand Rapids, Michigan 49507-3398.

Q₂ PLEASE BRIEFLY DESCRIBE YOUR BACKGROUND AND WORK EXPERIENCE.

A₂ I received a Bachelor of Science Degree in Civil Engineering from the University of Michigan in 1979, and a Master of Science in Engineering in 1980, also from the University of Michigan. In 1981 I joined D. Tongue & Associates, Inc., predecessor of HTE, an independent consulting firm that renders engineering services for the design, construction and operation of pipelines, processing plants and other facilities for the oil and gas and other industries. I served as staff engineer for eight (8) years and as principal engineer for nine (9) years. Since March 1998, I have been the President of HTE. I am a Regis-

tered Professional Engineer in Michigan, New Jersey and Ohio. I am also a member of the Society of Petroleum Engineers and the National Association of Corrosion Engineers. My curriculum vitae is attached hereto as Exhibit A- (DMC-1).

Q₃ HAVE YOU PREVIOUSLY TESTIFIED BEFORE THIS COMMISSION?

A₃ Yes, I testified as an engineering expert on behalf of Paxton Resources, LLC in Case No. U- 11765, Spartan Intrastate Pipeline System in Case No. U-10812, Preston Oil Company in Case No. U-10195, and Dart Oil & Gas Company in Case No. U-8925. Each of these cases involved applications for 1929 PA 9 certifications.

Q₄ WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A₄ Wolverine Pipeline Company (“Wolverine”) retained HTE as an independent engineering expert for the pipeline proposed in Wolverine’s application in this docket. Specifically, HTE was retained to evaluate the safety aspects of Wolverine’s proposed pipeline.

Q₅ WHY IS WOLVERINE PRESENTING TESTIMONY ON THE SAFETY OF THE PROPOSED PIPELINE?

A₅ During discussions with Commission Staff relative to this docket and the previous Case No. U-12334, concerns were raised over perceived safety risks of the proposed pipeline. To address those concerns, Wolverine retained me to conduct an independent safety and risk assessment study of the remaining segment at issue in this proceeding.

Q₆ ARE YOU FAMILIAR WITH THE PIPELINE BEING PROPOSED BY WOLVERINE?

A₆ Yes, I am.

Q₇ HOW DID YOU OBTAIN THAT FAMILIARITY?

A₇ I obtained it by reviewing project-related documents furnished by Wolverine, by discussions with Wolverine personnel, and by performing field and map reviews of the proposed pipeline route.

Q₈ ARE YOU SPONSORING ANY EXHIBITS?

A₈ Yes. In addition to my curriculum vitae attached as Exhibit A- (DMC-1), I have prepared Exhibit A- (DMC-2), a summary of pipeline risk assessment modeling results.

Q₉ WHAT IS YOUR EXPERIENCE WITH PIPELINE RISK ASSESSMENT MODELING?

A₉ During my twenty-one (21) years of engineering experience, I have continually assessed risk while working to achieve both safe and practical design and operating solutions for pipeline projects. In conducting my safety and risk assessment study for the pipeline proposed in this proceeding, I familiarized myself with the risk assessment model developed by Mr. Kent Muhlbauer, who provided expert testimony on behalf of Wolverine in Case No. U-12334. I reviewed Mr. Muhlbauer's book, *Pipeline Risk Management Manual* (Woburn, MA: Gulf Professional Publishing, 1999) and applied his model to the proposed pipeline for safety and risk assessment purposes.

Q₁₀ HOW DOES THE PIPELINE RISK ASSESSMENT MODEL WORK?

A₁₀ Mr. Muhlbauer's model provides a very detailed and consistent method for evaluating a pipeline's safety-related features. The model assigns numerical values to responses to a series of questions about a pipeline's design, construction, operation, maintenance, environmental conditions and the nature of the product transported. Relative risk factors are then calculated based on pipeline industry operating experience and statistical failure data.

Q₁₁ WHAT CONCLUSIONS DO YOU DRAW FROM THE RISK ASSESSMENT MODELING RESULTS?

A₁₁ As Exhibit A- (DMC-2) indicates, the pipeline proposed in this proceeding has a very low probability of failure when compared to its alternatives. To arrive at this conclusion, I applied the risk assessment model to the proposed pipeline, and to a pipeline built along the same route, but meeting only the minimum requirements of the federal safety standards for transportation of hazardous liquids by pipeline contained in Title 49, Code of Federal Regulations, Part 195. I also obtained model results for the portion of Wolverine's existing 8-inch Stockbridge to LaPaugh pipeline located in Meridian Township, Ingham County. As presented in Exhibit A- (DMC-2), the index sum values for the proposed pipeline are 284 in low development areas, 298 in more highly developed areas. The comparable values for the Part 195-minimum line are 231 and 227, while the index sum for the 8-inch line in Meridian Township is 228. Higher index sum values indicate lower risk, so the proposed line represents a failure probability reduction of more than 20 percent.

Q₁₂ DO YOU HAVE AN OPINION AS TO THE SAFETY OF THE PROPOSED PIPELINE?

A₁₂ Yes, I do.

Q₁₃ WHAT IS YOUR OPINION?

A₁₃ The proposed pipeline is safe with respect to both the proposed route and engineering design.

Q₁₄ WHY DO YOU CONCLUDE THAT THE PROPOSED PIPELINE ROUTE IS SAFE?

A₁₄ In addition to the favorable outcome of the pipeline risk assessment modeling described above, it is very significant that the proposed pipeline route along the I-96 right-of-way limits the proximity of nearby development. The federal safety standards for transportation of hazardous liquids by pipeline state that “Pipeline right-of-way must be selected to avoid, as far as practicable, areas containing private dwellings, industrial buildings, and places of public assembly.” While it is impossible to travel through the Lansing area without encountering development, use of the I-96 right-of-way provides a corridor free of occupied buildings and places of public assembly. In addition, no future development of this corridor for such purposes is likely, enhancing the long-term safety of the pipeline.

Another safety feature of the I-96 limited access right of way is the reduced possibility of third party damage when compared with other, non-limited access routes. The pipeline will be installed in an area that is carefully controlled by the Michigan Department of Transportation, and any excavation would be by permit only. Third party damage is the primary cause of leaks for both hazardous liquid and gas pipelines.

Q₁₅ ARE THERE SIGNIFICANT ADVANTAGES OF THIS ROUTE OVER OTHER ALTERNATIVES CONSIDERED?

A₁₅ Yes. As mentioned above, the I-96 limited access corridor provides excellent protection against accidental excavation damage. Other routes considered do not offer the same level of protection. The proposed route also reduces environmental impact with respect to other routes considered, as discussed in the prefiled direct testimony of Steven J. Koster in this proceeding.

If the proposed pipeline were not constructed, the liquid petroleum products to be transported by the line would need to be hauled by truck, rail or the continued use of Wolverine’s existing 8-inch pipeline running from Stockbridge to LaPaugh. Pipelines have a

much better safety record than either rail or truck transportation, and the proposed pipeline offers significant routing and design advantages over the existing 8-inch line.

Q₁₆ DO YOU HAVE AN OPINION AS TO THE SAFETY OF THE PROPOSED PIPELINE'S DESIGN?

A₁₆ Yes.

Q₁₇ WHAT IS YOUR OPINION?

A₁₇ In my opinion, the pipeline has been designed to meet or exceed Federal codes and industry standards for hazardous liquid pipelines, and is safe.

Q₁₈ WHY DO YOU CONCLUDE THAT THE DESIGN IS SAFE?

A₁₈ I have reviewed the general engineering and construction specifications attached as Exhibit A- (CSW-1) to the prefiled direct testimony of C. S. Woodburn in this proceeding, as well as the comparison of the pipeline design to the Code of Federal Regulations attached to Mr. Woodburn's testimony as Exhibit A- (CSW-2). Wolverine has included numerous design features to enhance safety. These include:

- Greater pipe wall thickness than required by Code (0.344 inch vs. 0.302 inch);
- Increased pipe wall thickness to 0.500 inch where the pipeline is installed by boring;
- 100 percent rather than 10 percent nondestructive testing of pipeline welds;
- At least 12 inches extra depth of cover;
- Remotely operated sectionalizing block valves for emergency shutdown;
- Hydrocarbon detectors with automatic shutdown system at pumping stations; and
- Multiple levels of overpressure protection at pumping stations.

It is important to note that the entire length of the proposed pipeline will be installed with at least 48 inches of cover. This is 12 inches greater than that required by the Federal

pipeline safety standards for industrial, commercial and residential areas. The Federal standards recognize extra cover as an effective public safety measure by requiring that lines located within 50 feet of a private dwelling, industrial building or place of public assembly be installed with 12 inches of extra cover. This additional cover provides protection from accidental damage due to excavation or other external forces.

Wolverine also plans to carefully monitor the pipeline for continued integrity of the original design by running a caliper pig after construction, by performing weekly aerial patrols of the pipeline (the Federal code requires patrols every two weeks) and by internally inspecting (smart pigging) the pipeline every five years.

Q₁₉ DOES THIS CONCLUDE YOUR TESTIMONY?

A₁₉ Yes, it does.

pipeline safety standards for industrial, commercial and residential areas. The Federal standards recognize extra cover as an effective public safety measure by requiring that lines located within 50 feet of a private dwelling, industrial building or place of public assembly be installed with 12 inches of extra cover. This additional cover provides protection from accidental damage due to excavation or other external forces.

Wolverine also plans to carefully monitor the pipeline for continued integrity of the original design by running a caliper pig after construction, by performing weekly aerial patrols of the pipeline (the Federal code requires patrols every two weeks) and by internally inspecting (smart pigging) the pipeline every five years.

Q₁₉ DOES THIS CONCLUDE YOUR TESTIMONY?

A₁₉ Yes, it does.



Key Personnel

DANIEL M. COOPER, P.E.

President

PROFESSIONAL PROFILE

Active since 1981 in the design and project management of natural gas and liquid petroleum production, processing, transportation, and distribution facilities. Special emphasis on natural gas pipelines and gas processing facilities. Experienced in feasibility studies, engineering design, permitting and certification, developing labor and material specifications, bidding, purchasing, contract administration, and construction management. Also skilled in writing and presenting technical reports, technical manuals, and computer programming and operation. Licensed Professional Engineer in Michigan and Ohio.

AREAS OF TECHNICAL EXPERTISE

- Natural Gas and Liquid Pipelines
- Oil and Gas Production Facilities
- Sitework, Foundation and Structural Design
- Industrial Pipelines and Fuel Systems
- Fluid Control and Metering
- Computer Programming and Operations

EMPLOYMENT SUMMARY

Hydrocarbon Technology Engineering, Grand Rapids, Michigan, USA
University of Michigan, Civil Engineering Dept., Ann Arbor, Michigan, USA

EDUCATION

M.S. Civil Engineering, University of Michigan, Ann Arbor, 1980
B.S. Civil Engineering, University of Michigan, Ann Arbor, 1979

AFFILIATIONS, HONORS AND SPECIAL QUALIFICATIONS

Society of Petroleum Engineers
National Association of Corrosion Engineers (NACE)
Tau Beta Pi (Engineering Honorary Society)
Chi Epsilon (Civil Engineering Honorary Society)

PIPELINE RISK ASSESSMENT MODELING RESULTS

	I-96 ROUTE AS PROPOSED		I-96 ROUTE DOT PART 195 MINIMUM		EXISTING 8-INCH PIPELINE
	Class 1 Areas	Class 3 Areas	Class 1 Areas	Class 3 Areas	Meridian Township
Third Party Index	78	78	65	61	48
Corrosion Index	73	73	64	64	61
Design Index	53	67	44	44	62
Incorrect Operations Index	80	80	58	58	58
Total Index Sum	284	298	231	227	228

Notes:

1. Class 1 indicates low development areas; Class 3 indicates high development areas.
2. Higher index values indicate lower risk.

STATE OF MICHIGAN

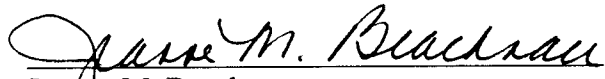
BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

* * * * *


In the matter of the application of)	
WOLVERINE PIPE LINE COMPANY FOR authority)	
under 1929 PA 16 to construct, operate and maintain)	Case No. U-13225
a pipe line for the transportation of liquid petroleum)	
products.)	
_____)	

STATE OF MICHIGAN)
) ss.
 COUNTY OF INGHAM)

Jeanne M. Beachnau, being first duly sworn, deposes and says that on the 28th day of December, 2001, she caused to be served upon the persons listed in the attached Service List, copies of Prefiled Direct Testimony of Daniel M. Cooper on behalf of Wolverine Pipe Line Company in the above-captioned matter by United States First Class mail.


 Jeanne M. Beachnau

Subscribed and sworn to before
 me this 28th day of December, 2001


 H. Sharyl Stofer, Notary Public
 Ingham County, Michigan
 My commission expires: 12/17/03

SERVICE LIST

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Hon. James Rigas
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