U.S. Department
of Transportation

Pipeline and Hazardous Materials
Safety Administration

1200 New Jersey Ave., SE
Washington, DC 20590

MAY 5 2010

Mr. David Chittick
Director, Pipeline Engineering
TransCanada Pipelines Limited
450 – 1st Street, S.W.
Calgary, Alberta, Canada T2P 5H1

Docket No. PHMSA-2009-0053

Dear Mr. Chittick:

On February 6, 2009, TransCanada Pipeline Limited-American Natural Resources (TCPL-ANR) wrote to the Pipeline and Hazardous Materials Safety Administration (PHMSA) requesting a special permit to waive compliance from PHMSA's pipeline safety regulation in 49 CFR § 192.611 for four segments of the TCPL-ANR natural gas transmission pipeline system located in Lake County, Indiana, Outagamie and Winnebago Counties, Wisconsin and Fulton County, Ohio. The regulation requires confirmation or revision of the maximum allowable operating pressure (MAOP) of a pipeline segment where the class location has changed.

PHMSA is denying this special permit, which would have allowed TCPL-ANR to operate segments of 30-inch Line 1-100, two 24-inch Line 226, and 30-inch Line 501 pipelines in Lake County, Indiana, Outagamie and Winnebago Counties, Wisconsin and Fulton County, Ohio at their current MAOPs. The reason for this denial can be found in the special permit analysis and findings document enclosed with this letter. This document and all other pertinent documents are available for review in Docket No. PHMSA-2009-0053 in the Federal Docket Management System (FDMS) located on the internet at www.Regulations.gov. PHMSA will grant TCPL-ANR twelve (12) months from the date of this letter to comply with the requirements of 49 CFR § 192.611.

My staff would be pleased to discuss this special permit or any other regulatory matter with you. John Gale, Director of Regulations (202-366-4046), may be contacted on regulatory matters and Alan Mayberry, Deputy Associate Administrator for Pipeline Safety (202-366-5124), may be contacted on technical matters specific to this special permit

Sincerely,

Jeffrey D. Wiese
Associate Administrator for Pipeline Safety

Enclosure: Special Permit Analysis and Findings

U.S. DEPARTMENT OF TRANSPORTATION

PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMINISTRATION

Special Permit Analysis and Findings

Special Permit Information:

Docket Number:	PHMSA-2009-0053
Pipeline Operator:	TransCanada Pipelines Limited, operator of American Natural Resources Pipeline (TCPL-ANR)
Date Requested:	February 6, 2009
Code Section(s):	49 CFR § 192.611(a)

Purpose:

The Pipeline and Hazardous Materials Safety Administration (PHMSA) provides this information to describe the special permit application submitted by TransCanada Pipelines Limited, operator of American Natural Resources Pipeline (TCPL-ANR), to discuss any relevant public comments received with respect to the application, to present an engineering and safety analysis of the special permit application, and to make findings regarding whether the requested special permit should be granted and if so under what conditions.

Pipeline System Affected:

This special permit application applies to four *special permit segments* along the TCPL-ANR system of natural gas pipelines, where the class locations along these pipelines have changed from an original Class 1 location to a Class 3[1] location. These four *special permit segments* include 30-inch Line 1-100, 24-inch Line 226, 24-inch Line 226, and 30-Inch Line 501 located in Lake County, Indiana, Winnebago and Outagamie Counties, Wisconsin, and Fulton County,

[1] The Class 3 *special permit segments* were originally Class 1 locations that were upgraded to Class 2 locations in accordance with § 192.611 (a) hydrostatic test.

Ohio, respectively. This special permit application applies to the *special permit segments* and *special permit inspection areas* defined below using TCPL-ANR Survey Station Numbers.

Lake and Porter Counties, Indiana

- *Special permit segment 1 – 30-inch Line 1-100* – 3181 feet; from Survey Station Number 272+52 which is downstream of Valve 56 (St. John Compressor Station) to Survey Station Number 304+33 in Lake County, Indiana. (Milepost 860.63 to 861.20)
- *Special permit inspection area 1 - 30-inch Line 1-100* – from Survey Station Number 0+00 feet downstream of Valve 56 (St. John Compressor Station) in Lake County, Indiana to Survey Station Number 840+44 feet. downstream of Valve 57 in Porter County, Indiana. *Special permit inspection area 1* is located in Lake and Porter Counties, Indiana. *Special permit inspection area 1* extends from approximately 5.16 miles upstream of *special permit segment 1* to approximately 25 miles downstream of *special permit segment 1*; a total of approximately 30.76 miles. (Milepost 855.42 to 885.95)

Waupaca, Outagamie, and Winnebago Counties, Wisconsin

- *Special permit segment 2 -24-inch Line 226* – 1309 feet; from Survey Station Number 462+30 feet which is downstream of Valve 8, to Survey Station Number 475+39 feet in Winnebago County, Indiana. (Milepost 91.24 to 91.49)
- *Special permit inspection area 2 – 24-inch Line 226* – from Survey Station Number 766+74 feet downstream of Valve 6 in Waupaca County, Wisconsin to Survey Station Number 0+67 feet downstream of Valve 9 in Winnebago County, Wisconsin. *Special permit inspection area 2* extends from approximately 25 miles upstream of *special permit segment 2* to approximately 3164 feet downstream of *special permit segment 2*; a total of approximately 25.85 miles. (Milepost 66.24 to 92.88)

Waupaca, Outagamie, and Winnebago Counties, Wisconsin

- *Special permit segment 3 – 24-inch Line 226* – 102 feet; from Survey Station Number 727+37 feet which is downstream of Valve 7, to Survey Station Number 728+39 feet in Outagamie County, Wisconsin. (Milepost 82.38 to 82.40)
- *Special permit inspection area 3 - 24-inch Line 226* – from Survey Station Number 298+94

feet downstream of Valve 6 in Waupaca County, Wisconsin to Survey Station Number 0+67 feet downstream of Valve 9 in Winnebago, Wisconsin. *Special permit inspection area 3* is located in Waupaca, Outagamie, and Winnebago Counties, Wisconsin. *Special permit inspection area 3* extends from approximately 25 miles upstream of *special permit segment 3,* to approximately 9.69 miles downstream of *special permit segment 3*; a total of approximately 34.71 miles. (Milepost 57.38 to 92.88)

Note: *Special permit inspection areas 2 and 3* overlap.

Defiance, Henry, and Fulton Counties, Ohio and Lenawee County, Michigan

- *Special permit segment 4 – 30-inch Line 501* – 349 feet; from Survey Station Number 288+29 which is downstream of Valve 71, to Survey Station Number 291+78 feet in Fulton County, Ohio. (Milepost 913.94 to 914.01)
- *Special permit inspection area 4 – 30-inch Line 501* – from Survey Station Number 0+00 feet downstream of Valve 70 in Defiance County, Ohio to Survey Station Number 181+48 feet downstream of Valve 73 in Lenawee County, Michigan. *Special permit inspection area 4* is located in Defiance, Henry, and Fulton Counties, Wisconsin and Lenawee County, Michigan. *Special permit inspection area 4* extends from approximately 19.46 miles upstream of *special permit segment 4* to approximately 25 miles downstream of *special permit segment 4*; a total of approximately 44.52 miles. (Milepost 894.48 to 939.01)

The total length of all of the *special permit inspection areas* is approximately 111 miles.

Special Permit Request:

TCPL-ANR submitted an application to PHMSA on February 6, 2009, for a special permit seeking relief from the Federal pipeline safety regulations in 49 CFR § 192.611(a) for four segments of TCPL-ANR natural gas transmission pipeline where a change has occurred from an original Class 1 location to a Class 3 location in Lake County, Indiana, Winnebago and Outagamie Counties, Wisconsin and Fulton County, Ohio. This special permit would allow TCPL-ANR to continue to operate the pipeline segments at their current maximum allowable operating pressures (MAOP) of 850, 975, 975 and 858 pounds per square inch gauge (psig),

respectively. The Federal pipeline safety regulations in 49 CFR § 192.611(a) require natural gas pipeline operators to confirm or revise the MAOP of a pipeline segment after a change in class location. If granted, a special permit will allow TCPL-ANR to continue to operate each of the four *special permit segments* at their existing MAOP's despite a change in class location.

Public Notice:

On April 28, 2009, PHMSA posted a notice of this special permit request in the Federal Register (74 CFR 19264). PHMSA did not receive any comments for or against this special permit request as a result of this notice. The request letter, Federal Register notice and all other pertinent documents are available for review in Docket No. PHMSA-2009-0053 in the Federal Docket Management System (FDMS) located on the internet at www.Regulations.gov.

Analysis:

Background: On June 29, 2004, PHMSA published in the Federal Register (69 FR 38948) the criteria it uses for the consideration of class location change waivers, now called special permits. First, certain threshold requirements must be met for a pipeline section to be further evaluated for a class location change special permit. Second, the age and manufacturing process of the pipe; system design and construction; environmental, operating and maintenance histories; and integrity management program elements are evaluated as significant criteria. These significant criteria are presented in matrix form and can be reviewed in the FDMS, Docket Number PHMSA-RSPA-2004-17401. Third, such special permits may only then be granted when pipe conditions, integrity management, and additional permit conditions would provide a level of safety greater than or equal to a pipe replacement or pressure reduction.

Threshold Requirements: Each of the threshold requirements published by PHMSA in the June 29, 2004, FR notice is discussed below in regards to the TCPL-ANR special permit application.

1) No pipeline segments in a class location changing to Class 4 location will be considered. This special permit request is for segments of TCPL-ANR pipeline where a class location change has occurred from Class 1 location to Class 3 location.
2) No bare pipe will be considered. These TCPL-ANR *special permit segments* are coated with coal tar enamel or hot wax. TCPL-ANR has met this requirement.

3) No pipe containing wrinkle bends will be considered. There are no wrinkle bends in the *special permit segments*. TCPL-ANR has met this requirement.
4) No pipe segments operating above 72% of the specified minimum yield strength (SMYS) will be considered for a Class 3 location special permit. The *special permit segments* operate at or below 72% SMYS. TCPL-ANR has met this requirement.
5) Records must be produced that show a hydrostatic test to at least 1.25 x maximum allowable operating pressure (MAOP) and 90% of SMYS. TCPL-ANR records submitted showed that the sections of Lines 100-1, 226 and 501 pipeline containing the *special permit segments*, have been hydrostatically tested to the following pressures:

Special Permit Segment 1: 30-inch Line 100-1	1080 psig test pressure	1.27 X MAOP	90.5 % SMYS
Special Permit Segment 2: 24-inch Line 226	1411 psig test pressure	1.45 X MAOP	104% SMYS
Special Permit Segment 3: 24-inch Line 226	1411 psig test pressure	1.45 X MAOP	104% SMYS
Special Permit Segment 4: 30-inch Line 501	1222 psig test pressure	1.42 X MAOP	102% SMYS

TCPL-ANR has met this requirement.

6) In-line inspection (ILI) must have been performed with no significant anomalies identified that indicate systemic problems. The proposed *special permit segments* were last inspected by ILI in: *special permit segment 1* in 2003, *special permit segment* 2 in 2008, *special permit segment* 3 in 2008, and *special permit segment* 4 in 2006 with no immediately actionable anomalies found. TCPL-ANR has met this requirement for wall loss, but would need to run an ILI tool to detect dents and re-run ILI for anomalies and corrosion.
7) The PHMSA criteria for consideration of class location change special permits define a waiver inspection area (*special permit inspection area*) as up to 25 miles of pipe either side of the waiver segment (*special permit segment*). The *special permit inspection area* must be inspected according to TCPL-ANR's integrity management program and periodically inspected with an ILI tool. The *special permit inspection areas* are approximately 25 to 34 miles long. Any special permit would be issued contingent upon TCPL-ANR incorporation

of each of the *special permit segments* in its written integrity management program as a "covered segment" in a "high consequence area" (HCA) per 49 CFR § 192.903.

Criteria Matrix: The original and supplemental data submitted by TCPL-ANR for the *special permit segments* have been compared to the class location change special permit criteria matrix. The data falls within the probable acceptance column of the criteria matrix except for:

a. Possible acceptance – pipe coating, test failure, depth of cover, cathodic protection, ILI time frame, and compliance history. Some TCPL-ANR segments would require additional inspections to confirm coating quality, depth of cover and ILI inspections would be required. The subject pipelines have cathodic protection. Any special permit would require TCPL-ANR to identify and remediate areas along the pipeline with poor cathodic protection current and coating.
b. Requires substantial justification - pipe manufacture, pipe material, girth weld inspection, and safety related condition report. Some TCPL-ANR segments contain pipe with manufacturing seam weld and girth weld issues.

The data falls within the "probable acceptance" column of the criteria matrix for all criteria except for the following:

Lake and Porter Counties, Indiana - *Special permit segment 1* – 30-inch Line 1-100

Pipe manufacture and material documentation, girth welds, and pipe coating: The 30-inch Line 1-100 pipeline was installed in 1960 and consists of American Petroleum Institute Specification 5L, *Specification for Line Pipe* (API 5L), double submerged arc welded (DSAW), X-52 steel pipe manufactured by National Tube in 1960. This pipe is of unknown toughness. TCPL-ANR documents indicate that the 30-inch DSAW pipe in this *special permit inspection area* was hydrostatically tested to 90.5% SMYS or 127% times MAOP, and has had no test or in-service failures. TCPL-ANR does not have documentation to verify the pipe mechanical and chemical properties of the pipe. Pipelines that are allowed to be upgraded from Class 1 to Class 3 locations must have mechanical and chemical properties documentation to ensure that the pipe is, in fact, of the strength that is being used in anomaly repair calculations. TCPL-ANR does not have any records documenting the non-destructive testing of pipeline girth welds. Girth weld

documentation confirms that the pipeline was constructed by quality assurance methods to ensure girth welds will not fail due to longitudinal stresses. The pipe external coating is coal tar enamel.

Waupaca, Outagamie, and Winnebago Counties, Wisconsin - *Special permit segment 2* -24-inch Line 226

Pipe manufacture, pipe material, pipe coating and girth weld inspection: The *24-inch Line 226* pipeline was installed in 1960 and consists of API 5L, low frequency electric resistance welded (LF-ERW), X-52 steel pipe manufactured by A.O. Smith. This pipe is of unknown toughness but TCPL-ANR has addressed this risk in their integrity management plan. TCPL-ANR documents indicate that the 24-inch LF-ERW pipe in this *special permit inspection area* was hydrostatically tested to 104% SMYS or 145% of MAOP. TCPL-ANR also reports that the 24-inch pipe in the *special permit inspection area* has never experienced a field hydrostatic test failure or operating failure in the 24-inch LF-ERW weld seam. However, this type of weld seam pipe is known for systemic manufacturing issues resulting in weld seam failure. This places the *special permit segments* in the "requires substantial justification" column of the criteria matrix. PHMSA has seen systemic weld seam issues on many pipelines with LF-ERW pipe seams including several failures linked to LF-ERW seams. There is no existing technology to thoroughly remediate and mitigate LF-ERW seam risks for this pipeline while in gas service in a Class 3 Location. TCPL-ANR does not have any records documenting the non-destructive testing of pipeline girth welds. The 24-inch pipeline is coated with hot applied wax.

Waupaca, Outagamie, and Winnebago Counties, Wisconsin - *Special permit segment 3* – 24-inch Line 226

Pipe manufacture, pipe material, and pipe coating: The *24-inch Line 226* pipeline was installed in 1960 and consists of API 5L, LF-ERW, X-52 steel pipe manufactured by A.O. Smith. This pipe is of unknown toughness but TCPL-ANR has addressed this risk in their integrity management plan. TCPL-ANR documents indicate that the 24-inch LF-ERW pipe in this *special permit inspection area* was hydrostatically tested to 90% SMYS or 125% of MAOP. TCPL-ANR also reports that the 24-inch pipe in the *special permit inspection area* has never experienced a field hydrostatic test failure. TCPL-ANR reports a reportable seam leak in 1971 and 2 non-reportable third party mechanical damage incidents in the special permit inspection

area. However, this type of weld seam pipe is known for systemic manufacturing issues resulting in weld seam failure. This places the *special permit segments* in the "requires substantial justification" column of the criteria matrix. PHMSA has seen systemic weld seam issues on many pipelines with LF-ERW pipe seams including several failures linked to LF-ERW seams. The 24-inch pipeline is coated with hot applied wax.

Defiance, Henry, and Fulton Counties, Ohio and Lenawee County, Michigan - ***Special permit segment 4* – 30-inch Line 501**

Pipe manufacture and pipe coating: The 30-inch Line 501 pipeline was installed in 1956 and consists of API 5L, electric flash welded (EFW), X-52 steel pipe manufactured by A.O. Smith in 1956. This pipe is of unknown toughness. TCPL-ANR documents indicate that the 30-inch EFW pipe in this *special permit inspection area* was hydrostatically tested to 102% SMYS and had one test failure in a pipe seam. This seam failure emphasizes the seam failure risks with this vintage seam manufacturing process. The pipe external coating is coal tar enamel.

Class Location:

The proposed *special permit segments* on subject pipelines are located in densely populated areas, in new Class 3 location population areas defined by § 192.5(a)(1), (a)(2) and (b)(3) – Class Locations as follows;

> *(a) This section classifies pipeline locations for purposes of this part. The following criteria apply to classifications under this section.*
>
> *(1) A "class location unit" is an onshore area that extends 220 yards (200 meters) on either side of the centerline of any continuous 1-mile (1.6 kilometers) length of pipeline.*
>
> *(2) Each separate dwelling unit in a multiple dwelling unit building is counted as a separate building intended for human occupancy.*
>
> *(b) (3) A Class 3 location is:*
>
> *(i) Any class location unit that has 46 or more buildings intended for human occupancy; or*
>
> *(ii) An area where the pipeline lies within 100 yards (91 meters) of either a building or a small, well-defined outside area (such as a playground, recreation area, outdoor theater, or other place of public assembly) that is*

occupied by 20 or more persons on at least 5 days a week for 10 weeks in any 12-month period. (The days and weeks need not be consecutive.)

Findings:

PHMSA has determined that a special permit, even with the conditions described above, that would allow TCPL-ANR to leave the existing subject pipeline segments in service at their current MAOPs will not ensure equivalent safety in these highly populated Class 3 Locations for the following reasons:

a) TCPL-ANR has not provided documentation of mechanical and chemical properties for its 30-inch Line 1-100-inch pipeline;

b) TCPL-ANR's 24-inch Line 226 pipeline contains LF-ERW seam pipe, which has known seam failure risks based upon a vintage seam manufacturing process; and

c) TCPL-ANR's 30-inch Line 501 pipeline contains EFW pipe, which has known seam failure risks based upon a vintage seam manufacturing process.

The failure risks of vintage seam pipe longitudinal welds (EFW and LF-ERW pipe) are documented in the "Integrity of Vintage Pipelines" prepared by the Interstate Natural Gas Association of America (INGAA) dated October, 2004 (Vintage Pipe Report). The Vintage Pipe Report documents several integrity and performance history reasons to be concerned with LF-ERW and/or EFW pipe due to:

- Lack of fusion and oxides along the weld seam bond line, due to poor process controls,
- Stitched seam welds, which are alternating from complete and incompletely fused or partially fused areas, due to uneven heating,
- Hook cracks near the weld seam bond line caused by inclusions in the steel,
- Excessive trim or grooving (wall thickness reduction), and
- Arc burns resulting from poor or intermittent welding electrode contact.

PHMSA plans to award a Research & Development contract to review the service history of LF-ERW (including EFW) longitudinal seam pipe and will also review integrity management/inspection tools to detect integrity issues with these pipe seams. This is a follow-up to a National Transportation Safety Board (NTSB) recommendation on the subject. Following

NTSB's investigation of the Dixie Pipeline failure in 2007, NTSB developed safety recommendations to PHMSA focused on preventing failures in LF- ERW pipe. Until the Research & Development project is finished, and PHMSA is satisfied that the inherent integrity risks associated with this type pipe seam can be reliably managed, PHMSA is not technically ready and will not issue special permits to allow operation of LF-ERW, EFW, or other pipe with a history of pipe seam integrity issues for original Class 1 location pipe installed in a sparsely populated area to be upgraded through a special permit process to operate in a densely populated Class 3 location.

The risks posed by these pipe seam characteristics and the lack of documentation are not acceptable in a populated Class 3 location. There is no existing technology to remediate these pipelines that would mitigate the safety risks in a Class 3 location consistent with replacing the pipe with modern steel pipe, external coatings, field welding, girth weld non-destructive testing, and in-place hydrostatic testing methods.

Based on the information submitted by TCPL-ANR and PHMSA's analysis of the technical, operational, and safety issues, PHMSA finds that granting this special permit to TCPL-ANR to operate segments of its natural gas transmission pipelines now in Class 3 locations, at the current MAOP, would be inconsistent with pipeline safety.

Completed in Washington DC on: MAY 5 2010

Prepared By: PHMSA – Engineering and Emergency Support