U.S. Department
of Transportation

**Pipeline and Hazardous
Materials Safety
Administration**

1200 New Jersey Avenue, SE
Washington, D.C. 20590

APR 1 - 2009

Mr. G. Joel Tierney
Pipeline Safety Program Manager
Montana Public Service Commission
1701 Prospect Avenue
PO Box 202601
Helena, MT 59620-2601

Dear Mr. Tierney:

Pursuant to 49 U.S.C. 60118(d), the Pipeline and Hazardous Materials Safety Administration (PHMSA) reviewed your letter of February 6, 2009, notifying us that the Montana Public Service Commission issued a Notice of Commission Action (NCA) to Energy West Montana (EWM) (MPSC Docket NO. D2008.9.107). The Commission is granting a special permit to EWM to modify 49 CFR 192.59 allowing the installation of up to five miles of Polyamide 12 (PA-12) pipe, modify the requirements of the design formula in 49 CFR 192.121, and modify the design limitations detailed in 49 CFR 192.123. These standards were adopted by Montana pursuant to Rule 38.5.2202 of the Administrative Rules of Montana. The Commission's grant of the special permit is conditioned on EWM's compliance with 23 specific requirements listed in the NCA.

PHMSA does not object to the waiver of 49 CFR 192.59, 192.121, and 192.123 as specified in the NCA submitted to PHMSA. However, PHMSA recommends the following:

(1) With respect to Condition 2 of the NCA, the Commission should require that a leak survey be performed:

(a) Within one month of operating the PA-12 pipeline;
(b) Within one month of adding additional appurtenances;
(c) Within one month of making repairs to the PA-12 pipeline;
(d) Another survey must be performed at six months following condition; and
(e) Once each calendar year, not to exceed 15 months as stated in NCA condition.

(2) With respect to Condition 20 of the NCA, in addition to the records regarding joints, PHMSA recommends that the Commission require EWM to collect and maintain traceable information on fittings such as:

(a) Part/Model #;
(b) Heat/Lot #;
(c) Date of Manufacture; and
(d) Name of Manufacturer.

State of Montana, Energy West Montana (EWM) Waiver

(3) Except where the more strict Commission imposed conditions apply, PHMSA recommends that EWM be required to follow the construction standards for Polyethylene in installing its PA-12 pipe (including use of locating wire, allowing for enough slack of thermal expansion/contraction and no angular rocks). The Commission should also consider requiring the use of warning tape if not already included in EWM's construction standards or other procedures related to damage prevention.

If you have any questions, John Gale, Director of Regulations, would be pleased to discuss these regulatory matters with you. He can be reached at 202-366-0434, or by email at John.Gale@dot.gov.

Sincerely,

Jeffrey D. Wiese
Associate Administrator for Pipeline Safety

FEB 0 6 2009

**MONTANA PUBLIC SERVICE COMMISSION**

1701 Prospect Avenue
PO Box 202601
Helena, MT 59620-2601
Telephone: 406-444-6199
FAX #: 406-444-7618
http://www.psc.mt.gov



February 4, 2009

Mr. Jeff Wiese
Associate Administrator for Pipeline Safety
Pipeline and Hazardous Materials Safety Administration
U.S. Department of Transportation
Pipeline Safety, PHP-1
1200 New Jersey Avenue, SE
Second Floor, E22-321
Washington, DC 20590

Dear Mr. Wiese,

Enclosed for your review and consideration is a Notice of Commission Action (NCA) issued by the Montana Public Service Commission on February 4, 2009. The NCA grants a special permit to Energy West Montana (EWM) to install up to five miles of polyamide 12 pipe (49 C.F.R. § 192.59), modify the requirements of the design formula in 49 C.F.R. § 192.121, and modify the design limitations detailed in 49 C.F.R. § 192.123. EWM is an intrastate natural gas operator located in Montana. The following is EWM's contact information:

No. 1 First Avenue South
P.O. Box 2229
Great Falls, MT 59403-2229
(406) 791-7500

The Commission's justification for granting the special permit is detailed in the enclosed memorandum. Additionally, the pertinent technical data that was considered for granting the special permit is contained on the enclosed compact disc. EWM, working with the Gas Technology Institute, has indicated portions of the technical data have already been filed with the Pipeline and Hazardous Materials Safety Administration under Docket PHMSA-2007-29042.

I understand that the Pipeline and Hazardous Materials Safety Administration has 60 days to consider this special permit.

Your review and consideration is appreciated.

Sincerely,

MONTANA PUBLIC SERVICE COMMISSION

G. Joel Tierney
Pipeline Safety Program Manager

Enclosures

Cc: Chris Hoidal

Service Date: February 4, 2009

DEPARTMENT OF PUBLIC SERVICE REGULATION
BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MONTANA

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|---|---|---|
| IN THE MATTER OF Energy West Montana, Great Falls and Cascade - Petition for a Special Permit for the Use of Polyamide 12 Piping for Natural Gas Distribution | ) ) ) ) ) | UTILITY DIVISION<br><br><br><br>DOCKET NO. D2008.9.107 |

**NOTICE OF COMMISSION ACTION**

On September 5, 2008, Energy West Montana (EWM) filed a request for a special permit to install up to five miles of polyamide 12 (PA12) piping, modify the requirements of the design formula in 49 C.F.R. § 192.121, and modify the design limitations detailed in 49 C.F.R. § 192.123. EWM's request for a special permit was noticed on the Commission's Agenda 08-10-07. No comments or concerns were received from interested persons.

The Commission enforces pipeline safety regulations contained in 49 C.F.R. Parts 191, 192, 193, and 199 for all jurisdictional intrastate natural gas pipeline operators. Authority for performing enforcement of the Federal regulations is granted to the Commission under an agreement with the United States Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA) entered into pursuant to 49 U.S.C. § 60105. The Commission may grant a special permit to vary how a pipeline operator must comply with a safety standard "if the [special permit] is not inconsistent with pipeline safety" (49 U.S.C. § 60118). Special permits granted by the Commission are subject to final approval by PHMSA and must be submitted to PHMSA 60 days prior to a special permit's effective date.

EWM provided relevant technical data in their special permit request and responses to Commission data requests. The technical data included reports that characterized the chemical and mechanical properties of PA12 pipe including a hydrostatic design basis value awarded by the

Plastic Pipe Institute; detailed the failure mechanisms of PA12 pipe; justified a design factor greater than 0.32; and, reviewed the installation of PA12 pipe in non-jurisdictional field installations. EWM also proposed additional ongoing safety measures and a test program that would be implemented upon operation of the PA12 pipeline to ensure its continued safe operation.

On February 3, 2009, at a regularly scheduled and noticed work session, the Commission granted EWM's special permit request to deviate from 49 C.F.R. §§ 192.59, 192.121 and 192.123, by allowing EWM to operate up to five miles of PA12 natural gas distribution pipe designed utilizing a design factor of 0.4 and a maximum design pressure of 250 psig. The effective date of this special permit is April 10, 2009, or the date the Commission receives affirmation of the granted special permit by PHMSA, whichever is sooner. Further, the Commission imposes the following conditions to ensure an equivalent level of pipeline safety is maintained:

1) Leak surveys must be performed once each calendar year not to exceed 15 months.
2) A leak survey must be performed within six months of operating the PA12 pipeline and within six months of adding additional appurtenances and within six months of making repairs to the PA12 pipeline.
3) EWM must reserve at least 80 feet of PA12 pipe for each pipe size utilized for future repairs. In the event repairs are made to the PA12 pipeline that results in EWM unable to maintain 80 feet of reserved PA12 pipe, EWM must submit a repair plan to the Commission that details how future repairs will be made to the PA12 pipeline within 30 days of EWM not meeting the PA12 pipe reserve requirement.
4) The PA12 pipeline must be patrolled twice each calendar year not to exceed time intervals of 6 months. The patrols cannot be performed concurrently with the leak survey.
5) The Commission must be notified of any leaks found on the PA12 pipeline within two hours of discovery.
6) EWM must retain a map that shows the location of all PA12 pipeline components. The

map must be updated to identify where the PA12 pipe and appurtenances are utilized and include the pipe and appurtenances EWM uses as a test leg. The map must be completely updated within one week of pipe or appurtenance installation or modification.

7) Provisions in EWM's Public Awareness Program plan must be made to notify residents along the affected right-of-way of the presence of a PA12 pipe in addition to the other information required by EWM's Public Awareness Program plan. EWM must deliver this information to the affected stakeholders at least every six months.

8) Line markers must be installed at all road crossings on both sides of the road and placed in a manner that ensures the next line marker can be seen with an unaided eye. Further, the PA12 pipeline section must be included in EWM's damage prevention program and included in EWM's one-call program.

9) EWM may install up to five miles of PA12 pipe.

10) EWM is not permitted to utilize PA12 pipe with a nominal pipe size greater than four inches.

11) The design pressure of EWM's PA12 pipeline must be determined utilizing the equation in § 192.121. However, EWM may utilize a design factor not exceeding 0.4 and utilize the HDB value determined for the PA12 resin certified by the Plastic Pipeline Institute. The maximum HDB value that may be used to calculate a design pressure is 3150 psi.

12) EWM may not install PA12 pipe with a wall thickness less than 0.09 inches.

13) An excess flow valve must be installed on any PA12 service lines.

14) EWM must install a test leg for taking periodic pipe samples.

15) The PA12 pipe cannot be squeezed to control the flow of gas except on the test leg. However, the PA12 pipe may be squeezed once data has been submitted to the Commission indicating the pipe can be safely squeezed at the coldest anticipated atmospheric temperature and upon Commission approval.

16) Samples of pipe from the test section must be collected and analyzed to determine the aging properties of the PA12 pipe. Samples must be collected and analyses performed at

intervals not exceeding one, three, five, and ten years from the start of pipeline operation. After ten years of operation, samples must be collected and analyzed at least every five years.

17) All data or test results obtained from samples collected on any jurisdictional PA12 pipe must be filed with the Commission within 60 days of obtaining the data or results.

18) EWM must petition the Commission for the termination of the conditions imposed by this special permit if and when PHMSA changes the regulations to allow PA12 pipe.

19) EWM must file the following documentation with the Commission prior to the start of constructing the PA12 pipeline:

A) Qualified joining procedures with records documenting qualification test results;

B) PA12 joining procedure qualification records for each individual that will be joining sections of PA12; and,

C) Records of personnel receiving training for visually inspecting PA12 joints.

20) EWM must retain the following records concerning all joints involving PA12 made on jurisdictional pipeline:

A) Date joint was made;

B) Type of joint;

C) Employee who made the joint;

D) Atmospheric temperature when the joint was made; and,

E) GPS location of joint.

21) EWM's Operations and Maintenance plan must explicitly state that polyethylene and PA12 are not compatible and cannot be used interchangeably.

22) If during the special permit period the PA12 pipe is found to be deficient, poses a risk to the public, or fails, the PA12 pipe must be replaced with pipe that is currently approved by 49 CFR Part 192 at EWM's cost.

23) Additional safety requirements may be imposed by the Commission if the Commission determines alternate safety measures are necessary to ensure the safe operation of EWM's

PA12 pipeline.

Done and dated this 3rd day of February, 2009, by a vote of 5 to 0.

BY THE MONTANA PUBLIC SERVICE COMMISSION

GREG JERGESON, Chairman
KEN TOOLE, Vice-Chairman
GAIL GUTSCHE, Commissioner
BRAD MOLNAR, Commissioner
JOHN VINCENT, Commissioner

**PUBLIC SERVICE COMMISSION**
**STATE OF MONTANA**

# Memorandum

**To:** Commissioners, Kate, Justin

**From:** Eric D., Joel

**Date:** January 28, 2009

**Re:** Energy West Montana, Great Falls, and Cascade - Petition for a Special Permit for the use of Polyamide 12 piping for Natural Gas Distribution - D2008.9.107

**Introduction**

On September 5, 2008, Energy West Montana (EWM) filed a request for a special permit to install up to five miles of polyamide 12 (PA12) piping, modify the requirements of the design formula in 49 C.F.R. § 192.121, and modify the design limitations detailed in 49 C.F.R. § 192.123. EWM requested the permit because the use of PA12 plastic pipe is currently not permitted by 49 C.F.R Part 192 and the material properties of PA12 pipe are potentially superior to those exhibited by the currently allowed plastic pipe materials. EWM states that the use of PA12 pipes will allow them to extend their natural gas distribution system from Ulm to Cascade in a more efficient manner than possible with the currently approved piping materials.

After reviewing EWM's special permit request and additional pertinent information, Commission pipeline safety staff members agree with EWM's assessment that PA12 pipe can be safely used for the requested application. The Commission's pipeline safety staff members recommend the Commission grant EWM's special permit request with conditions.

**Background**

EWM currently delivers liquefied petroleum gas (LPG) to customers in Cascade through a gas distribution system. EWM is in the process of constructing a natural gas pipeline from Ulm to Cascade that will be used to deliver natural gas to EWM's Cascade customers. The natural gas pipeline will tie into EWM's existing Cascade distribution system and the propane tank and ancillary equipment will be decommissioned.

Gas distribution systems are constructed from either steel pipe or plastic pipe. Currently, most utilities choose to use plastic pipe due to its cost, operation, maintenance, and construction properties. In Montana, polyethylene has been the only plastic material used for constructing natural gas distribution systems.

During the design phase of the Ulm to Cascade pipeline project, EWM discussed the possibility of using PA12 pipe with Commission staff. Compared to polyethylene pipe, PA12 pipe can be operated at much higher pressures based on its material properties. Because PA12 pipe has material properties that allow it to operate at higher pressures, a utility would be able to either transport more gas through a pipe with given wall thickness or utilize a smaller pipe with a thinner pipe wall thickness to transport the same amount of gas. In some instances, PA12 could also be used instead of steel. Although PA12 pipe has several material properties that are superior to polyethylene pipe, there is no provision in the pipeline safety regulations to allow the use of PA12 pipe. Thus, EWM must request a special permit from the Commission in order to use PA12 pipe.

The Commission enforces pipeline safety regulations contained in 49 C.F.R. Parts 191, 192, 193, and 199 for all jurisdictional intrastate natural gas pipeline operators. Authority for performing enforcement of the federal regulations is granted to the Commission under an agreement with the United States Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA) entered into pursuant to 49 U.S.C. § 60105. The Commission may grant a special permit (waive compliance) with a safety standard "if the waiver [(special permit)] is not inconsistent with pipeline safety" (49 U.S.C. § 60118). Special permits can be granted by the Commission by following the Commission's procedural rules. However, if the Commission approves a special permit, the order granting the special permit must be forwarded to PHMSA 60 days prior to its effective date. PHMSA can approve the special

permit, stay the Commission's order granting the special permit or choose not to object to the special permit. If PHMSA does not object to the special permit granted by the Commission, the special permit is approved by default.

**Regulations**

The following is a list of the regulations that EWM's requested special permit would affect if approved:

- 49 C.F.R. § 192.59 Plastic Pipe;
- 49 C.F.R. § 192.121 Design of Plastic Pipelines; and,
- 49 C.F.R. § 192.123 Design Limitations for Plastic Pipes.

49 C.F.R. § 192.59 Plastic Pipe

The types of plastic pipe that are qualified for natural gas distribution lines are regulated by 49 C.F.R. § 192.59. In order to be qualified, the plastic pipes must be manufactured in accordance with a listed specification. Specifically, § 192.59 requires thermoplastic pipe to be manufactured according to the 1999 edition of ASTM D2513 (ASTM D2513-99) and be resistant to chemicals with which contact may be anticipated.

The thermoplastic pipe materials listed by ASTM D2513-99 include: polyethylene, polyvinyl chloride, and polyamide 11 (PA11). ASTM D2513 specifies the requirements and test methods for material dimensions, tolerances, hydrostatic burst strength, chemical resistance and impact resistance of plastic pipe for use in fuel gas mains and services. ASTM D2513 also specifies the in-plant quality control program pipe manufactures are required to utilize in order to mark their pipe with the ASTM D2513 designation. The ASTM D2513 standard has periodically been updated; however, PHMSA has declined to incorporate the latest editions into the pipeline safety regulations. Thus, new types of plastic materials cannot be used for manufacturing pipes that are used for the transportation of natural gas per 49 C.F.R. Part 192 by a regulated pipeline operator unless a regulated pipeline operator is granted a special permit.

49 C.F.R. § 192.121 Design of Plastic Pipelines

Plastic pipelines for natural gas systems must be designed in accordance with 49 C.F.R. § 192.121 using the formula in *Equation 1*.

$$P = 2S\frac{t}{(D-t)}F \qquad \textit{Equation 1}$$

Where:

$P$ = Design Pressure (psig)

$S$ = Hydrostatic Design Basis (HDB) determined in accordance with the ``Policies and Procedures for Developing Hydrostatic Design Basis (HDB), Pressure Design Basis (PDB), Strength Design Basis (SDB), and Minimum Required Strength (MRS) Ratings for Thermoplastic Piping Materials or Pipe." PPI TR-3/2004 (2004).

$t$ = Wall Thickness

$D$ = Outside Diameter

$F$ = Design Factor

In *Equation 1*, the design factor required by 49 C.F.R. § 192.121 is 0.32 for all types of plastic pipes except PA11. PA11 pipes designed with a nominal pipe size of four inches or less and a standard dimension ration (SDR) of 11 or less may utilize a design factor of 0.40.

49 C.F.R. § 192.123 Design Limitations for Plastic Pipe

The operating pressure of plastic pipelines is limited by 49 C.F.R. § 192.123. Plastic pipe used in distribution systems or plastic pipe located in Class 3 or Class 4 locations are limited to a maximum design pressure of 100 psi. Class locations are defined in 49 C.F.R. § 192.5 and are based on the number of buildings intended for human occupancy in an area that extends 220 yards (200 meters) on either side of the centerline of any continuous 1-mile section of pipeline. Additionally, 49 C.F.R. § 192.123 imposes temperature limitations at which plastic pipe can be used and limits the minimum wall thickness of thermoplastic pipe to 0.062 inches. It should be noted that 49 C.F.R. § 192.123 contains an exception that allows polyethylene pipe (PE2406 and PE3408), 12 inches or less in diameter to operate at 125 psig provided the design pressure determined by *Equation 1* is commensurate with the increase.

On December 24, 2008, PHMSA approved a maximum design pressure of 200 psig for pipes constructed from PA11. The PA11 pipes must be four inches or less in diameter and have a SDR less than or equal to 11. PHMSA based their approval on a test data from a petitioner. The test data included results from a three year research program conducted by the Gas Technology Institute (GTI) and the successful testing of exhumed samples of PA11 pipe that had been installed and operated under Federal and State special permits.

**EWM's Special Permit Request**

EWM's special permit request specifically asks the Commission for consideration to install up to five miles of PA12 pipe that is designed with a design factor of 0.4 and allow a design pressure up to 250 psig. EWM requests the special permit remain in effect until such time, if any, PHMSA adopts rules to allow PA12 piping systems designed and operated at the requested conditions. Further, EWM requests the special permit be superseded if, in the future, PHMSA adopts rules permitting the installation of PA12 piping systems designed and operated at the requested conditions. EWM's special permit request also provided a basis for their request and additional safety measures they would utilize to ensure the safe operation of their proposed PA12 pipe installation.

Basis for EWM's Special Permit

EWM stated a design factor of 0.32 was adopted over 25 years ago into the pipeline safety regulations from the American Society of Mechanical Engineers Code B31.8. EWM noted that the design factor has historically been used to account for nominal variations in material, manufacturing quality, and compensate for stresses in pipe which are unrelated to internal pressure. EWM believes pipe currently manufactured in accordance with ASTM standards has very little variation in material and manufacturing quality and a design factor of 0.40 is justified

EWM stated the pressure limit for their proposed PA12 pipe installation could be increased to 250 psig based on the proposed pipe sizes and HDB factor. EWM noted the HDB rating for the PA12 pipe they propose to install was determined in accordance with the procedure established by the Plastic Pipe Institute. EWM also noted that GTI has corroborated the materials strength, long term performance and integrity of the pipe and joining techniques. In

addition to manufacturing and material test data, EWM indicated that PA12 pipe has been used at operating pressures of 250 psig in non-jurisdictional applications.

Safety Measures

EWM stated the proposed PA12 pipe would be installed with Energy West quality assurance procedures developed specifically for PA12. EWM also stated they would maintain records of the type of pipe material, location of material, length, pressure, pipe size, wall thickness, and Class locations. Once the proposed PA12 pipeline is installed and operating, EWM will remove samples of the pipe for testing after 12-month and 36-month time periods. The samples will be tested and the results evaluated to determine the ageing characteristics of the PA12 pipe. EWM stated the results of the PA12 pipe evaluation will be supplied to both PHMSA and the Commission.

EWM stated they would follow all of the pipeline safety regulations. However, as a condition for using PA12 pipe, EWM stated they would leak survey the pipeline twice the first year and then annually each subsequent year the special permit is in effect. Additionally, EWM stated they would remove from service any pipe material that is found to be deficient, pose a risk to the public or fails. EWM said if the PA12 requires removal, they would replace the pipe, at their cost, with pipe that is currently permitted by the regulations.

**Commission Staff Analysis**

Commission staff has considered EWM's request for a special permit to use PA12 pipe for constructing a natural gas pipeline from Ulm to Cascade. Staff also analyzed information EWM provided in their responses to staff data requests. Commission staff has provided an analysis of how a special permit would modify the requirements of the current regulations and whether staff believes the public's safety is preserved if the special permit is granted by the Commission.

Effect of Special Permit on 49 C.F.R. § 192.59 Plastic Pipe

If the Commission grants EWM's special permit, EWM will be permitted to install and operate their distribution system with a limited length of PA12 pipe installed to transport natural gas. The ability to utilize PA12 pipe for natural gas transportation will have a profound effect on

the design pressure calculated by *Equation 1*. By switching pipe materials, the HDB value will change. The HDB value is the categorized long-term hydrostatic strength in the circumferential or hoop direction, for a given set of end use conditions. The pipeline safety regulations require HDB values used in *Equation 1* to be awarded by the Plastic Pipe Institute (PPI). PPI reviews pipe strength data obtained from tests performed in accordance with ASTM Test Method D2837 and categorizes the results to obtain a recommended HDB rating. PPI has reviewed the strength data for PA12 and granted an experimental HDB rating of 3150 psi for PA12 in PPI's TR4/2008a HDB/HDS/SDB/PDB/MRS Listed Materials tables. In contrast, PE pipe has a HDB rating of 1250 psi or 1600 psi depending on the resin formulation. As illustrated by *Equation 1*, the HDB value is directly proportional to the design pressure. That is, the greater the HDB value, the greater the design pressure of the pipe for a pipe with a given wall thickness and diameter. Thus, by utilizing PA12 pipe, EWM can achieve a higher design pressure without increasing the wall thickness of the pipe.

EWM has provided sufficient data to demonstrate the suitability of PA12 for natural gas service (EWM response to data request PSC-002(c)). As part of EWM's response to the Commission's data requests, EWM provided several reports characterizing the properties of PA12 pipe. The reports were prepared by GTI. GTI is a nonprofit research and development organization that works with the energy industry. It should be noted that all of the technical documents and reports filed with Commission have also been filed with PHMSA under Docket PHMSA-2007-29042.

As previously noted, ASTM D2513-99 has been incorporated by reference into the pipeline safety regulations. ASTM D2513 lists the specifications pipe must conform and limits the materials that are allowed for pipe used to transport natural gas. Although PA12 pipe is not included in ASTM D2513-99, the latest editions of ASTM D2513 include PA12 pipe.

The technical reports prepared by GTI and submitted by EWM demonstrate that PA12 conforms to the requirements of ASTM D2513. However, PHMSA is exercising caution by not adopting the recent editions of ASTM D2513 and thereby permitting the widespread use of PA12 pipe. Rather, PHMSA is waiting until data is available from some limited field applications that are approved on a case by case basis through the special permit process. EWM's special permit

request is aligned with both the gas industry and PHMSA's requirement of utilizing PA12 in a controlled fashion to safely demonstrate its capabilities.

Commission staff members believe EWM's proposed use of PA12 pipe will not have an adverse affect on the level of safety for transporting natural gas. EWM is proposing to use the PA12 pipe in a controlled fashion whereby the location of pipe, appurtenances and joints are characterized with atypical precision. EWM has also proposed enhanced safety measures and agreed with Commission staff to implement several additional safety measures to ensure the pipeline is operated safely. Thus, Commission staff believe PA12 pipe can be used without detriment to public safety.

Effect of Special Permit on 49 C.F.R. § 192.121 Design of Plastic Pipelines

Approval of EWM's special permit will allow EWM to utilize a design factor (F) of 0.40 rather than 0.32 in *Equation 1.* The design factor, as defined by PPI, is a number less than 1.00 that takes into consideration the variables and degree of safety involved in a properly installed thermoplastic pressure piping installation. By allowing EWM to use a 0.40 design factor, EWM can operate their proposed sections of PA12 pipeline at pressures that are 25% greater than those calculated with a 0.32 design factor. Alternatively, EWM can utilize a pipe that has a wall thickness that is 18.5% less than the wall thickness required utilizing a design factor of 0.32 for operating their proposed PA12 pipeline at a given pressure.

In 1970, when the pipeline safety regulations were first promulgated, a risk based design factor that ranged from 0.20 in Class 4 locations to 0.32 in Class 1 locations was adopted. In 1977, the Materials Transportation Board (MTB) (now known as PHMSA) adopted 0.32 as a single design factor. At the time, the MTB indicated a design factor of 0.32 was appropriate to protect against unforeseeable events and was appropriate based on the state of plastic pipe technology in 1978. A design factor of 0.32 has remained in effect since May 1978.

On December 24, 2008, PHMSA adopted regulations to allow a design factor of 0.40 for pipelines constructed from PA11. In PHMSA's Notice of Proposed Rulemaking published January 8, 2008, PHMSA noted that increasing the design factor to 0.40 for certain PA11 pipes would not compromise safety. PHMSA based their assessment in part on data gathered from

safely operating trial systems and the likelihood that an increase in design factor would allow PA11 pipe to be used in lieu of steel pipe thereby reducing corrosion.

Commission staff believe granting EWM's special permit request for increasing the design factor in *Equation 1* from 0.32 to 0.40 would not compromise safety. Staff's opinion is based on analysis of the technical reports prepared by GTI and submitted by EWM. Additionally, EWM provided descriptions of several PA12 test installations in their response to the Commission's data request, PSC-002(a). The test installations were used to validate the safe operating characteristics of the PA12 pipe. Five of the seven test installations were designed using a design factor of 0.40. The other two installations were designed with design factors of 0.52 and 0.55. Because EWM has provided relevant technical data that indicates PA12 pipelines can safely operated when designed with a design factor of 0.40, staff recommends the Commission grant EWM's request to utilize a design factor of 0.40.

Effect of Special Permit on 49 C.F.R. § 192.123 Design Limitations for Plastic Pipes

EWM's special permit request asks the Commission to allow EWM to operate their proposed PA12 pipeline at pressures up to 250 psig. EWM has provided data that substantiates the safe operation of PA12 pipe at pressures greater than 250 psig. In response to Commission data request PSC-002)(a), EWM provided a list of test installations. Four of the seven test installations were safely operated at 250 psig, one installation was safely operated at 330 psig, and one test installation was safely operated at 345 psig. The other test installation was operated at 150 psig, but its design pressure was based on the use of an elevated temperature HDB value. Plastic pipelines operated in environments with higher temperatures are limited to lower pressures as high operating temperatures have a deleterious effect on the strength of plastic pipe.

In addition to providing field trial data, EWM also provided technical reports prepared by GTI. The reports provide data on the ability of PA12 pipe to resist slow crack growth, the primary failure mechanism inherent to plastic pipe. Several different tests were conducted to substantiate the ability of PA12 to resist failure by slow crack growth. The tests included long term hydrostatic strength validation, PENT tests, notched pipe tests, and secondary stress tests. GTI reported the results from the slow crack growth testing indicate PA12 is highly resistant to this type of failure mechanism.

EWM has provided data regarding the safe operating characteristics of PA12 pipe at pressures greater than or equal to 250 psig and technical reports prepared by GTI that substantiates PA12 is highly resistant to slow crack growth mechanisms. Based on the positive research and test data results provided to the Commission by EWM and the agreement by EWM to implement enhanced safety measures, Commission staff believe approval of EWM's special permit request by the Commission will not be detrimental to the public's safety.

Public Notice and Comment

EWM's request for a special permit that would allow the use of PA12 pipe was noticed on the Commission's 08-10-07 Agenda. No comments have been received nor concerns been expressed by interested persons.

Staff Recommendations

The Commission should approve EWM's special permit request. However, the Commission should approve the special permit request with the following conditions:

1) Leak surveys must be performed once each calendar year not to exceed 15 months.
2) A leak survey must be performed within six months of operating the PA12 pipeline and within six months of adding additional appurtenances and within six months of making repairs to the PA12 pipeline.
3) EWM must reserve at least 80 feet of PA12 pipe for each pipe size utilized for future repairs. In the event repairs are made to the PA12 pipeline that results in EWM unable to maintain 80 feet of reserved PA12 pipe, EWM must submit a repair plan to the Commission that details how future repairs will be made to the PA12 pipeline within 30 days of EWM not meeting the PA12 pipe reserve requirement.
4) The PA12 pipeline must be patrolled twice each year. The patrols cannot be performed concurrently with the leak survey.
5) The Commission must be notified of any leaks found on the PA12 pipeline within two hours of discovery.

6) EWM must retain a map that shows the location of all PA12 pipeline components. The map must be updated to identify where the PA12 pipe and appurtenances are utilized and include the pipe and appurtenances EWM uses as a test leg. The map must be completely updated within one week of pipe or appurtenance installation or modification.
7) Provisions in EWM's Public Awareness Program plan must be made to notify residents along the affected right-of-way of the presence of a PA12 pipe in addition to the other information required by EWM's Public Awareness Program plan. EWM must deliver this information to the affected stakeholders at least every six months.
8) Line markers must be installed at all road crossings on both sides of the road and placed in a manner that ensures the next line marker can be seen with an unaided eye. Further, the PA12 pipeline section must be included in EWM's damage prevention program and included in EWM's one-call program.
9) EWM may install up to five miles of PA12 pipe.
10) EWM is not permitted to utilize PA12 pipe with a nominal outside diameter greater than four inches.
11) The design pressure of EWM's PA12 pipeline must be determined utilizing the equation in § 192.121. However, EWM may utilize a design factor not exceeding 0.4 and utilize the HDB value determined for the PA12 resin certified by the Plastic Pipeline Institute. The maximum HDB value that may be used to calculate a design pressure is 3150 psi.
12) EWM may not install PA12 pipe with a wall thickness less than 0.09 inches.
13) An excess flow valve must be installed on any PA12 service lines.
14) EWM must install a test leg for taking periodic pipe samples.
15) The PA12 pipe cannot be squeezed to control the flow of gas except on the test leg. However, the PA12 pipe may be squeezed once data has been submitted to the Commission indicating the pipe can be safely squeezed at the coldest anticipated atmospheric temperature and upon Commission approval.
16) Samples of pipe from the test section must be collected and analyzed to determine the aging properties of the PA12 pipe. Samples must be collected and analyses performed at intervals not exceeding one, three, five, and ten years from the start of pipeline operation.

After ten years of operation, samples must be collected and analyzed at least every five years.

17) All data or test results obtained from samples collected on any jurisdictional PA12 pipe must be filed with the Commission within 60 days of obtaining the data or results.

18) EWM must petition the Commission for the termination of this special permit regardless of changes to the regulations by PHMSA.

19) EWM must file the following documentation with the Commission prior to the start of constructing the PA12 pipeline:
   A) Qualified joining procedures with records documenting qualification test results;
   B) PA12 joining procedure qualification records for each individual that will be joining sections of PA12; and,
   C) Records of personnel receiving training for visually inspecting PA12 joints.

20) EWM must retain the following records concerning all joints involving PA12 made on jurisdictional pipeline:
   A) Date joint was made;
   B) Type of joint;
   C) Employee who made the joint;
   D) Atmospheric temperature when the joint was made; and,
   E) GPS location of joint.

21) EWM's Operations and Maintenance plan must explicitly state that polyethylene and PA12 are not compatible and cannot be used interchangeably.

22) Additional safety requirements may be imposed by the Commission if the Commission determines alternate safety measures are necessary to ensure the safe operation of EWM's PA12 pipeline.

**Conclusion**

The special permit EWM requested will allow EWM to design PA12 pipeline sections with thinner walled pipe and operate them at greater pressures then what is currently permitted by the pipeline safety regulations. After reviewing EWM's special permit request, data responses, material test reports and additional pertinent information, Commission pipeline safety staff

members agree with EWM's assessment that PA12 can be safely used for the requested application. The Commission should grant EWM's request for a special permit, with conditions, to allow EWM to install and operate a pipeline sections constructed with PA12 pipe.

Staff Recommended Motion

Approve EWM's request for a special permit and direct Commission staff to forward an order contained in a Notice of Commission Action approving the special permit with the staff recommended conditions to PHMSA.