

U.S. Department of Transportation  
Research and Special Programs Administration  
400 Seventh St., S.W.  
Washington, D.C. 20590

AUG 20 2002

Mr. Robert F. Smallcomb, Jr.  
Director, Pipeline Engineering and Safety Division  
Massachusetts Department of Telecommunications & Energy  
One South Station  
Boston, MA 02110

Dear Mr. Smallcomb:

We have considered your letter of July 10, 2002, notifying us that the Massachusetts Department of Telecommunications & Energy has granted the Keyspan Energy Delivery Services Company a waiver from compliance with 49 CFR Part 192, § 192.321(a). The waiver will permit the installation of 6-inch nominal diameter, SDR 11.5, PE 2406 plastic carrier pipe into a new 8-inch nominal diameter, coated, welded steel casing, in Billerica, Massachusetts. Approximately 350 feet of the plastic piping will not meet the burial requirements of § 192.321(a). The steel-encased plastic pipe will be protected against mechanical damage and ultraviolet radiation, and meet all stress limits applicable to plastic pipe.

We have no objection to the waiver. The circumstances are comparable to those of previous waivers we have approved relative to § 192.321(a).

Sincerely,  
Stacey L. Gerard  
Associate Administrator for Pipeline Safety

THE COMMONWEALTH OF MASSACHUSETTS  
OFFICE OF CONSUMER AFFAIRS AND BUSINESS REGULATION  
DEPARTMENT OF TELECOMMUNICATIONS & ENERGY  
ONE SOUTH STATION  
BOSTON, MA 02110

Ms. Stacey Gerard  
Associate Administrator for Pipeline Safety ( DPS-1)  
Research and Special Programs Administration  
Department of Transportation  
400 Seventh Street, SW.  
Washington, D.C. 20590

RE: Waiver of Pipeline Safety Regulations

Dear Ms. Gerard:

Being a certified agent under section 60105, Public Law 103-272, the Massachusetts Department of Telecommunications and Energy has approved a waiver to Keyspan Energy Delivery ("Keyspan") from the requirements of Title 49 C.F.R. Part 192, § 192.321(a).

The waiver allows Keyspan to install a six-inch nominal diameter, SDR 11.5, PE 2406 plastic carrier pipe into a new eight-inch nominal diameter, coated, welded steel casing. Approximately 350 feet of the plastic piping will not meet the burial requirements of § 192.321(a). The installation site is in Billerica, Massachusetts.

As required by section 60118(d), Public Law 103-272, I am forwarding a copy of the waivers to your office with the understanding that the waivers will be effective within 60 days of notification unless the Secretary objects to the waiver in writing before the effective date.

Thank you for your support in this matter.

Very truly yours,  
Robert F. Smallcomb, Jr.  
Director, Pipeline Engineering and Safety Division

Keyspan  
201 Rivermoor Street  
West Roxbury, Massachusetts 02132

Mr. Robert F. Smallcomb  
Director, Pipeline Engineering and Safety Division  
Commonwealth of Massachusetts  
Department of Telecommunications and Energy (DIE)  
One South Station  
Boston, MA 02110

RE: Petition for Waiver to Install Plastic Pipe under the Treble Cove Rd. Bridge, crossing Route 3  
NB/SB in Billerica, MA  
MHD Bridge Replacement

Dear Mr. Smallcomb,

The Massachusetts Highway Department (MHD) is planning to replace the above-referenced bridge in Billerica, Massachusetts. As part of the MHD's proposed bridge work, Keyspan Energy Delivery is planning to replace approximately 350 feet of existing 4-inch diameter, bare steel, intermediate pressure gas main with a new 6-inch nominal diameter, SDR 11.5, PE 2406, intermediate pressure plastic pipe. The new 6-inch diameter main will be installed within a 8-inch diameter steel casing pipe. The casing will be protected with 0.065-inches minimum thick, UV resistant, Pritec coating. Keyspan Energy Delivery respectfully requests DIE approval to install this new 6-inch gas main.

In accordance with 220 CMR 101.02: Application for Exceptions and Waivers from Provisions of the D.T.E. Regulations, Keyspan Energy Delivery (the "Company") hereby petitions the Massachusetts Department of Telecommunications and Energy (the "Department") for a waiver from the provision of 49 CFR 192.321; "Installation of plastic pipe", paragraph (a). Paragraph (a) requires that plastic pipe must be installed below ground level.

The pipeline will be joined by heat fusion and inserted into a 8-inch nominal diameter, coated and welded steel casing pipe. The new 6-inch diameter pipeline will operate at an internal pressure of 60 psig. It will be tested in accordance with the requirements of either Massachusetts Regulations 220 CMR 101.06, 220 CMR 109.11 or Federal Regulation, 49 CFR 192, whichever is more stringent. In this case the line will be tested to 1.5 MAOP which is 90 psig.

The specifications for the plastic pipe appear as Table 1 and Table 2 in Exhibit A, and the specifications for the steel-casing pipe appear as Table 1 in Exhibit B. Exhibit C, KeySpan Energy Delivery Construction drawings, contain the design of the pipeline installation across the bridge. The drawings show the steel casing pipe layout and support locations and the means for maintaining separation between the plastic pipe and the steel casing pipe. In accordance with 220 CMR 101.06 (10) (a) (6), a plastic valve will be located on each side of the bridge, at the approximate distances shown on the construction plan drawings in Exhibit C.

In accordance with 220 CMR 101.06 (10), I am providing the following information regarding the new main

1. The nominal pipe diameter of the carrier pipe is 6-inches, with a wall thickness of 0.576 inches. The Specified Minimum Yield Strength (SMYS) is 3,000 psi.
2. The maximum operating pressure of the new main is 60 psig and the test pressure is 90 psig.
3. As stated in 220 CMR 101.06 (10), a calculation for the hoop stress is required for nominal pipe diameter's 12" or greater. This Request for Approval is for an 6" diameter pipe, which does not apply.
4. Due to the short length of the new plastic main, approximately 400 feet total, with only about 350 feet between bridge abutments, it is not necessary in this particular case, to provide for expansion or contraction. The minor thermal movements can be absorbed in the pipe routing and soil beyond the bridge abutments.
5. The pipe supports shall be in accordance with Keyspan Energy Delivery's detail for pipe supports on bridges. There will be a total number of thirteen (13) supports on the bridge, spaced no more than approximately 30'

apart. See Exhibit C for the steel casing pipe support locations and details. Engineering has performed a pipe stress analysis to justify the support spacing. The analysis shows the steel casing pipe is well within allowable stress parameters identified in the ASME B31.8 - 1995 Edition, Gas Transmission and Distribution Piping Systems Code.

The layout of the abutments and support beams as indicated on the attached plan were obtained from a set of construction plans prepared for the MHD by URS Corporation, dated November 15, 2001.

The stress on the plastic pipe will not exceed the pipe's yield strength of 3,000 psig presented in Exhibit A, Table I, due to the fact that the anticipated temperature that the pipe will experience after installation is not less than -20°F, nor greater than 100°F. The anticipated temperature of the plastic pipe during installation will vary between 30°F and 80°F.

The plastic pipe will not be exposed to excessive thermal stresses, the deteriorating effects of ultraviolet light from the sun, or mechanical damage under normal operating conditions. Consequently, the Company believes that there is no safety hazard associated with the installation of the plastic pipe above ground level across the bridge, as described herein.

If you have any questions or require additional information to be submitted regarding this petition, please feel free to contact either myself at (718) 403-3062, or George J. Circosta in our Project Engineering Department, at (617) 723-5512, ext. 4450. A check in the amount of \$100." has been included with this submittal for the filing fee required by the Department.

Sincerely,  
Dr. Steven A. Vitale  
Vice President

EXHIBIT A  
Plastic Pipe Specifications

TABLE 1  
Physical Property Data For UAC 2000 Polyethylene Pipe

PE 2406

| <u>Property</u>                 | <u>Nominal Value</u>        |
|---------------------------------|-----------------------------|
| Melt Index                      | 0.2 g/10 min                |
| Density                         | 0.943 g/cc                  |
| Thermal Expansion               | $9 \times 10^{-5}$ in/in/°F |
| Yield Strength                  | 3,000 psi                   |
| Flexular Modulus                | 100,000 psi                 |
| Thermal Conductivity            | 1.8 Btu/hr/sq ft/°F/in      |
| Hydrostatic Design Basis @73°F  | 1,250 psi                   |
| Deflection Temperature @ 68 psi | 140°F                       |
| Vicat Softening Point           | 248°F                       |
| Brittleness Temperature         | <-180°F                     |
| Hardness, shore D               | 64                          |
| Flammability                    | 1 in/min                    |
| Ultimate Elongation             | >800%                       |

TABLE 2

## Plastic Pipe Data – PE 2406

| Nominal Pipe Size (inches) | Standard Dimension Ratio (SDR) <sup>1</sup> | Average Outside Diameter (inches) | Average Inside Diameter (Inches) | Minimum Wall Thickness (Inches) | Design Pressure Rating @ 100°F (psi) |
|----------------------------|---|-----------------------------------|----------------------------------|---------------------------------|--------------------------------------|
| 2                          | 11.0  | 2.375                             | 1.917                            | 0.216                           | 80                                   |
| 3                          | 11.5  | 3.500                             | 2.856                            | 0.301                           | 76                                   |
| 4                          | 11.5  | 4.500                             | 3.672                            | 0.391                           | 76                                   |
| 6                          | 11.5  | 6.625                             | 5.403                            | 0.576                           | 76                                   |
| 8                          | 13.5  | 8.625                             | 7.270                            | 0.639                           | 64                                   |
| 12                         | 13.5  | 12.750                            | 10.749                           | 0.945                           | 64                                   |

<sup>1</sup> SDR, Standard Dimension Ratio, is calculated by dividing the average outside diameter of the pipe by the minimum wall thickness as described in ASTM D2513.

EXHIBIT B  
Casing Specifications

TABLE 1

Specifications for Casing Pipe  
TYPE OF PIPE: API 5L, Grade B

Property, Dimension, or Specification

|                    |   |
|--------------------|---|
| Nominal Pipe Size: | 8 in.   |
| Outside Diameter:  | 8.625 in.   |
| Inside Diameter    | 8.125 in.   |
| Wall Thickness:    | 0.250 in.   |
| Schedule Number    | 20  |
| Weight per foot:   | 22.36 lb  |
| Coating:           | Pritec high molecular polyethylene outer coating with butyl rubber adhesive |

EXHIBIT C

KeySpan Energy Delivery Construction Drawing No. P-168



## I. BACKGROUND

On June 10, 2002, Colonial Gas Company, an intrastate natural gas distribution company that operates in Massachusetts, doing business as Keyspan Energy Delivery ("Keyspan"), requested that the Department of Telecommunications and Energy ("Department") grant a waiver of the underground installation requirements for plastic pipe contained in 49 C.F.R. Part 192 ("Part 192"). Keyspan seeks to install 350 feet of plastic main inside a steel casing across a bridge located on Treble Cove Road, Billerica. The bridge spans state Route 3.

## II. REGULATORY REQUIREMENTS

The minimum federal safety standards for transportation of natural gas by pipeline are contained in Part 192. Specifically, § 192.321(a) states: "Plastic pipe must be installed below ground level."

Any waiver of any of the provisions of Part 192 granted by the Department is subject to the approval of the Secretary of Transportation's Office of Pipeline Safety COPS"). The Massachusetts Pipeline Safety Code, 220 C.M.R. § 101, and Public Law 103-272, formerly the Natural Gas Pipeline Safety Act, require the Department to give OPS notice of any waiver at least 60 days before it becomes effective. The Department regulations at 220 C.M.R.

§ 101.02(2) state:

The [Department] may issue a waiver to a gas corporation or municipal gas department from the provisions of Part 192 in Title 49 of the Federal regulations providing that the waiver pertains to an intrastate facility and the [Department] gives notice to the Department of Transportation at least 60 days before the waiver becomes effective.

In addition, Public Law 103-272 states in § 60118: Compliance and Waivers:

(d) Waivers by State Authorities. If a certification under section 60105 of this title...is in effect, the state authority may waive compliance with a safety standard to which the certification... applies in the same way and to the same extent the Secretary may waive compliance.... However, the authority must give the Secretary written notice of the waiver at least 60"days before its effective date. If the Secretary makes a written objection before the effective date of the waiver, the waiver is stayed.:1'.

## III. ANALYSIS AND FINDINGS

The proposed six-inch nominal diameter plastic pipe is to be permanently installed in an eight-inch nominal diameter, coated, welded steel casing. The casing will be located in a utility bay underneath the bridge. The plastic pipe, sheathed within the casing, will not be exposed to ultraviolet radiation.

There are advantages to the use of encased plastic pipe at this bridge crossing. First, plastic pipe is not prone to corrosion, and therefore will require less maintenance than a steel pipeline. Second, a steel-encased plastic pipe is less susceptible to damage from vandalism, airborne objects and external loading.

In the expected ambient temperature range, the forces acting on the plastic pipe due to expansion and contraction are well within acceptable limits. The tensile stress due to temperature variation is 675 pounds per square inch gauge ("p.s.i.") which is well below the allowable limit of 2,160 p.s.i. (72 percent of the specified minimum yield strength which is 3,000 p.s.i.). The stresses due to pressure and bending, including the combined stresses, are also well below the allowable limits established in the American Society of Mechanical Engineers B31.8 Code, which is incorporated into Part 192 by reference.

Since 1979, many similar waivers have been granted by states and approved by OPS. OPS has approved dozens of similar waivers to operators in Massachusetts. All of these pipelines have operated satisfactorily. In addition, the following factors support the Keyspan application. Casing spacers will be placed on the plastic pipe at intervals no

greater than eight feet. These will support the carrier pipe and allow for movement during expansion and contraction. The steel casing will continue approximately 15 feet past each of the abutments. The plastic pipe will be joined by butt fusion, requiring no fittings over the encased portion of the main. The pipe will be tested to 90 p.s.i. to establish a maximum allowable operating pressure of 60 p.s.i. Isolation valves will be installed on the approaches to each side of the bridge in accordance with 220 C.M.R. §101.06(10)(a)6.

IV. ORDER

Accordingly, after due consideration, it is:

ORDERED: Keyspan Energy Delivery is hereby exempted from the underground installation requirement in 49 C.F.R. Part 192 and authorized to install encased plastic pipe on the bridge on Treble Cove Road over state Route 3 in Billerica.

The foregoing waiver is granted with an effective date of August 20, 2002; provided that the Secretary of Transportation or his designee does not object to the waiver prior to the effective date.

By Order of the Department,  
Pau B. Vasington, Chairman  
James Connelly, Commissioner  
W. Robert Keating, Commissioner  
Eugene J. Sullivan, Jr., Commissioner  
Deirdre K. Manning, Commissioner

Appeal as to matters of law from any final decision, order or ruling of the Commission may be taken to the Supreme Judicial Court by an aggrieved party in interest by the filing of a written petition praying that the Order of the Commission be modified or set aside in whole or in part.

Such petition for appeal shall be filed with the Secretary of the Commission within twenty days after the date of service of the decision, order or ruling of the Commission, or within such further time as the Commission may allow upon request filed prior to the expiration of twenty days after the date of service of said decision, order or ruling. Within ten days after such petition has been filed, the appealing party shall enter the appeal in the Supreme Judicial Court, sitting in Suffolk County by filing a copy thereof with the Clerk of said Court. (Sec. 5, Chapter 25, G.L. Ter. Ed., as most recently amended by Chapter 485 of the Acts of 1971).