
**DEPARTMENT OF
TRANSPORTATION**
**Research and Special Programs
Administration**

[Docket No. P-90-1W; Notice 1]

**Transportation of Natural and Other
Gas by Pipeline; Petition for Waiver;
Panhandle Eastern Corporation**

The Panhandle Eastern Corporation (Panhandle) has petitioned the Research and Special Programs Administration (RSPA) for a waiver from compliance with the repair requirements of 49 CFR 192.713(a) to allow the installation of a proprietary composite reinforced (CR) sleeve material (Clock Spring™ manufactured by Clock Spring Company of North America, Long Beach, CA) as a full encirclement wrapped sleeve for the repair of imperfections and damages in steel pipe at six locations on its Line #2 in Fayette County, Ohio. Currently under §192.713(a), the repair permitted to each imperfection or damage that impairs the serviceability of a segment of steel transmission line operating at or above 40 percent of specified minimum yield strength (SMYS) must be either by cutting out the segment and replacing a cylindrical piece of pipe or by installing over the segment a full encirclement welded split sleeve.

*Proposal and Rationale Submitted by
Panhandle*

The proprietary repair method proposed consists of installing a CR sleeve material in coil form held in place by an adhesive. The adhesive adheres both to the pipe surface and to the adjacent layers of the coiled composite reinforcement. The composite reinforcement is an isophthalic polyester resin reinforced with fiberglass. The adhesive is a methacrylate. Both the composite reinforcement and the adhesive have histories of suitable performance in other applications described in documents in the docket.

The suitability of a standard CR sleeve for repair of a measured defect is determined using a computer program developed by the Gas Research Institute (GRI). Panhandle reports that destructive tests of pipe with standard CR sleeves installed over manufactured defects repeatedly burst in the non-reinforced steel pipe, demonstrating the

validity of the computer program. The CR sleeve does not require pretesting nor are there any welds to be nondestructively tested.

Panhandle describes the following advantages of using CR sleeves:

(1) The CR sleeve material is relatively easy to install.

(2) The CR sleeve material is furnished in standard widths and thicknesses. The length of the repair to be made determines the number of sleeve units to be used. Multiple units can be brought to the job site at the time of excavation. Therefore, there is no delay between determining the extent of the repair and procuring materials for repair.

(3) The crew performing the investigation can make the repair without calling for pipe handling equipment or welders.

(4) In most circumstances, there will be no need to take the line out of service, eliminating interruptions or curtailments to customer service. The CR sleeve repairs can be made while the line is operated at full or reduced pressure.

(5) There is a substantial reduction in cost compared with the repair methods currently acceptable under §192.713(a).

Panhandle estimates that the average cost of repair will be reduced from \$26,000 for a pipe cutout or \$16,000 for a welded split sleeve to \$9,000 for a CR sleeve. The result would be a maximum savings of \$17,000 per replacement repair, or \$102,000 for 6 repairs or a minimum of \$7,000 per welded split sleeve repair, or \$42,000 for 6 repairs. Panhandle claims to make approximately 300 repairs per year. On the Panhandle system alone, annual savings could range between \$5,000,000 and \$2,000,000 per year.

The subject segment of Line #2 was installed in 1943. The pipe is 20 inch diameter, 0.3125 inch wall, API 5L Grade B. The line was designed and constructed in accordance with the American Society of Mechanical Engineers, ASA B31.1 Code for Pressure Piping. The line was hydrostatically tested in 1943 to a pressure of 985 p.s.i.g. or 90 percent of S[M]YS. The maximum allowable operating pressure (MAOP) of the line is 750 p.s.i.g. The line operates at 68.6 percent of SMYS. The line segment is in a Class Location 1 area for the entire 19 miles of its length. It is coated with standard grade coal tar enamel. The line has been operated and maintained in accordance with company operation and maintenance procedures which have met,

at a minimum, the requirements of appropriate industry codes and standards and since 1970 the requirements of the pipeline safety regulations. The line segment was hydrostatically tested again in 1990 to a minimum of 90 percent of SMYS plus 25 p.s.i. as part of a scheduled pipeline integrity verification program that was initiated in 1987.

In February 1989, an instrumented internal inspection device was used to evaluate the condition of Panhandle's Line #2. The inspection indicated potential anomalies in the pipe which were classified using Panhandle's classification criteria. Type A and B are the most severe anomalies among the Panhandle classification criteria. Panhandle has disposed of the Type A and B anomalies using the conventional techniques currently permitted by §192.713(a). The anomalies in question are classified as Type C. Type C anomalies are clusters of pits of 25-50 percent of wall thickness and massive, concentrated pitting less than 25 percent of wall thickness.

There are 12 anomaly sites on this segment of Line #2 proposed to be investigated for possible use of a CR sleeve. All 12 sites are at least 1000 feet from the nearest house or other building. The area is rural and the land use is predominantly agricultural. The integrity of all sites was validated by the hydrostatic test performed in June 1990. These 12 sites have been selected as possible candidates for repair using the alternate repair method discussed in this request for waiver. The analysis of the pig run indicates that six of the twelve anomalies will require repair. The need for repair cannot be verified without on-site visual inspection. Therefore, Panhandle intends to investigate and inspect these 12 locations in order to determine whether repair is required. If repair is required, this alternate repair method would be used on up to 6 of these sites.

The investigation of an anomaly site is to be conducted in accordance with a standard Panhandle procedure. Once the pipe is excavated and the coating is removed, the pipe will be examined, corrosion will be measured, and an analysis for serviceability will be performed using ANSI/ASME B31G "Manual for Determining the Remaining Strength of Corroded Pipelines." The manual is applicable to corroded areas with pit depths between 10 percent and 80 percent of the wall thickness of the pipe. By using the B31G manual, Panhandle can make a determination whether a pipeline can

continue to operate at its established MAOP. If the corrosion is superficial and the pipeline can continue to operate at its MAOP, the pipeline will be re-coated, backfilled, and placed back in service. If the corrosion is significant, and the pipeline cannot continue to operate at the established MAOP, as determined by B31G, the MAOP will be reduced or the pipe will be replaced or repaired.

Panhandle believes that this new technology provides an excellent alternative to pipe replacement or the use of a full encirclement welded split sleeve for the repair of imperfections and damage in transmission pipe. The GRI, through various contractors, has conducted extensive analyses and tests on CR sleeves and their component materials. Panhandle reports that the strength of the sleeves has been proven through the GRI development program by laboratory and simulated field tests. Panhandle also reports that, under the GRI program, Clock Spring Company of North America has perfected the installation of the CR sleeves through numerous tests and under actual field conditions. Computerized design criteria have been developed and verified by burst tests in which CR sleeves have been installed over large, deep simulated defects. In all but one atypical sleeve installation, failure occurred in full wall thickness of the unsleeved pipe body. The computer program is designed to verify whether or not the standard CR sleeve will reliably serve as a repair.

Panhandle's waiver request includes a proposal to monitor the condition of the CR sleeves at designated intervals after installation. Panhandle will examine and take measurements of the CR sleeves and separate samples of sleeve materials to be buried adjacent to the sleeves. Two installed sleeves will be evaluated each at 2, 4, and 8 year intervals. Measurements will include strain gage readings of two CR sleeves at 6 month intervals to verify the expected absence of creep of the composite and the adhesive.

RSPA Analysis and Proposed Action

RSPA twice requested additional information to support the Panhandle waiver request. The information included the following topics:

(1) CR sleeve product specifications. The initial information submitted as product specifications was inadequate to define the product.

(2) Design calculations. The initial submission included no basis for selecting the appropriate CR sleeve thickness or verifying that the sleeve selected would perform adequately.

(3) Adhesive curing characteristics and adhesive properties. The initial submission did not include data on adhesive curing characteristics or cured adhesive properties.

(4) Quality assurance and quality control programs applicable to the production of CR sleeves. The initial submission did not include quality control criteria applicable to the CR sleeve product.

(5) Installation procedures. While the initial submission described the application of CR sleeves, it did not describe procedures necessary to ensure adequate application to pipe to the repaired.

(6) Post installation inspections. In the initial submission, the description of post installation inspections was minimal.

(7) Performance in creep of the fiber reinforced resin and the adhesive. The initial submission did not include data assuring that the proposed materials would resist creep in the installed condition.

The accumulated information in the initial waiver application and subsequent submittals represents satisfactory response to the requests by RSPA. The information provided by Panhandle is available in the docket.

In addition to the advantages cited by Panhandle, RSPA considers that the ability to make a repair without welding eliminates the possibility of cracking and pipeline failure attributable to residual stresses from welding and to hydrogen induced cracking associated with welding. Also eliminated is the possibility of burning through the pipe wall while welding. Overall, RSPA considers the CR sleeve repair procedure to be a safe alternative to either the welded split sleeve repair procedure or the pipe replacement procedure, both currently permitted by §192.713(a).

RSPA believes that 49 CFR 192.713(a) should be waived to permit Panhandle to install CR sleeves as a permanent repair of six of the twelve corrosion anomalies cited in Line #2 in Fayette County, Ohio. RSPA believes that the use of this technology provides at least the same level of integrity as replacement of pipe or installation of a full encirclement welded split sleeve.

Interested persons are invited to comment on the proposed waiver by submitting in duplicate such data, views, or judgments as they may desire. Communications should identify the Docket and Notice numbers in the heading of this document, and be submitted to Dockets Unit, Room 8421, Office of Pipeline Safety, Research and Special Programs Administration, Department of Transportation, Washington, DC 20590.

All comments received before February 12, 1993, will be considered before final action is taken. Late filed comments will be considered so far as practicable. All comments will be available for viewing between the hours of 8:30 a.m. to 5 p.m., before and after the closing date for comments. No public hearing is contemplated, but one may be held at a time and place set in a Notice in the **Federal Register** if requested by an interested person desiring to comment at a public hearing and raising a genuine issue.

Issued in Washington, DC, on December 8, 1992.

George W. Tenley, Jr.,
*Associate Administrator for Pipeline Safety,
Research and Special Programs
Administration.*

[FR Doc. 92-30216 Filed 12-11-92; 8:45 am]

**DEPARTMENT OF
TRANSPORTATION**
**Research and Special Programs
Administration**

[Docket No. P-90-1W; Notice 2]

**Transportation of Natural and Other
Gas by Pipeline; Grant of Waiver;
Panhandle Eastern Corporation**

The Panhandle Eastern Corporation (Panhandle) petitioned the Research and Special Programs Administration (RSPA) for a waiver from compliance with the repair requirements of 49 CFR 192.713(a). Panhandle wants to install a proprietary composite reinforced (CR) sleeve material (Clock Spring™ manufactured by Clock Spring Company of North America [Clock Spring Company], Long Beach, CA) as a full encirclement wrapped sleeve for the repair of imperfections and damages in steel pipe at six locations on its Line #2 in Fayette County, Ohio. Currently, under §192.713(a), each imperfection or damage that impairs the serviceability of a segment of steel transmission line operating at or above 40 percent of specified minimum yield strength (SMYS) must be repaired by either cutting out the segment and replacing a cylindrical piece of pipe or by installing over the segment a full encirclement welded split sleeve.

Proposal and rationale submitted
Panhandle

The proposed proprietary repair method consists of installing a CR sleeve material in coil form over the damaged area and holding it in place with an adhesive. The adhesive adheres to both the pipe surface and the adjacent layers of the coiled composite reinforcement. The CR sleeve does not require pretesting nor are there any welds to be nondestructively tested.

In its petition, Panhandle described five advantages of using CR sleeves. Panhandle believes that this new technology provides an excellent alternative to pipe replacement or the use of a full encirclement welded split sleeve for the repair of imperfections and damage in transmission pipe. The Gas Research Institute (GRI), through various contractors, has conducted extensive analyses and tests on CR sleeves and their component materials. Panhandle reports that laboratory tests and simulated field tests

connected with the GRI development program have proven the strength of the sleeves. Panhandle also reports that, in actual field conditions and with numerous tests under the GRI program, Clock Spring Company has perfected and proven the installation methods for the CR sleeves. Computerized design criteria have been developed and verified by burst tests in which CR sleeves have been installed over large, deep simulated defects. In all but one atypical sleeve installation, failure occurred in full wall thickness of the unsleeved pipe body. The computer program is designed to verify whether or not the standard CR sleeve will reliably serve as a repair.

Savings using CR sleeves for the six repairs covered by the petition were estimated between \$42,000 and \$102,000.

Panhandle estimates that, on their complete system, annual savings could range between \$2,000,000 and \$5,000,000 per year.

Panhandle's waiver request includes a proposal to monitor the condition of the CR sleeves at designated intervals after installation. Panhandle will examine and take measurements of the CR sleeves and separate samples of sleeve materials to be buried adjacent to the sleeves. Two installed sleeves will be evaluated each at 2, 4, and 8 year intervals. Measurements will include strain gage readings of two CR sleeves at 6 month intervals to verify the expected absence of creep of the composite and the adhesive.

RSPA Analysis and Action

RSPA twice requested additional information to support the Panhandle waiver request. RSPA has reviewed the initial waiver application and subsequent submittals and finds the accumulated information satisfactory to support the waiver request. The information provided by Panhandle is available in the docket.

In addition to the advantages cited by Panhandle, RSPA finds that the ability to make a repair without welding eliminates several safety concerns. One is the possibility of leaking or pipeline failure attributable to residual stresses from welding or to hydrogen induced cracking associated with welding. The use of CR sleeves also eliminates the possibility of burning through the pipe wall while welding. Overall, RSPA believes the CR sleeve repair procedure is a safe alternative to either the welded split sleeve repair procedure or the pipe replacement

procedure, both currently permitted by §192.713(a).

In response to the petition and the justification contained in the petition and subsequent submittals, RSPA issued a Notice of Petition for Waiver inviting interested parties to comment (Notice 1) (57 FR 59198; December 14, 1992). In that notice, RSPA explained why granting a waiver using this new technology appears to provide at least the same level of integrity as replacement of pipe or installation of a full encirclement welded split sleeve.

Comments

Comments were received from 12 operators, 2 pipeline industry trade associations, and 2 firms providing services to the pipeline industry. All commenters strongly supported granting the waiver requested by Panhandle.

One of the service companies suggested an additional inspection of the installed CR sleeves only one year after installation. Panhandle proposed inspections 2, 4, and 8 years after installation. In considering the data submitted in support of the petition, RSPA believes that inspection one year after installation is not necessary. The safety factor inherent in the CR sleeve design analysis is so large that strength is not a consideration. None of the properties or tests of the resin, composite, or adhesive indicate a reason to be concerned that it will deteriorate rapidly in service. Similar resins had served adequately for more than 20 years when removed from underground service as gasoline tanks.

Three operators cited specific substantial potential savings to be realized on their pipeline systems if they used CR sleeves in the manner proposed in the petition. The American Gas Association estimated the industry could save \$6,500,000 annually by using CR sleeves in the manner proposed.

Many commenters commended RSPA for its positive response to adopting new technology and reducing pipeline maintenance costs while improving pipeline public and employee safety.

Action on petition

In accordance with the foregoing and by this order, RSPA finds that Panhandle's compliance with 49 CFR 192.713(a) is unnecessary for the installation of welded split sleeves as a permanent repair of six of the twelve corrosion

anomalies cited in Line #2 in Fayette County, Ohio. The requested waiver would not be inconsistent with pipeline safety. Accordingly, Panhandle's petition for waiver from compliance with §192.713(a) for six of the twelve corrosion anomalies is granted, on the conditions that Panhandle installs the CR sleeves using the procedure described in the documents supporting their petition, performs the inspections described in the petition, promptly reports to RSPA the results of the inspections and any unfavorable performance of the CR sleeves, and determines and reports to RSPA the cause of any unfavorable performance.

Issued in Washington, DC on March 10, 1993.

George W. Tenley, Jr.,
*Associate Administrator for Pipeline Safety,
Research and Special Programs
Administration.*

[FR Doc. 93-5852 Filed 3-12-93; 8:45 am]