



U.S. Department of Transportation
Pipeline and Hazardous Materials
Safety Administration

1200 New Jersey Ave, S.E.
Washington, D.C. 20590

OCT 08 2015

VIA CERTIFIED MAIL AND FAX TO: 405-425-8421

Mr. Mark A. Fischer
Chairman & CEO
Chaparral Energy, LLC
701 Cedar Lake Blvd.
Oklahoma City, OK 73114

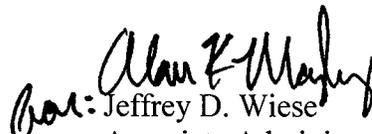
Re: CPF No. 4-2015-5017H

Dear Mr. Fischer:

Please find enclosed the Post-Hearing Decision regarding the Corrective Action Order issued to Chaparral Energy, LLC on August 28, 2015. The Decision confirms the Corrective Action Order with respect to the Coffeyville pipeline. This Decision is being served by facsimile and certified mail in accordance with 49 C.F.R. § 190.5. The terms of the decision are effective upon receipt.

Thank you for your cooperation in this matter.

Sincerely,


Jeffrey D. Wiese
Associate Administrator
for Pipeline Safety

Enclosure

cc: Ms. Linda Daugherty, Deputy Associate Administrator for Field Operations, OPS
Mr. R.M. Seeley, Director, Southwest Region, OPS
Mr. Ahren Tryon, Tryon Law Firm (*via email to atryon@tryonenergy.com*)

**U.S. DEPARTMENT OF TRANSPORTATION
PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMINISTRATION
OFFICE OF PIPELINE SAFETY
WASHINGTON, D.C. 20590**

_____)
In the Matter of)

Chaparral Energy, LLC,)

Respondent.)
_____)

CPF No. 4-2015-5017H

**POST-HEARING DECISION CONFIRMING
CORRECTIVE ACTION ORDER**

On August 28, 2015, the Associate Administrator for Pipeline Safety, Pipeline and Hazardous Materials Safety Administration (PHMSA), Office of Pipeline Safety (OPS), issued a Corrective Action Order (CAO) under authority of 49 U.S.C. § 60112 and 49 C.F.R. § 190.233, finding that continued operation by Chaparral Energy, LLC (Chaparral or Respondent) of its Coffeyville carbon dioxide (CO₂) pipeline would be hazardous to life, property, or the environment. The CAO made preliminary findings that the hazards were associated with a failure of the pipeline discovered August 25, 2015, and the hazards would continue unless certain corrective measures were taken. The CAO also found that failure to issue the order expeditiously without prior notice would result in a likelihood of serious harm to life, property, or the environment.

Pursuant to § 190.233, Respondent requested expedited review of the CAO to determine whether the order should remain in effect. In accordance with 49 C.F.R. §§ 190.211 and 190.233(c), a hearing was held October 1, 2015, in Houston, Texas, before a Presiding Official from the Office of Chief Counsel, PHMSA, who presided by video teleconference.

At the hearing, Respondent provided an overview of its pipeline system, discussed the characteristics of CO₂, updated factual information about the pipeline accident, and argued the CAO should be terminated because there is not a hazardous condition. In the alternative, Respondent requested that the terms of the corrective action be amended.

Background

On August 25, 2015, at 9:00 a.m. CDT, Chaparral received a report from a landowner of a vapor cloud in the area of its Coffeyville CO₂ pipeline. Chaparral personnel arrived on site shortly before 10:00 a.m. CDT and confirmed there was a pipeline leak. Personnel closed valves upstream and downstream of the failure and blew down the line between the two valves, a total distance of 20 miles, by 12:35 p.m. CDT.

It is not known when the release started. The pipeline was not operating when the accident was discovered, but it was shut-in at operating pressure. After looking at pressure recording charts, Respondent initially believed the release started approximately 7 days prior to discovery. Respondent later revised that estimate to 2-3 days prior to discovery.

Respondent initially estimated that the amount of CO₂ released as a result of the failure was 2,648 barrels. At the hearing, Respondent explained this early estimate was made without benefit of knowing the size of the hole. Based on more accurate information concerning the hole size, Respondent believed the failure resulted in a release of only 28 barrels. Even if the release occurred for 7 days, Respondent stated the release would still be less than 100 barrels. The blowdown resulted in an additional 6,800 barrels of CO₂ released. Respondent reported that property damage as a result of the release was less than \$11,000.

The accident occurred in a remote location and did not cause any injuries, evacuations, or impacts to the environment. Video of the release shows CO₂ vapor rising through an opening in the ground above the pipeline. As the vapor gets five to ten feet off the ground, it moves downwind and then dissipates into the atmosphere. Respondent reported the plume of vapor was approximately 15 feet downwind.

Respondent repaired the pipeline and returned it to service under a restart plan approved by the Director pursuant to the terms of the CAO. The failed section of pipe was sent to a metallurgical lab for testing under protocols approved by the Director. An inline inspection was also performed on the pipeline. The results of the metallurgical testing and inline inspection are pending.

Photographs of the removed pipe show what appears to be localized external corrosion with two pinholes. Respondent's preliminary investigation leads the Company to believe the external corrosion was caused by stray current from a nearby pipeline.

The Coffeyville pipeline was constructed in 2012 and consists of 8-inch, 0.220" nominal wall thickness, Grade X-65 pipe. The pipeline began operating in 2013. When Chaparral performed a deformation tool run following construction, Respondent identified an area with 43% wall loss from external corrosion. The pipeline has experienced two failures since operations began, both seemingly caused by external corrosion. In addition to the failure discovered August 25, 2015, there was an earlier failure discovered May 4, 2015.

Chaparral operates approximately 300 miles of pipeline transporting CO₂ in Texas, Oklahoma, and Kansas. The Coffeyville pipeline is approximately 68 miles long and transports CO₂ from the Coffeyville Resources Nitrogen Fertilizer Plant in Coffeyville, Kansas, to the North Burbank production field near Shidler, Oklahoma. The pipeline travels through Montgomery County in Kansas and the counties of Nowata, Washington, and Osage in Oklahoma. The failure occurred near the end of the pipeline in proximity to Shidler, Oklahoma. The maximum operating pressure (MOP) of the pipeline is 2,220 psig, established by hydrostatic test in 2013. The pressure at the point of the failure was approximately 1,100 psig when the failure occurred.

Standard for Reviewing Issuance of a Corrective Action Order

The authority for issuing a CAO is specified in 49 U.S.C. § 60112 and 49 C.F.R. § 190.233. Under those provisions, the Associate Administrator may issue a CAO if a pipeline facility is or would be hazardous to life, property, or the environment. Prior notice to the operator of the facility must be given before issuance of a CAO, but prior notice may be waived if the Associate Administrator finds that failure to do so would result in the likelihood of serious harm to life, property, or the environment. The CAO may include corrective measures including suspended or restricted use of the facility, physical inspection, testing, repair, replacement, or other appropriate action.

The primary purpose of a hearing following issuance of a CAO without prior notice is to determine whether the CAO should remain in effect or be terminated or amended.¹ If the Associate Administrator finds the facility is or would be hazardous to life, property, or the environment, the Associate administrator confirms the CAO. If the Associate Administrator does not find the facility is or would be hazardous, the Associate Administrator terminates the order.

In making such a determination, the Associate Administrator must consider, if relevant: (1) the characteristics of the pipe and other equipment used in the pipeline facility, including its age, manufacturer, physical properties (including its resistance to corrosion and deterioration), and the method of its manufacture, construction or assembly; (2) the nature of the materials transported (including their corrosive and deteriorative qualities), and the pressure required for such transportation; (3) the characteristics of the geographical areas in which the pipeline facility is located, in particular the climatic and geologic conditions (including soil characteristics) associated with such areas, and the population density and population and growth patterns of such areas; and (4) any other factors the Associate Administrator consider appropriate. These factors are considered below.

(1) Characteristics of the Pipe

The Coffeyville pipeline is relatively new. It was constructed in 2012 and began operating in 2013. New pipe generally presents a lower risk of time dependent threats because such conditions, like external corrosion, usually take extended periods of time to develop and potentially lead to a failure.

Despite being relatively new, Respondent's pipeline has already experienced external corrosion significant enough to cause multiple failures. In addition to the August 25, 2015, failure that gave rise to this proceeding, Respondent's pipeline experienced a failure in May 2015 that was also preliminarily attributed to external corrosion. An estimated 4.5 barrels of CO₂ were released as a result of that failure, with estimated property damage of approximately \$13,000. Blowdown of the line after the May 2015 release resulted in the loss of 6,800 barrels of CO₂.

¹ § 190.233(b).

Also, following construction of Respondent's pipeline, Chaparral performed a deformation tool run that identified an area with 43% wall loss due to external corrosion.

The Coffeyville pipeline is evidently not resistant to external corrosion at the level required for safe operation of the facility. The rate at which Respondent's new pipeline has developed significant wall loss from corrosion is concerning. Without immediate corrective action, including investigation and remediation, more corrosion and potential pipeline failures would likely occur.

(2) Nature of the Materials Transported

Respondent reported that the CO₂ transported by the Coffeyville pipeline is 99.984% pure and does not contain any flammable or toxic hydrocarbons. Respondent explained that CO₂ is an odorless, colorless, non-flammable gas. It occurs naturally in the atmosphere, is used by plants, produced by humans during respiration, and produced in various manufacturing and industrial facilities. Respondent contended that the CO₂ transported by the Coffeyville pipeline presents very little hazard.

At atmospheric pressure CO₂ is a gas. At higher pressures, CO₂ enters a supercritical fluid state, resembling the density of a liquid. This occurs at a critical pressure of roughly over 1,000 psig. Pipelines transporting CO₂ are operated at very high pressures to keep the product in a supercritical fluid state. Respondent stated that most CO₂ pipelines are operated between 1,200 and 3,000 psig. The maximum operating pressure of the Coffeyville pipeline is 2,220 psig. Since the line has no pump stations, pressure decreases as product moves downstream. Pressure at the failure location near the end of the pipeline was estimated to be 1,100 psig at the time of the accident.

Respondent produced information about CO₂ from the Occupational Safety and Health Administration (OSHA) website. The OSHA documentation confirmed CO₂ is a colorless, odorless, non-flammable gas. It is also classified as an asphyxiant gas.² In the atmosphere, CO₂ normally exists at concentrations between 300-700 ppm. The OSHA permissible exposure limit is 5,000 ppm. Exposure to higher concentrations can result in increased respiratory rate, headache, convulsions, dizziness or narcosis. At 30,000 ppm there may be loss of consciousness; at 40,000 ppm, CO₂ becomes immediately dangerous to life.³

Chaparral argued the risk of such harm resulting from a pipeline release is very low, since the release would be in the open air. Respondent noted that the August 25, 2015, release resulted in a released concentration of CO₂ of just under 3,100 ppm, which is less than the OSHA permissible exposure limit. Respondent also cited a presentation by an individual from the University of Texas who concluded the likelihood of a fatality from a CO₂ pipeline failure was

² Chaparral Pre-hearing Submission, Supporting Documentation (SD) at 97.

³ Chaparral SD at 93.

less than the likelihood of a fatality from a lightning strike.⁴ In conclusion, Respondent argued the nature of CO₂ does not support finding Respondent's pipeline is or would be hazardous to life, property, or the environment.

PHMSA agrees the information presented by Respondent demonstrates CO₂ does not pose the same risk as hazardous liquids that are flammable or toxic. PHMSA notes the pipeline safety regulations in 49 C.F.R. Part 195 define hazardous liquids to include petroleum, petroleum products, anhydrous ammonia, and ethanol, but supercritical CO₂ is not included in that definition.

When PHMSA initially proposed amending the safety regulations in 1989 to include CO₂ pipelines, the Agency noted that CO₂ differed from flammable and toxic substances already regulated under the definition of hazardous liquid.⁵ Therefore, PHMSA proposed to regulate CO₂ pipelines in Part 195 without calling CO₂ a hazardous liquid.

This is not to say CO₂ pipelines are without risk. The primary hazard of CO₂, as noted by PHMSA in the proposed rule, is the potential for asphyxiation if a high concentration is accidentally released from a pipeline. PHMSA noted that Congressional concerns over the safety of CO₂ pipelines were reflected in the Pipeline Safety Reauthorization Act of 1988, which directed the Agency to amend Part 195 to ensure the safety of CO₂ pipelines. As documented in the proposed rule, Congress recognized despite "its pervasive nature and absolute necessity to life, CO₂ has the potential to be as lethal as any other gas when it is present in concentrations greater than 10 percent. This could happen if a CO₂ pipeline ruptured."⁶

Since then, PHMSA has applied the pipeline safety regulations to supercritical CO₂ pipelines and hazardous liquid pipelines in essentially the same manner. For example, integrity management regulations require "each hazardous liquid pipeline and carbon dioxide pipeline that could affect a high consequence area" to be covered by an integrity management program (IMP) designed to ensure greater safety in those areas.⁷ Operators must design, test, operate, and maintain CO₂ pipelines to prevent accidental release just as they must for hazardous liquids pipelines. Accidents must be reported for both hazardous liquid and carbon dioxide pipelines.⁸

Respondent has made a strong case that the risks of CO₂ are generally considered to be less than other hazardous liquids, but there are still risks. PHMSA has determined through rulemaking

⁴ Chaparral SD at 149.

⁵ Transportation of Carbon Dioxide by Pipeline, 54 Fed. Reg. 41912, 41914 (*proposed* Oct. 12, 1989).

⁶ 54 Fed. Reg. at 41913.

⁷ § 195.452. Respondent noted that some high consequence areas, namely unusually sensitive environmental areas, are only applicable to hazardous liquid pipelines. Populated areas, which are of importance here, are applicable to both hazardous liquid pipelines and CO₂ pipelines.

⁸ §§ 195.50 and 195.52.

that the risks inherent to the transportation of CO₂ by pipeline must be managed to protect life and property. The nature of the CO₂ transported by Respondent's pipeline is no less hazardous.

(3) Characteristics of the Geographical Areas in Which the Pipeline Facility Is Located

Respondent's pipeline is approximately 68 miles long and travels through the high consequence area (HCA) of Coffeyville, Kansas, at the very beginning of the pipeline. There are two other HCAs that could be affected by the pipeline. South Coffeyville, Oklahoma, is 471 feet from Respondent's pipeline near the beginning of the line. Shidler, Oklahoma, is 0.51 miles from the pipeline near the end. All three HCAs are populated areas.

The remainder of the 68-mile pipeline, including the location of the failure, is rural. Pictures from the location of the failure show flat, grassy land in all four directions. The Director noted that Respondent's pipeline traverses ravines and low-lying areas, which could pose a risk of CO₂ pooling in higher concentrations.

Respondent argued that if corrosion is being caused by stray current, then the risk of corrosion is confined to the later portion of the Coffeyville pipeline where a third-party pipeline runs parallel. Respondent noted that both pipeline failures and wall loss anomaly occurred in the later portion of the Coffeyville line. Respondent reasoned that the HCAs near the beginning of the pipeline are not subject to the same risk. Respondent also questioned whether its pipeline could actually affect the HCA near the end of the line.

PHMSA notes that the cause of the external corrosion has not yet been determined to be stray current from the parallel pipeline. Until such a decision is reached, PHMSA cannot discount the possibility that additional corrosion could develop and lead to failure affecting an HCA. Also the risks to persons and property from a CO₂ pipeline release in a rural area cannot be entirely discounted. In fact, the August 25, 2015, failure was discovered by a local land owner.

(4) Other Appropriate Factors

Respondent presented several other arguments to support its position that the CAO should be terminated. Firstly, Respondent noted that the August 25, 2015, accident did not meet the regulatory threshold for immediate telephonic reporting.

PHMSA recognizes the revised volume of product released would not have exceeded the threshold for immediate telephonic reporting. Respondent initially believed the release resulted in the loss of 2,648 barrels, which exceeds the threshold for immediate reporting. It should be noted that Respondent was still required to file a written accident report under § 195.50, because the accident resulted in the loss of more than 5 barrels of product.

Respondent also analyzed past data on CAOs, telephonic reports, and PHMSA accident reports to demonstrate the relatively low risk of CO₂ pipeline failures and the absence of past enforcement by the Agency similar to this case. For example, Respondent looked at all CAOs issued since 2005, and found virtually all involved either fire, evacuation, environmental

damage, affected water, closure of roadway, or a high consequence area. Respondent's pipeline failure did not involve any of those.

Respondent analyzed telephonic reports to the National Response Center since 1990, including all 24 reports involving releases of CO₂ from a pipeline. None involved a fatality, injury, or damage to wildlife or the environment. Only one involved an evacuation, and Chaparral theorized this was due to the presence of hydrogen sulfate with the CO₂.

Respondent then analyzed PHMSA 7000.1 Accident Reports filed by operators since 1994, including all 71 reports involved CO₂ pipeline released. Respondent found zero fatalities, injuries, fires, damage to environment, evacuations, or third-party property damage.

The data submitted by Respondent demonstrates the Agency does not have a history of issuing CAOs for pipeline failures involving CO₂. The Parties can only postulate as to the reasons for an absence of enforcement. The assumption of Chaparral that this could be due to the lack of serious consequences associated with CO₂ accidents is a plausible explanation.

In reviewing the issuance of the CAO in this case, however, PHMSA must evaluate the facts of this particular accident to determine if the Coffeyville pipeline is or would be hazardous. The data provided by Respondent, while informative of past Agency practice, has limited relevance to this evaluation because it does not concern the actual facts of this case. I find it more relevant to consider the characteristics of the Coffeyville pipeline, the nature of CO₂ transported by the pipeline, and the geographical areas through which the pipeline travels.

Analysis and Finding of Hazardousness

As noted above, the characteristics of Respondent's pipeline are concerning. The pipeline has already experienced two corrosion failures and another significant corrosion anomaly in the short period of time it has been in operation. The cause of the corrosion has not yet been determined, and therefore has not been remediated. The evidence suggests Respondent's pipeline is experiencing corrosion at an usually high rate and the pipeline would likely experience more failures caused by corrosion until appropriate corrective action is taken. Such failures could affect populated areas.

There are documented risks of CO₂ in elevated concentrations even if the product does not present the same level of risk as flammable and toxic liquids. A CO₂ pipeline experiencing periodic failures resulting in uncontrolled releases of product at very high pressures is a hazardous condition that must be promptly addressed to ensure safety. Given all of these considerations, the evidence in the record demonstrates there is a hazardous condition that warrants continuation of the CAO.

Whether the Terms of the CAO Should Be Amended

Respondent requested, in the alternative, that the CAO be amended. Specifically, at the hearing Chaparral requested the pressure restriction be modified. Following the hearing, Chaparral submitted a document requesting several other modifications.

(1) Pressure Restriction

The pressure restriction in Paragraph 3 of the CAO states that when Chaparral returns the Coffeyville pipeline to service “the operating pressure must not exceed eighty percent (80%) of the actual operating pressure in effect immediately prior to the Failure.”

Respondent argued this pressure restriction is problematic from a technical standpoint because it would prevent Respondent from delivering CO₂ in a supercritical state. The pipeline was operating at approximately 1,100 psig at the location of the failure when the accident occurred. Eighty percent of that pressure is approximately 880 psig, which is below the pressure required for CO₂ in a supercritical state. Chaparral suggested that a revised pressure restriction should be 80% of MOP.

From a legal perspective, Respondent also argued the pressure restriction would be problematic because the pipeline safety regulations in 49 C.F.R. Part 195 apply to pipelines that transport CO₂ in a supercritical state. Respondent contended that if at any point in time the CO₂ is not in a supercritical state, the pipeline cannot be subject to Part 195.

Operating a pipeline at no more than 80% of the highest pressure the line was safely operated or tested is a long-established method of ensuring an appropriate safety margin. For example, under Part 195, pipelines may be operated at a pressure up to 80% of their test pressure.⁹ When a pipeline failure occurs, the terms of any CAO will regularly require a similar margin of safety based on the level of pressure on the line when the failure occurred.

After considering Respondent’s technical position, PHMSA finds the hazardous condition requires the same margin of safety until Respondent can demonstrate it is safe to resume operations on the Coffeyville pipeline at its pre-failure level. The Director has authority under the existing terms of the CAO to modify the pressure restriction upon a showing that a pressure increase is safe.

With regard to the legal argument, PHMSA disagrees with Respondent’s contention that the pipeline would not be subject to Part 195 at a lower pressure. The Coffeyville pipeline is subject to the pipeline safety regulations by virtue of its regular transport of CO₂ in a supercritical state. The pipeline remains subject to those regulations, including applicable maintenance requirements, during any temporary conditions involving lowered pressure, shutdown, idling, or purging of product.

(2) Other Amendments

Following the hearing, Respondent submitted a document requesting additional amendments to the terms of the CAO. These amendments were not discussed at the hearing.

⁹ § 195.406.

Pressure test or ILI in lieu of pressure restriction. As an alternative to its proposal for a revised pressure restriction, Respondent requested to return the pipeline to service either after performing a pressure test or submitting certain ILI data. Since these proposals were not discussed at the hearing, PHMSA finds no basis to amend the CAO at this time. The Director has authority under the existing terms of the CAO to remove or modify the pressure restriction upon a showing that a pressure increase is safe.

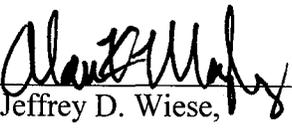
Time periods. Respondent requested to change the 90-day time period to 150 days for performing a root cause failure analysis and for developing a remediation work plan. Chaparral also requested to delay the start date for quarterly reporting. No reason was given for these requested extensions. PHMSA finds no basis to amend the CAO in this regard. The Director has authority under the existing terms of the CAO to grant an extension of time for compliance with any of the terms in the order upon a written request timely submitted demonstrating good cause for an extension.

Completed actions. Respondent requested to eliminate a provision in the CAO regarding the remedial work plan because the Company has already performed the required ILI tool run. PHMSA finds no reason to amend the CAO to eliminate provisions that are satisfied; by definition, completed terms require no further action.

Scope of remedial work plan. Respondent requested to eliminate a provision regarding the remedial work plan that requires Chaparral to determine if conditions similar to those contributing to the August 25, 2015, failure are likely to exist elsewhere within the Company's pipeline systems. Respondent did not provide an argument for why Chaparral should not be required to perform this action. PHMSA finds no support to eliminate this provision.

Conclusion

The CAO issued to Chaparral Energy, LLC on August 28, 2015, is confirmed and will remain in effect without change to its terms or deadlines.

per: 
Jeffrey D. Wiese,
Associate Administrator
for Pipeline Safety

OCT 08 2015

Date Issued