Docket No. SA-534

Exhibit No. 2-DZ

NATIONAL TRANSPORTATION SAFETY BOARD

Washington, D.C.

WHITE PAPER ON EQUIVALENT SAFETY FOR ALTERNATIVE VALVE SPACING, INGAA, NOVEMBER 15, 2005

(26 Pages)

White Paper on Equivalent Safety for Alternative Valve Spacing

INGAA Pipeline Safety Committee
November 15, 2005

Prepared by:
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(P-PIC)

Background and Issue

The Pipeline Safety Regulations at 49 CFR, Part 192, Subpart D – Design of Pipeline Components, has a scope that states "§192.141 Scope: This subpart prescribes minimum requirements for the **design** and **installation** of pipeline components and facilities". §192.179 establishes the requirements for sectionalizing block valve (block valve) location relative to class location during original design. The operator considers other spacing issues such as maintenance, the volume of gas that may be released, noise and other nuisance considerations, and accessibility for both maintenance and emergency response. This is typically accomplished by locating block valves near existing access roads.

§192.179, regarding transmission line valves, states that each transmission line, other than offshore, must have sectionalizing block valves located at no greater than the prescribed distances from any given point on the pipeline. These are not exacting valve spacing requirements but rather proximity requirements from a defined location to a block valve and are based on class location.

Subpart L – Operations, of the same Part, has a scope that states "§192.601 Scope: This subpart prescribes minimum requirements for the operation of pipeline facilities". §192.607 and §192.609 set forth requirements for class location studies and confirmation or revision of maximum allowable operating pressure ("MAOP").

§192.607 states that if the population density along a pipeline changes, a study must be conducted in order to determine if the class location has changed.

§192.609 states that if the class location has changed, the maximum allowable operating pressure (MAOP) must be confirmed as being satisfactory for the new class location, or revised by lowering the pressure in the pipeline to be commensurate with the new class location.

If the operator determines that the MAOP cannot be lowered, pipe replacement or pressure testing must be conducted as appropriate. Where the MAOP can be retained by pressure testing, this testing must be conducted in accordance with Subpart J – Test Requirements. In many cases, the operator elects to replace the pipe in order to maintain MAOP and the resulting transportation volume capability.

Any perceived higher risk, driven by the consequence side of the risk equation and due to the increased population density, is countered by a decreased likelihood of failure due to lowering the pressure, retesting the pipe, replacing pipe with pipe having a lower design factor, all of which serve to increase the margin of safety of the pipe, provide a higher assurance of the integrity of the pipe or both.

Subpart M – Maintenance, of the same Part, states the requirements for prevention and inspection activities. The type and frequency of inspections are based on class location. The higher the class location, the more frequent the inspection. This is another way in which the pipeline safety regulations manage the risk associated with higher consequences due to increased population.

Since the promulgation of the pipeline safety regulations (1970), the pipeline industry has consistently interpreted the requirements of §192.179 as applying only during original system design and construction. The natural gas pipeline industry never saw §192.179 covering pipe replacement for class change purposes. It was believed that maintenance replacements of pipe for class location change purposes did not impact the overall original pipeline system design including valve proximity. It was further believed that if the Office of Pipeline Safety ("OPS") intended valve proximity to be considered when class changes occurred, they would have stated such a requirement in either §192.607 or §192609. If the location class of the pipe goes up, §192.609 requires either a reduction in operating pressure or the existing pipe to be replaced with new pipe with greater wall thickness or higher yield strength or both. Modern pipe manufacturing and construction practices such as tougher steel, better pipe coatings, and improved welding, inspection and pressure testing technologies will provide additional protection to counter the major threats of third party damage and corrosion.

In 1991, one pipeline operator was cited by an OPS agent state for not complying with the requirements of §192.179. In this case, the operator had replaced pipe to maintain MAOP following a class location change, and the proximity of a block valve did not meet the requirements of §192.179. A hearing was held at which the operator and the pipeline industry stated the interpretation that had been used by the industry. For years, nothing happened as a result of this hearing and the pipeline industry continued to operate as in the past.

In 1998, seven years after the hearing and 28 years after the pipeline safety regulations went into effect, the then Associate Administrator issued a Final Order (attached) to the operator finding the operator to be in violation of the regulations but offering alternatives to a valve addition if equivalent safety could be demonstrated. In the intervening period, between the hearing and the Final Order (1996) §192.179 had been revised to provide for alternative valve spacing if equivalent safety could be demonstrated.

As written, §192.179 presently allows flexibility from the valve proximity prescriptive requirements if the Associate Administrator finds that alternative spacing would provide an equivalent level of safety. This means that each time proximity requirements are not met; the operator must demonstrate to the Associate Administrator the equivalent alternative and obtain the requisite finding. The Associate Administrator seems to have delegated this task to the Regional Directors. This task is not only burdensome, but since there is no guideline for what constitutes an equivalent level of safety, each Region has different opinions and has set different standards.

Rationale for a regulation-prescribed proximity cannot appropriately consider all of the non-engineering factors that influence valve spacing for a pipeline. An operator locates block valves where deemed necessary, such as on each side a river flood plain or similar location, but these are operational and access rather than safety reasons.

Public perception has influenced the stance on controlling the gas loss during an incident. Virtually all of the human safety concerns resulting from a pipeline failure occur during the first few minutes of rupture. The largest amount of gas available for ignition and the highest rate of gas loss, i.e., energy availability, occurs at the time of the rupture[1] and decreases rapidly in comparison to the time it takes to close a valve and reduce the inventory of the gas entering the isolated pipeline section. This misunderstanding of the time of decompression of gas inventory (i.e. burn-down rate) in a pipeline has confused the public safety issue. The presence of this escaping gas may prevent first responders from performing tasks other than those related to nearby property damage control but very rarely has anything to do with human health and safety. Appropriate response by emergency personnel is one of the topics operators are required to include in their public awareness activities. Few incidents have occurred where the ability of the first responders to attend to secondary property damage control was hindered by the escaping inventory of gas in isolated pipe sections. During the later parts of an incident, after the original surge of gas that defines the worst case scenario, there remains a diminished inventory of gas in the pipeline, even if the section is isolated. This gas may not be completely vented for a period of several minutes to several hours.

In comparison to the requirements for hazardous liquid pipelines, Title 49 CFR §195.260, prescribes valve location requirements for hazardous liquid pipelines. This regulation does not state proximity requirements but rather leaves valve spacing up to the operator based on a performance requirement to minimize damage and pollution caused by an accidental discharge. These requirements do not state so-called safety requirements. This regulation does require a valve at pump stations, at lateral takeoffs, at tank farms, on each side of a water crossing that is more than 100 feet wide and on each side of a reservoir holding water for human consumption. The hazardous liquid regulations do not at any point reference population density or use of valves for safety purposes.

The requirements of the Final Order do not produce a consistent approach or solution. The valve addition requirement only applies when pipe is replaced. An additional valve is not required when the location class changes and either the pipeline MAOP is commensurate with the new class location or when the pipeline MAOP is lowered to a level satisfactory for the new class location or the pipeline is pressure tested to a level that supports continuation of the current MAOP. In each of these cases, since the pipe is not replaced, the Final Order does not require installation of a new block valve and thus the requirements of §192.179 do not apply. The perceived public safety issue is exactly the same. However, the required actions are different.

The natural gas pipeline industry has never believed that valve spacing is a safety issue. The gas pipeline industry and OPS have conducted research into the spacing and effects of valve closure. This research, as will be discussed in detail in the paper, concludes that valve spacing is driven by design, maintenance and especially access issues for the pipeline operator and is not strictly a public safety issue.

Physics of Released Gas

The consequences from a rupture are set by physics and encroachment, neither of which can be controlled by the pipeline operator. Most of the human safety issues and direct property damage resulting from a pipeline failure occur immediately at the time of rupture and during the first few minutes thereafter. This may be explained by the fact that gas is compressible and confined at the maximum potential energy in the pipeline. A rupture quickly releases this compressed energy, releasing the peak energy levels at the initial loss of containment.

There are three major consequence scenarios due to a rupture: debris throw, pressure waves (peak noise) and if ignited, thermal radiation energy from the exterior surface of the natural gas release. Most of the impact occurs immediately, in the first thirty seconds from the initial loss of containment. This burst of energy is independent of both the block valve location and whether or not the valves are open or closed at the time of the rupture. The rupture immediately releases the high pressure combustible natural gas, discharging the cover over a predictable radius, and radiating a predictable pressure wave. The natural gas quickly rises as a single plume above the smaller discharge flow (natural gas is primarily methane and is lighter than air). If immediately ignited, the burning plume (as a mushroom shaped cloud) provides the maximum thermal radiation density for about 30 seconds as it rises and then disperses. If ignited later, the plume will have dispersed to a significant extent, the outflow of natural gas will have continue to drop quickly with time and thus the affected area will be greatly reduced.

The rate of methane released from the two ends of the broken pipe decreases exponentially with time [2, 3,4,5,6]. The maximum thermal dosage (thermal flux per unit time) occurs within the first minute after the natural gas is ignited. For large diameter, high pressure pipelines this peak thermal dose has sometimes been sufficient to initiate local secondary fires due to thermal radiation. After several minutes, the thermal flux will no longer initiate combustion, but any existing fires may continue to burn. However, as the pressure in the pipeline and thus the rate of escape of gas decrease with time, any associated natural gas combustion also continues to decrease until the pressure in the broken section between the closed block valves reaches atmospheric pressure. The total time and volume of gas release is a function of the distance between closed block valves and the average initial pressure.

Valves, once closed, serve to isolate the segment of the pipeline and minimize the volume and time gas continues to be released. Gas has been known to burn for an hour after both block valves are closed. This loss of gas is the reason operators concentrate on improving their emergency response times.

The public and emergency responders are highly alarmed when ignited ruptures are perceived to burn for extended periods of time. Unfortunately, the public concludes that the company has lost control, even though all the thermal radiation and explosion damage occurred in the first minute or so. This is the reason why access is so important when locating valves. Easier access to the block valve location improves response times to close valves and stop the flow of fuel. The six references listed at the end of this paper confirm valve spacing is an operations and maintenance decision. Operators work toward reasonable response times rather than minimizing the spacing between valves. Public perception and surface site availability, accessibility, safety and security all may influence individual operator decisions in choosing valve locations during original construction.

Valve Spacing as an Operating Decision, Rather than a Safety Decision

A detailed study conducted under the sponsorship of the Pipeline Research Council International, Inc. ("PRCI"), "Valve Spacing Basis for Gas Transmission Pipelines" (PR249-9728), concludes that valve spacing has little or no physical effect on public safety. The PRCI study examined the relationship of block valve spacing to the overall risk to public safety using OPS reportable pipeline incident data by class location, including the effect of an explosive pressure wave following a pipeline rupture and the risks posed to the public from flying debris and thermal radiation in the event of a fire. The study concluded that valve placement should be determined by operational and maintenance needs and not population density.

Two studies conducted under the Gas Research Institute ("GRI"), GRI-95/0101 & GRI-98/0076, reviewed the technology and benefits of manual, automatic and remotely operated valves. Both reports provide predictions of the transient discharge rates and total volumes based on valve spacing and times until valve closure. These two reports also concluded that short-interval spacing and rapid closure of block valves has no perceptible physical effect on public safety. They also reviewed the OPS incident reports from 1984 to 1994, which showed no deaths and one semi-related injury as a result of valve closure time. A third report GRI 98/0367.1, commonly called the Emeritus Report, reviewed the decisions made in the writing of 49CFR Part 192 and confirmed that valve spacing standards were established primarily by access needs and thus depended on the road spacing found in average location class settings. Regardless of perceptions, there have been no studies and no data presented that lead to a contrary or alternate conclusion.

Regulatory language and criteria to assist the user in assessing key conditions and rationale for determining pipeline-specific valve spacing could be developed in lieu of mandatory and pre-determined valve spacing. An initial approach would be to consider adopting the design basis published in a PRCI report entitled "Valve Spacing Basis for Gas Transmission Pipelines" (PR249-9728). This report comes with software to enable detailed assessment prior to making block valve spacing decisions. However, as noted above and reiterated below, these criteria are largely driven by operator economic impacts rather than safety impacts, so there is no basis or need established for safety regulations on this aspect of pipeline design.

This PRCI study (PR249-9728) also examined the relationship of block valve spacing to the overall risk to public safety using OPS reportable pipeline incident data by class location. It examined the effect of the pressure wave following a pipeline rupture and risk posed to the public from thermal radiation in the event of a fire. The study considered environmental effects with respect to the amount of gas released to the atmosphere and addressed various issues associated with pipeline operations and maintenance, including the reduction in gas loss as a function of closer block valve spacing and faster closure times.

All four studies concluded that valve spacing has little or no effect on public safety, and that valve placement should be determined by operational and maintenance needs - not population density. A prior study of the rationale behind the regulations[3], conducted under the GRI, (GRI-98/0367.1), also reported that field experience did not support short-interval spacing and rapid closures of block valves. Both had little or no effect on public safety but did reduce the volume of gas lost.

The American Society of Mechanical Engineers (ASME) B31.8 Code, the basis for the Pipeline Safety Regulations, based valve spacing primarily on accessibility factors, economics and operating convenience. Blowdowns of pipeline sections for maintenance caused some amount of public disruption due to noise, etc. Reducing the amount of gas released to the atmosphere during maintenance by limiting spacing between valves was a significant driver; however, local conditions and accessibility were also to be considered. GRI-98/0367.1 states:

> Operating convenience, economics, and the need to limit adverse publicity during an incident were the primary motivations for establishing valve spacing recommendations in the Code [B31.8]. Although it is often perceived that valve spacing is based on minimizing the consequences of a pipeline incident, in actuality the majority of damage from a pipeline rupture occurs in the first few minutes (Sparks, 1995; Sparks, 1998). If the gas is ignited, being able to close the valve quickly has no effect on safety but may minimize negative public perception. Timely valve closure may not significantly reduce the amount of gas released to the atmosphere (Sparks, 1995, 1998). Safety is best addressed in the Code by assuring that the valve is accessible, and unexpected gas losses are minimized.

GRI-98/0367.1 goes on to state that the Pipeline Safety Regulations were based on recommendations in the B31.8 Code.

> The TPSSC believed that valve placement was primarily an economic matter rather than a safety consideration. The increased number of valves required for higher population areas was based on minimizing the volume of gas released during maintenance activities and was not a decision based on public safety.

Based on these reports, it is apparent that the intent of establishing valve spacing recommendations was to be and most logically remains an issue for consideration during initial design as a system issue, not as a local design issue to be perpetually re-evaluated for incremental class location changes.

The proximity rule in 49CFR §192.179 has another inherent issue to be addressed when locating block valves, in that the rule requires that each valve section be able to be blown down. This requires a blow-off valve assembly to be installed on block valves. Blowing down a valve section for maintenance in the middle of a class 3 suburban area can be very noisy. It would be less disruptive to blow it down some distance away. These valve settings thus require a surface site with the typical blow-down and crossover pipeline above ground. Such a site may be difficult to obtain in an area already developed, and may be incompatible with current land use. An imposed tight valve proximity requirement may therefore actually conflict with the perception of public safety and on disruption concerns.

Cost Considerations

As a result of this prior research effort, the PRCI produced a simple cost-benefit model to define optimum valve spacing. The model takes into consideration the economics of the total installed cost versus operational and maintenance constraints, the conservation of gas, the frequency of valve operation, and the probability of valves not sealing when fully closed. The range of valve spacing distances resulting from various scenarios examined fell within the current regulatory requirements of 5 to 40 miles (8 to 64 km). A survey of the gas pipeline industry revealed that the desired valve spacing for operations and maintenance ranges from 1 mile (1.6 km) to more than 30 miles (48 km). Based on this survey, it was concluded that the cost benefit model provides a rational approach to the placement of block valves, but is an economic and operability concern of the operator, not a safety concern requiring strict regulation.

Safety Considerations

Technical reports have concluded that installation of additional isolation valves to meet the proximity requirements of §192.179 after a pipe replacement due to a change in class location provides little or no additional safety benefit to the public. GRI-98/0076 concluded that

> Of 81 injury incidents reviewed (1970 to 1997 NTSB Incident Reports), 75 reported injuries at the initial rupture. Of the other six incidents, four occurred within 3 minutes of the rupture. It seems clear, therefore, that early valve closure time will have little or no effect on injuries sustained, and

> no effect on rupture severity. Valve closure will be "after the fact" as far as most injuries and damage are concerned. There is no evidence that prolonged blow down of a ruptured line causes injuries.

The valve proximity requirements specified in §192.179, are based on ASME B31.8. These requirements were not the result of safety considerations but of economic and practicality considerations. Installation of an additional valve as a result of a class change would provide little or no additional safety to the public. [6]

ASME states that any increase in consequence that accompanies higher population density areas is best managed by additional prevention and inspection practices. The standard and the pipeline safety regulations, therefore, provide for more frequent tests and inspections in higher class locations. In some cases, different inspection and testing techniques are specified. For example §192.706 requires that leakage surveys be performed twice a year in Class 3 locations as compared to once a year in Class 1 locations and further requires that the leak survey be conducted with leak detector equipment if the gas is not odorized.

Conclusions

The installation of additional sectionalizing block valves following a pipe replacement due to a class change to meet the proximity requirements of §192.179 provides no measurable increase in public safety. Therefore, the installation of additional valves in these situations should be left to the discretion of the operator.

References

1. GRI Gas Research - Report "A Model for Sizing High Consequence Areas Associated with Natural Gas Pipelines (GRI/C-FER)" October 2000.

2. Eiber, R.J. and McGehee, W.B., Design Rationale for Valve Spacing, Structure Count, and Corridor Width, PR249-9631, PRC International, May 30, 1997.

3. Eiber, R.J., McGehee, W.B., Hopkins P, Smith T, Diggory I, Goodfellow G, Baldwin T & McHugh D., Valve Spacing Basis for Transmission Pipelines, PR249-9728, PRC International, January 2000.

4. Shires, T.M. and Harrison, M.R., Development of the B31.8 Code and Federal Pipeline Safety Regulations: Implication for Today’s Natural Gas Pipeline System, GRI-98/0367.1, December 1998.

5. Sparks, C.R. et al., Remote and Automatic Main Line Valve Technology Assessment, Appendix B, GRI-95/0101, July 1995.

6. Sparks, C.R., Morrow, T.B. and Harrell, J.P., Cost Benefit Study of Remote Controlled Main Line Valves, GRI-98/0076, May 1998.

Mr. Greg J. Palmer
President
Viking Gas Transmission
825 Rice Street
St. Paul, MN 55117

Re: CPF No. 32102

Dear Mr. Palmer:

Enclosed is the Final Order issued by the Associate Administrator for Pipeline Safety in the above-referenced case. It makes a finding of violation and requires certain corrective action applicable to future pipe replacements.

Your receipt of the Final Order constitutes service of that document under 49 C.F.R. § 190.5.

Sincerely,

Gwendolyn M. Hill
Pipeline Compliance Registry
Office of Pipeline Safety

Enclosure

cc Mr. Ron Wiest
   Minnesota Office of Pipeline Safety
   175 Aurora Avenue
   St. Paul, MN 55103-2356

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DEPARTMENT OF TRANSPORTATION
RESEARCH AND SPECIAL PROGRAMS ADMINISTRATION
WASHINGTON, DC

In the Matter of	)	
	)	
Viking Gas Transmission,	)	CPF No. 32102
	)	
Respondent.	)	
___________________________________	)	

FINAL ORDER

On August 10, 1991, pursuant to 49 U.S.C. § 60117, a representative of the Minnesota Office of Pipeline Safety, as agent for the Office of Pipeline Safety (OPS), conducted an on-site pipeline safety inspection of Respondent's facilities near Perham, Minnesota. As a result of the inspection, the Director, Central Region, OPS issued to Respondent, by letter dated March 13, 1992, a Notice of Probable Violation and Proposed Compliance Order (Notice). In accordance with 49 C.F.R. § 190.207, the Notice proposed finding that Respondent had violated 49 C.F.R. §§ 192.13(b) and 192.179 and proposed that Respondent take certain measures to correct the alleged violations.

Respondent responded to the Notice by letter dated April 8, 1992. Respondent contested the allegations and requested a hearing that was held on April 27, 1993.[1] After the hearing, Respondent submitted additional information on May 19 and 21, 1993.

FINDING OF VIOLATION

[1] An official transcript, dated April 27, 1993, was made of this hearing.

The Notice alleged that Respondent had violated 49 C.F.R. §§ 192.13(b) and 192.179, because it was operating a segment of pipeline in which it had replaced pipe without complying with the Part 192 pipeline safety regulations. Specifically, Respondent had not installed a valve within four miles of a class 3 location when Respondent replaced 2000 feet of pipe following a class location change from class 1 to class 3.

2

Respondent said that it disagreed with OPS's interpretation of the relationship between §§ 192.13(b) and 192.179. Respondent said that it had replaced the pipe segment in accordance with Part 192, because the replacement had only to comply with the operations and maintenance requirements in subparts L and M, not with the design requirements in subpart D.

Respondent argued that OPS's interpretation that valve spacing requirements apply to a pipe replacement is contrary to the intent of the pipeline safety enabling statute and implementing regulations, the scope of Part 192's subparts, and industry practice. Respondent also argued that applying OPS's interpretation leads to endless inconsistencies, results in costly remediation, and does not contribute to damage mitigation or pipeline safety.

<u>Legislative and regulatory intent</u>

Respondent maintained that a pipe replacement need only comply with the operations and maintenance requirements (subparts L & M). Valve spacing requirements would not apply because they are design (subpart D) requirements not applicable to an existing pipeline. Respondent contended that its position was supported by the history of the gas pipeline safety statute and regulatory standards.

Respondent explained that the Natural Gas Pipeline Safety Act (NGPSA)[2] intended that design standards not apply to a pipeline

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[2] When the Notice was issued, Respondent was cited under the Natural Gas Pipeline Safety Act of 1968, 49 U.S.C. app. §

in existence prior to gas pipeline safety regulations being adopted. Respondent's pipeline existed before the gas pipeline safety regulations were issued in 1970. Respondent referred to language in the NGPSA that -

> standards affecting the design, installation, construction, initial inspection, and initial testing shall not be applicable to pipeline facilities in existence on the date such standards are adopted. NGPSA, § 3(a)(1).

Moreover, Respondent said OPS's own statements reinforced this interpretation. Respondent explained that when the final pipeline safety regulations implementing the NGPSA were published in the Federal Register, OPS said in the Preamble that "[e]xisting pipelines are subject to the maintenance, repair and

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1671 et seq. In 1994, the NGPSA was repealed and recodified at 49 U.S.C. § 60101 et seq.

operations requirements." 35 Fed. Reg. 13248; Aug. 19, 1970.[3]

Neither the legislative history of the pipeline safety statute nor RSPA's statements when it issued the regulations support Respondent's interpretation that a replacement to a pipeline that existed when the regulations were issued need only comply with the operations and maintenance provisions in Part 192.

When the NGPSA was passed, Congress discussed the application of safety standards to existing pipeline facilities. H.R. Rep. No. 90-1390, (1968), reprinted in 1968 U.S. Code Cong. & Ad. News 3223, 3236. Congress said that standards affecting the design, installation, construction, initial inspection, and initial testing would not apply to pipelines existing on the date the Secretary of Transportation issued standards.[3] Congress further said -

> In other words, any Federal standard leading to inspection and testing (other than initial inspection and testing), extension, operation, replacement, and maintenance may be applied to existing pipe as well as new pipe.

U.S. Code Cong. & Ad. News at 3236.

The legislative history shows Congress did not intend to exempt pre-existing pipelines from all pipeline standards. Rather, Congress recognized that design and construction standards could apply to changes or replacements to existing pipelines.

In the Preamble to the final rule establishing the gas pipeline regulations, OPS noted industry's concern about the retroactive effect of the new regulations on existing pipelines. OPS discussed the language in the NGPSA that -

> Standards affecting the design, installation, construction, initial inspection, and initial testing shall not be

[3] The authority given to the Secretary of Transportation was delegated to the Office of Pipeline Safety (OPS), which has responsibility for pipeline safety matters.

> applicable to pipeline facilities in existence on the date such standards are adopted.

As Respondent noted, OPS explained that existing pipelines would be subject to the maintenance, repair, and operations requirements. However, OPS also explained that it was adding § 192.13 to clarify the applicability of the regulations to new and existing pipelines, and to avoid confusion as to their[4] retroactive effect. OPS said that "[w]ith respect to existing pipelines, all changes made after November 12, 1970, must comply with Part 192." 35 Fed. Reg. at 13,251.

This discussion shows that when OPS issued the implementing regulations, OPS intended that a change to an existing pipeline, such as a replacement, would have to comply with **all** of Part 192.

Scope of Subparts

By its reading of Part 192, Respondent said the pipe replacement complied with the applicable subpart. Respondent maintained that its reading was consistent with the scope statements of Part 192 and with the rules of regulatory construction.

Respondent explained that its understanding came from examining each of Part 192's subparts and their differences in scope. Respondent maintained that the rules of regulatory construction acknowledge a subdivision with a separate title may reflect a difference in scope.

Respondent explained that each subpart's language sets out its scope beginning with § 192.13(b), which provides the general scope.

> No person may operate a segment of pipeline that is replaced, relocated or otherwise changed after November 12, 1970 ... unless that replacement, relocation or change has been made in accordance with this part.

Respondent said this language means that one then has to look to see which subparts are implicated.

Respondent explained that subparts L and M prescribe the requirements for operating and maintaining an existing pipeline system. Because a class location change appears within the context of maintenance, Respondent argued that the context limited the application to an existing pipeline system.

Respondent further explained that the design subparts (subparts C and D) prescribe minimum requirements for design of pipe, and the design and installation of pipeline components and facilities. Respondent said neither design subpart has any statement similar to the statements in L & M that a pipeline cannot be operated unless it meets its requirements. Respondent maintained that because these subparts state that the requirements apply to new pipeline facilities, they were not meant to apply retroactively to existing systems.

5

Respondent said that each subpart’s language, when interpreted according to the rules of regulatory construction, implied that the valve spacing requirements in the design subpart did not apply to its pipe replacement. Respondent said this was further supported by the lack of evidence showing OPS’s intent to apply design standards to the maintenance provisions for a class location change.

I am not persuaded by Respondent’s narrow reading of the scope of the subparts. Section 192.13 states that a person may not operate a segment of pipeline that is replaced, relocated, or otherwise changed unless such activities are accomplished in accordance with Part 192. It does not state that a replacement or other change should be made according to the applicable subpart.

Furthermore, the design subpart is implicated in a pipe replacement. When there is a change in class location, § 192.609(b) requires that an operator evaluate the design, construction and testing procedures followed in the original construction and compare those procedures with those required for the present class location. This evaluation would have alerted Respondent to the need to consider the valve spacing requirements.

Moreover, the narrow interpretation Respondent urged would mean that an operator would not have to use the welding requirements (subpart E) or corrosion control requirements (subpart I) because neither subpart states that a pipeline may not be operated unless it complies with the subpart. Although Respondent said welding and corrosion standards were prospective (as it classified design requirements), Respondent admitted that it applied the welding requirements and corrosion protection standards. (Transcript at 78-79). If Respondent only relied on the scope statements it would not be applying these standards to a pipe replacement.

<u>Maintenance or Repair</u>

Respondent maintained that a pipe replacement because of a change in class location is a maintenance function (subpart M) brought about by an operating requirement(subpart L). Respondent argued that if class location changes were to affect the location and installation of valves, the block valve requirement should have appeared in these subparts.

Respondent said that a change in class location falls under subpart L for operations. Respondent explained that § 192.613 refers to a change in class location as an unusual operating and

maintenance condition, and requires compliance with §§ 192.609 and 192.611.

Respondent further explained that a pipe replacement falls within subpart M, which covers the maintenance of transmission lines and the permanent field repair of imperfections and damage to transmission lines. Respondent said that because § 192.611(a)(3) called for a reduction in maximum allowable operating pressure (MAOP), Respondent determined pursuant to § 192.613(b), that the existing segment of pipe was in unsatisfactory condition. Respondent further said that to repair what it considered an unsatisfactory condition, Respondent replaced the segment of pipe by following the field repair requirements of § 192.713.

A motel had been built within 100 yards of Respondent’s pipeline changing the pipeline’s class location. Under § 192.611, a reduction in MAOP was necessary. Rather than reduce MAOP Respondent replaced a segment of the pipeline. The Part 192 regulations consider a pipeline repair to be a leak, imperfection, or damage that impairs a line’s serviceability.(§ 192.711(a)(1)). Respondent’s pipeline did not have a leak or minor damage necessitating repair. Rather than reduce MAOP, Respondent chose to replace pipe of 72% specified minimum yield strength (SMYS) with pipe of 50% SMYS at the same MAOP. A replacement is not a repair; therefore, § 192.713 does not apply.
Section 192.613 requires a procedure for continuing surveillance to detect changes in class location, failures, and corrosion among other unusual operating and maintenance conditions. This reflects that an operator must be alert to changing conditions along its pipeline, not whether a particular design requirement is necessary because of a pipe replacement.

As previously discussed, subpart M implicates the design requirements in subpart D. When a class location change affects a segment of pipeline, § 192.609(b) requires that an operator evaluate the design, construction and testing procedures followed in the original construction and compare those procedures with those required for the present class location. Coupled with the provision in § 192.13 that a replacement be made in accordance with Part 192, Respondent should have been alerted to the necessity for evaluating the valve spacing requirements in § 192.179 when it replaced the pipe segment at issue.

ASME B31.8 Code

Respondent contended that its interpretation was consistent with the ASME Code for Pressure Piping - Gas Transmission and

7

Distribution Piping Systems, USAS B31.8-1968 edition (B31.8-1968 Code). At the hearing, Respondent’s pipeline safety technical consultant explained that he was involved in formulating the ASME B31.8 requirements and their subsequent translation into Part 192. He explained that Part 192 is based in large part on the B31.8-1968 Code and that it is contrary to Code's intent to apply provisions to existing pipelines that were developed exclusively for new pipeline systems.

The consultant said that B31.8-1968 standards for valve spacing are design standards and that if the B31.8 Committee had intended valve spacing requirements for new pipelines to apply when a class location changed, it would have said so.[4] Moreover, as a member of the task group that developed the class location change provisions, the consultant said this group never considered that a class change would affect the valve locations on the pipeline, whether or not pipe was replaced.

Respondent's consultant further explained that he was a member of a task group that advised OPS's technical advisory group on the gas pipeline regulations OPS had proposed. Again, he said this task group never considered that OPS intended pipe replacement would trigger the valve spacing requirements. Rather, he believed the group considered pipe replacement a maintenance function that requires operators to comply with operating requirements.

I do not dispute Respondent's consultant's memory of what the B31.8 Committee intended when it developed the industry standards. Although the consultant admitted that the present situation was not discussed (Transcript at 67), I do not doubt the consultant's assertions about the Committee's intent.

Whatever the B31.8 Committee intended, its intent is not relevant to OPS's intent when it developed the regulations. Congress saw the need for the NGPSA because it recognized that the industry code had shortcomings and that comprehensive federal pipeline safety standards were needed to assure pipeline safety. U.S. Code Cong. & Ad. News at 3230-32. As previously discussed, Congress did not limit OPS's authority to apply its regulatory standards to pipeline replacements. OPS used the B31.8-1968 industry standard as a guide in developing the

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[4] The B31.8 Code has since been revised to include consideration of valve spacing when pipe is replaced because of a class location change.

regulations. It did not adopt the discussions and intent that went into the industry code. OPS's intent when it developed the gas pipeline

8

regulations was that a replacement to a pipeline comply with all of Part 192. This intent was expressed in the Preamble to the Part 192 regulations OPS issued in 1970.

Valve spacing

Respondent asserted that even if the valve requirements apply to the replaced segment, they should only apply to the replaced segment, and not to the surrounding pipe or facilities. Thus, Respondent would not need to install valves on the segment it replaced since the replaced segment is shorter than the four-mile spacing requirement for a class 3 area.

Contrary to Respondent's assertion, the regulations do not require four-mile valve spacing. Rather, § 192.179(a)(2) requires that "[e]ach point on the pipeline in a class 3 location be within 4 miles of a valve." Respondent replaced 2,000 feet of pipe. In making the replacement, Respondent should have installed a valve within the replaced segment. The requirement applied to the replaced segment, not to the surrounding segments.

Industry Consensus and OPS's Acquiescence

Respondent argued that industry generally believed that repair and replacement standards are maintenance standards unrelated to the design standards for a new pipeline. At the hearing, Respondent referred to two surveys: one it had made of pipeline operators, which found that the majority of those polled agreed with Respondent's interpretation; the other, a survey INGAA made, which had a similar outcome. (Transcript at 24). Moreover, Respondent contended that OPS's inaction in enforcing the valve spacing requirement on replacements was an acquiescence to Respondent's (and industry's) interpretation.

The surveys were done informally. Respondent did not present any written product. (Transcript at 27). There was also some overlap between the operators Respondent and INGAA polled. Reliable surveys are based on scientific polling criteria and techniques. Without knowing whether those Respondent (and INGAA) polled were a representative sample of the gas pipeline industry, what questions were asked and how they were phrased, I am not able to determine if Respondent's characterization of industry's understanding represents industry's consensus.

The lack of previous enforcement action is not an acquiescence. A valve is not required on a pipe replacement unless the class location change renders the previous valve spacing inadequate. [9]
Such a situation is infrequent and difficult for enforcement staff to detect. Respondent even acknowledged at the hearing that this situation may not often arise because of where an operator operates its pipeline and the diameter of pipe used. (Transcript at 34).

<u>Cost</u>

Respondent maintained that OPS's interpretation would result in a $42 million remediation program, and up to $1.6 million in annual class location change costs. Respondent estimated that cost of a valve at $1,500 per diameter inch, excluding freight, labor crew, and other associated installation and procurement costs. Respondent stated that the cost to implement OPS's interpretation on all its pipelines would be $2 million for 200 locations in its systems, and another $1.6 million annually for additional class location changes.

I question Respondent's estimated costs to retrofit its pipelines. As already noted, Respondent has acknowledged the rarity of this type of replacement. Moreover, in the present case, Respondent had the opportunity to install the valve when it shut down the pipeline to make the replacement, and avoid retrofit costs. It is not clear whether Respondent's estimate accounts for this.

<u>Effect on safety</u>

Respondent argued that OPS's interpretation is contrary to the interests of pipeline safety and results in irrational inconsistencies.

Respondent maintained that adding block valves where location class change occurs adds little to damage mitigation. Respondent said studies have shown that due to the immediacy of damage caused by a rupture, even with automatic valves, safety is not significantly increased. Rather, Respondent maintained that the most effective method to mitigate the effects of a rupture is to reduce the probability that a rupture will occur. By replacing pipe that had a hoop stress of 72% SMYS with pipe having a hoop stress of 50% SMYS at the same MAOP, Respondent said it lowered the stress level and reduced the probability of a rupture.

Respondent gave examples of what it considered inconsistent application of the valve spacing requirement to class location changes. Among these -

10

- An operator would not need to install a valve if it lowered MAOP instead of replacing the pipe.

- A class location change might affect only one of several parallel pipelines. Valve spacing would only have to be considered for the affected line, which would not help if one of the other lines ruptured.

- If an operator had anticipated a class change and installed stronger pipe to accommodate the class change, valve spacing need not be considered.

- If an operator converted its pipeline to a service not covered by Part 192, replaced the line and then converted the pipeline back to a service covered by Part 192, the valve spacing requirements would not apply.

I agree with Respondent that valves may not be the only, or even the best, means of ensuring safety. I disagree that the examples outlined indicate inconsistent requirements for valves. Rather, a minimum level of protection is being provided. Part 192 sets minimum standards, which provide flexibility for an operator to exceed to provide an enhanced level of safety. However, even if there were inconsistent applications, that does not mean that OPS should not enforce compliance with the minimum pipeline safety regulations. Perhaps, as risk management becomes part of the pipeline safety regulations and allows even more flexibility than the current standards, an operator can present alternative methods to assure superior safety.

A valve may not prevent an accident but it does have other safety benefits. A valve will control an accident through more rapid pressure reduction and shorter blowdown times, and it can reduce the size of a resulting fire.

Accordingly, I find that Respondent violated 49 C.F.R. §§ 192.13 and 192.179 by not installing a sectionalizing block valve when it replaced the 2,000-foot pipeline segment

This finding of violation will be considered a prior offense in any subsequent enforcement action taken against Respondent.

COMPLIANCE ORDER

The Notice proposed a compliance order. The Notice proposed that Respondent install a sectionalizing block valve in the segment it had replaced.

11

I recognize the substantial costs to retrofit the pipeline segment. Thus, I will not require Respondent to retrofit any of its pipelines with sectionalizing block valves. However, Respondent must ensure that any future pipeline replacements comply with 49 C.F.R. § 192.179.[5]

[5] If a future replacement requires that a valve be installed, yet Respondent believes that it can take equivalent steps to assure the pipeline's integrity and the public's safety, § 192.179 allows Respondent to petition the Administrator for such a finding.

Under 49 U.S.C. § 60118(a), each person who engages in the transportation of gas or who owns or operates a pipeline facility is required to comply with the applicable safety standards established under chapter 601. Pursuant to the authority of 49 U.S.C. § 60118(b) and 49 C.F.R. § 190.217, Respondent is hereby ordered to take the following actions to ensure that future pipe replacements comply with the pipeline safety regulations applicable to its operations.

1. Prepare operations and maintenance procedures addressing that pipe replacements are to comply with the valve spacing requirements in 49 C.F.R. Part 192, subpart D.

2. Complete the above Item within 60 days following receipt of a Final Order, unless the Central Regional Director, upon request, grants an extension.

3. Send the completed procedures to the Central Regional Director, OPS at 1100 Main Street, Room 1120, Kansas City, MO 64105.

Failure to comply with this Final Order may result in the assessment of civil penalties of up to $25,000 per violation per day, or in the referral of the case for judicial enforcement.

Under 49 C.F.R. § 190.215, Respondent has a right to petition for reconsideration of this Final Order. The petition must be received within 20 days of Respondent's receipt of this Final Order and must contain a brief statement of the issue(s). The filing of the petition automatically stays the payment of any civil penalty assessed. All other terms of the order, including any required corrective action, shall remain in full effect

12

unless the Associate Administrator, upon request, grants a stay. The terms and conditions of this Final Order are effective upon receipt.

/s/ Richard B. Felder
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Richard B. Felder
Associate Administrator
for Pipeline Safety

Date:__05/01/98_________

