Application of Safety Regulation to Rural Onshore Hazardous Liquid Low-Stress Pipelines (Phase II)

Volume I
Regulatory Analysis

Prepared For:

Pipeline and Hazardous Materials Safety Administration

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Since 1963

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TABLE OF CONTENTS

TABLE OF EXHIBITS

EXECUTIVE SUMMARY

The Pipeline Inspection, Protection, Enforcement, and Safety Act of 2006 (PIPES Act), signed December 29, 2006, reauthorized federal pipeline safety programs, which are administered by the Pipeline and Hazardous Materials Safety Administration (PHMSA). Section Four of the PIPES Act requires that PHMSA issue regulations subjecting all rural onshore hazardous liquid low stress pipelines (referred to as "low stress pipelines" and sometimes abbreviated as "LSP") mileage to the same standards and regulations as other hazardous liquid transmissions pipelines. PHMSA proposed to regulate low stress pipelines in two phases. Phase I, which became effective on July 3, 2008, extended all of 49 CFR Part 195 requirements to the higher risk, rural low stress pipeline. This encompassed low stress pipelines larger than or equal to 8 ⅝ inches in diameter (referred to as "large diameter") located in or within ½ mile of an Unusually Sensitive Area (USA). The purpose of this Phase II Regulatory Analysis is to examine the regulatory impacts of extending 49 CFR Part 195 requirements to the remaining unregulated rural low stress pipelines. The pipelines affected by the proposed rulemaking include those low stress pipelines of any diameter that are more than half a mile outside an USA and low stress pipeline less than 8 ⅝ inches in diameter (referred to as "small diameter") in or within ½ mile of an USA.

Alternatives Considered

In this Regulatory Analysis, six Phase II alternatives are selected based on previous Phase I alternatives and OMB Circular A-4[1] alternative suggestions. Alternative 1, as it has a positive benefit cost ratio and fully complies with the requirements of the PIPES Act, is selected for regulatory action. Alternatives 2 through 6 are examined in this Regulatory Analysis for the purpose of comparing the variance of benefits and costs across different categories of low stress pipelines and different subparts of Part 195. These alternatives and the estimated mileages affected by them are:

Alternative 1: Apply all Part 195 requirements to all eligible low stress pipelines – all 1,384.2 miles

Alternative 2: Apply all Part 195 requirements to small diameter low stress pipelines within ½ mile of an USA – 100.5 miles

Alternative 3: Apply all Part 195 requirements to large diameter low stress pipelines outside ½ mile of an USA – 840.6 miles

Alternative 4: Apply all Part 195 requirements to small diameter low stress pipelines outside ½ mile of an USA – 443.2 miles

Alternative 5: Apply all Part 195 requirements, except Subpart H (Corrosion Control), to all low stress pipelines not currently regulated – all 1,384.2 miles

Alternative 6: Apply all Part 195 requirements, except the Integrity Management Program (IMP), to all low stress pipelines not currently regulated – all 1,384.2 miles

Pipeline Mileage

[1] Office of Management and Budget, Circular A-4 provides guidance to Federal agencies on the development of regulatory analysis as required under Executive Order 12866. http://www.whitehouse.gov/omb/circulars_a004_a-4/#c

This regulatory analysis assumes the mileage subject to the proposed rulemaking are as shown in Exhibit E-1. The sum of the mileages listed in Exhibit E-1, or the total eligible Phase II low stress pipeline, is 1,384.3 miles.

Exhibit E-1: Phase II Eligible Mileage

Pipeline Diameter	Miles Within ½ Mile of USA	Miles Outside ½ Mile of USA
≤ 8 ⅝"	100.5	443.2
> 8 ⅝"		840.6

Four sources of mileage data that provide varying levels of detail were analyzed to derive these pipeline mileage estimates:

- The Regulatory Analysis for the Low-Stress I Final Rule by PHMSA published in August 2006
- The Volpe National Transportation Systems Center (Volpe Center) survey of operators of low stress pipelines
- The annual mileage data pipeline operators report to PHMSA
- Mileage estimates reported to the National Pipeline Mapping System (NPMS)

Each source of data has limitations and the different sources do not contain uniform estimates when they examine the same items. The Volpe Center survey data was reported on a one-time voluntary basis. The PHMSA Annual Report and NPMS data were collected for the first time in 2009.

Costs of the Regulation

The final 30 year net present values of compliance costs for each of the proposed alternatives are listed in Exhibit E-2.[2]

Exhibit E-2: 30 Year Net Present Value Compliance Costs by Alternative

Alternative	Cost (Millions)
1. All low stress	$ 104.9
2. Small diameter within ½ mile of USA	$ 3.7
3. Large diameter outside ½ mile of USA	$ 97.9
4. Small diameter outside ½ mile of USA	$ 3.2
5. All except Subpart H	$ 25.2
6. All except the IMP	$ 101.4

To determine the compliance costs of the Phase II rulemaking, the following research activities were conducted:

- Phase I compliance cost estimates and data sources were reviewed.

[2] A 2.7 percent real discount rate is applied as suggested by OMB Circular No. A-94 for 30 year net present values

- The Volpe Center survey of Phase II compliance costs from major low stress pipeline operators was evaluated.
- An independent engineering assessment of Phase II compliance costs, including follow-up data collection on the Volpe Center survey, was conducted.

A major limitation of the Phase I data is that they were collected in 2003 and largely represent cost estimates submitted by one company for gas pipelines. The Association of Oil Pipelines did not have any more up-to-date or complete estimates. In addition, this Phase I data was not available by pipe diameter.

The major limitation of the Volpe Center survey data is that compliance cost estimates were only submitted by four companies and were not reported separately for initial and recurring costs. This makes the Volpe Center estimates difficult to interpret and apply to the Phase II alternatives.

As part of this regulatory analysis, an independent engineering assessment was performed to estimate the compliance costs faced by affected pipeline operators. This assessment included a thorough review of each of the requirements of Part 195 and the necessary activities and costs for compliance. The assessment also included a review of the Volpe Center survey results to verify the data collected and follow-up to collect additional cost information for each of the operators. In total, 20 operators were contacted, of which 12 had low stress hazardous liquid pipelines subject to Phase II regulation. The strength of this data is the coverage of a larger sample of operators with detail on diameter and location of pipe and initial and recurring costs by subpart of the regulation. For these reasons, the independently collected and verified data is used for Phase II compliance cost estimates.

Data on initial and recurring costs was collected for each of the 12 operators. Each of the operators was also classified by whether their mileage was located within or outside ½ mile of an USA and by diameter of pipe. In a few cases, assumptions were made to assign costs by diameter and location. Initial and recurring cost estimates were then arrayed by year and discounted to a net present value using OMB mandated discount rates. Seven of the 12 operators had small or no compliance costs and the remaining five had large compliance costs. As shown in Exhibit E-2, the total net present value cost of the regulation for all low stress pipeline (Alternative 1) is $104.9 million.

Benefits of the Regulation

The final 30 year net present values of benefits for each of the proposed alternatives are listed in Exhibit E-3.

Exhibit E-3: 30 Year Net Present Value Benefits by Alternative

Alternative	Benefit ($Millions)
1. All low stress	$ 326.5
2. Small diameter within ½ mile of USA	$ 25.6
3. Large diameter outside ½ mile of USA	$ 233.1
4. Small diameter outside ½ mile of USA	$ 67.8
5. All except Subpart H	$ 214.5
6. All except the IMP	$ 323.7

PHMSA expects the proposed regulatory changes to reduce the number of incidents and the incident costs and consequences. The ability of the proposed regulation to reduce or avoid these costs are considered to be the primary benefit of the regulation and are referred to as traditional benefits. Data on incident costs for the low stress pipelines are generally not available because PHMSA has not regulated these pipelines in the past. Moreover, the reduction in costs that the regulation would cause is also unknown. Therefore, as part of this regulatory analysis, the research team examines several data sources and approaches in order to evaluate the potential avoided costs. These approaches include:

- Utilization of data from the 1990 ANPRM / Low Stress Phase I
- Compilation of PHMSA's 7000-1 data for low stress pipelines
- Collection of data from individual states
- Time series trend line analysis

An examination of the costs of compliance and the current levels of compliance for individual pipelines revealed that pipelines fell into two distinct subgroups. The first group of pipelines, seven operators in total, was generally in compliance (voluntary) with the regulations and faced small costs in order to comply with the proposed regulations. The second group of pipelines, five in total, did not currently comply (they are under no obligation to comply) with the regulations and faced significant costs in order to comply with the proposed regulations. Due to the presence of this division, estimates were derived for the benefit of bringing a pipeline already substantially in compliance into full compliance and the benefit of bringing a pipeline out of compliance into full compliance. Assigning benefits in this manner is effective for weighting the mileage by expected benefits.

The benefit estimate for regulating an unregulated pipeline is derived from a combination of the Low Stress Phase I inflation updates of the 1990 ANPRM data and PHMSA's 7000-1 incident database. In the Phase I rulemaking, the 1990 ANPRM data were updated for general inflation in the economy. However, current PHMSA 7000-1 incident data reveals that the cost of remediation per incident has increased more rapidly than the general inflation rate. It is presumed this additional increase is due to changes in environmental cleanup practices and methods over the past twenty years.

Using PHMSA's 7000-1 database, current per mile costs are compared to the 1990 ANPRM inflation-updated regulated costs. The difference in the figures provides an estimate of the increases in costs beyond inflation (e.g. methods and practices). Applying this additional factor to the ANPRM inflation-updated unregulated cost per mile creates an estimate for current unregulated costs. This estimate is $21,055 in avoided costs per mile after regulating a pipeline that is out of compliance.

The benefit estimate for regulating a pipeline that is already substantially in compliance is derived from the time series trend analysis. This approach allows for an analysis of the rate of hazardous liquid pipeline incidents by cause over time. To determine the benefits of regulating a substantially regulated line, regulated incident rates in 1986 are compared to current regulated incident rates2008. The 1986 rates of incidence for regulated pipelines provide a rough picture of what incidents rates might look like now for a substantially regulated pipeline. The 2008 figure is what incident rates look like on currently fully regulated pipeline, since all incidents in PHMSA's database are assumed to be regulated. This method provides a proxy of the benefits from regulating a pipeline that is already substantially in compliance, yielding an estimated benefit of $674 per mile.

While the previous PHMSA regulatory analyses have not attempted to quantify nontraditional benefits, this regulatory analysis examines injury and loss of life, energy security - domestic supply disruption, energy security - dependency on foreign oil, additional environmental impacts, air pollution impacts,

standardization and federalization of pipeline regulations, and public confidence. Where possible, the economic impacts of these nontraditional benefits are normalized to a spill unit value per-barrel or per-mile. However, nontraditional benefits were not included in the benefit-cost analysis of the rulemaking alternatives in order to maintain conservative estimates of benefits.

According to OMB Circular A-4, it will not always be possible to express in monetary units all important benefits and costs. In such cases, OMB recommends that agencies should exercise professional judgment in determining how important the non-quantified benefits or costs may be in the context of the overall analysis. In the case of the proposed regulation, non-quantified benefits are likely to be significant. For example, the research team estimates additional environmental costs are 5 to 31 percent of traditional incident costs.[3] These nontraditional benefits, however, are not likely to vary significantly by alternative on a percentage basis. Therefore, they would not alter the basic ranking of the alternatives. If nontraditional benefits were included, they would increase the final benefit estimates and increase the already positive net benefits of the proposed rulemaking.

As shown in Exhibit E-3, the total net present value benefit of the regulation for all low stress pipeline (Alternative 1) is $326.5 million.

Benefit-Cost Analysis

A distinctive feature of benefit-cost analysis (BCA) is that both benefits and costs are expressed in monetary units, which allows for the evaluation of different regulatory options using a common measure. As stated in the OMB Circular A-4 Part D, the size of net benefits – the absolute difference between the projected benefits and costs – indicates whether one policy is more efficient than another. The benefit-cost ratio presents a quick measure or relative benefits and costs and whether the proposed alternative is expected to yield a net benefit. An economic concept called "net present value," accounts for the impact of time on the value of money and discounts the future value of a dollar. The concept of net present value is important because the timing of costs and benefits of a regulation are often different.

Exhibit E-4 below presents the 30 year present value of benefits, costs, and net benefit on a per mile basis and a total miles basis, for each proposed alternative. The last column shows the benefit-cost ratio for each proposed alternative of the regulation. A comparative chart of the benefit-cost ratios is presented in Exhibit E-5. The benefit-cost ratio for each alternative is greater than 1, signifying the present value benefits are greater than the costs for each of the six proposed Phase II alternatives. The relative net benefits from each proposed alternative are compared in Exhibit E-6. An analysis of the benefits and costs for each alternative follows.

[3] These estimates are based on reported additional environmental costs associated with the Exxon Valdez, Arthur Kill, and Texaco Anacortes incidents (Reference Section 3.4).

Exhibit E-4: Benefit-Cost Summary of Proposed Alternatives (Present Value, 30 years)

Alternative	Per Mile			Total			Benefit-Cost Ratio
	Benefit	Cost	Net Benefit	Benefit ($Millions)	Cost ($Millions)	Net Benefit ($Millions)	
1. All low stress	$ 235,834	$ 75,781	$ 160,053	$ 326.5	$ 104.9	$ 221.6	3.1
2. Small diameter within ½ mile of USA	$ 254,694	$ 37,206	$ 217,488	$ 25.6	$ 3.7	$ 21.9	6.8
3. Large diameter outside ½ mile of USA	$ 277,298	$ 116,517	$ 160,781	$ 233.1	$ 97.9	$ 135.2	2.4
4. Small diameter outside ½ mile of USA	$ 152,925	$ 7,264	$ 145,660	$ 67.8	$ 3.2	$ 64.6	21.1
5. All except Support Pi	$ 154,982	$ 18,175	$ 136,806	$ 214.5	$ 25.2	$ 189.3	8.5
6. All except the IMP	$ 233,879	$ 73,280	$ 160,599	$ 323.7	$ 101.4	$ 222.2	3.2

Exhibit E-5: Benefit-Cost Ratios by Alternative

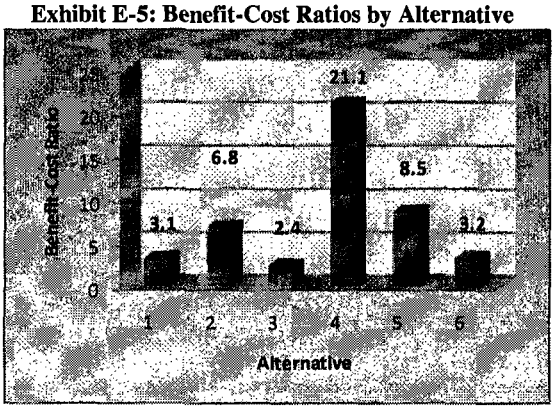
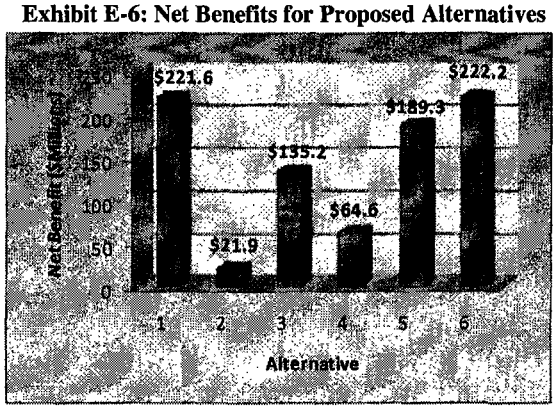


Exhibit E-6: Net Benefits for Proposed Alternatives



Alternative 1: Apply all Part 195 requirements to all eligible low stress pipeline

Alternative 1 subject, for the first time, all rural low stress lines to a majority of the requirements of Part 195 of the pipeline safety regulations. The only difference is that operators are not required to perform could affect analysis to determine the applicability of integrity management requirements, but instead would utilize the ½-mile buffer zone. It is the opinion of PHMSA that this alternative complies with the intent of the PIPES Act, and has a positive benefit cost ratio. It is, therefore, the selected alternative. Alternatives 2 through 6 are examined in this Regulatory Analysis for the purpose of comparing benefits and costs.

The benefit-cost ratio for Alternative 1 is 3.1. This indicates that the benefits of the regulation exceed the costs. In addition, this benefit-cost ratio would be even higher if nontraditional benefits were included. This alternative's benefit-cost ratio of 3.1 is relatively low compared to some other alternatives. However, this can be misleading when trying to determine the total overall benefit from the regulation. Alternative 1 has a net present value over 30 years of approximately $221.6 million, and is the sum of the net present values of Alternatives 2, 3 and 4.

PHMSA has estimated the cost of this regulation based on costs either submitted or reviewed by operators of approximately 50 percent of the pipeline mileage subject to the regulation. Therefore, these cost values are assumed to be highly reliable estimates. The total average annual cost of this alternative, as well as all the other alternatives, is well below the $100 million threshold for a significant regulatory action as defined by Executive Order 12866.

Alternative 2: Apply all Part 195 requirements to small diameter low stress pipelines within ½ mile of an USA

Alternative 2 applies only to small diameter low stress pipeline within ½ mile of an USA. This sub-portion of low stress pipelines is unique because it is the only currently unregulated sub-portion in which the IMP would apply. The IMP is important to the rulemaking because a greater amount of corrosion is detectable and because the IMP is relatively costly compared to other Part 195 subparts. Alternative 2 allows for an examination of the benefits and costs by a geographical sub-portion of the low stress pipeline system where environmental impacts are of great concern.

The benefit-cost ratio for Alternative 2 is relatively high at 6.8. However, the net benefit is relatively low at $21.9 million, reflecting relatively low mileage for this sub-portion of the system. Cost estimates are reliable as data was collected or estimated for six operators. Companies that reported costs provided estimates of the costs of implementing Subpart F, and in general, these costs were not particularly large.

Alternative 3: Apply all Part 195 requirements to large diameter low stress pipelines outside ½ mile of an USA

This alternative applies to all unregulated large diameter low stress pipelines. As all large diameter low stress pipelines within ½ mile of an USA were regulated in Phase I, this alternative applies only to large diameter low stress pipelines far from an USA. This alternative examines a geographic sub-portion of eligible low stress pipeline where environmental impacts are less of a concern.

The benefit-cost ratio for Alternative 3 is relatively low at 2.4. However, the net benefit is relatively high at $135.2 million. As expected, benefits for this alternative reflect the high cost of incidents and spill volumes for large diameter pipe. However, costs are also high due to the extremely high costs reported by Plains All American Pipeline, largely reflecting high Subpart H and IMP corrosion programs necessary for their particular pipeline. A factor in the large net benefit estimate is the relatively large number of eligible miles for the sub-portion. Cost data for this sub-portion of low stress pipeline was available for eight operators.

Alternative 4: Apply all Part 195 requirements to small diameter low stress pipelines outside ½ mile of an USA

Alternative 4 will regulate only small diameter pipe outside ½ mile of USAs. This alternative examines a geographic sub-portion of eligible low stress pipeline where environmental impacts are less of a concern. The benefit-cost ratio for Alternative 4 is the highest of all the alternatives at 21.1. The net benefit is the second smallest of any alternative at $64.6 million, but is still substantially higher than Alternative 2. The extremely high benefit-cost ratio reflects the relatively low costs reported by operators for pipelines in this sub-portion of eligible low stress pipeline.

Alternative 5: Apply all Part 195 requirements, except Subpart H (Corrosion Control), to all low stress pipelines not currently regulated

Alternatives 5 and 6 differ from alternatives 2 through 4 in that they examine subparts of the requirements as opposed to subparts of the low stress pipeline system. Alternative 5 proposes the removal of Subpart H from all eligible miles of low stress pipeline. This subpart is composed of corrosion control requirements such as cathodic protection and external corrosion direct assessments. It is one of the two most costly subparts in terms of operator compliance and is excluded in this alternative in an attempt to vary regulatory stringency while minimizing cost.

The benefit-cost ratio for Alternative 5 is relatively high at 8.5, and the net benefit is $189.3 million. While benefits are significantly reduced by this alternative, costs are also largely reduced, preserving a relatively high net benefit. Compliance costs data in this category was available for four companies. The benefit-cost ratio for this alternative, which excludes Subpart H, is higher than Alterative 1, which includes Subpart H. This indicates a relatively low benefit-cost ratio for Subpart H. However, Subpart H still provides slightly more benefits than costs.

Alternative 6: Apply all Part 195 requirements, except the Integrity Management Program, to all low stress pipelines not currently regulated

Alternative 6 proposes the regulation of all eligible low stress pipelines but removes the IMP. Alternative 6 applies all Part 195 requirements, except the IMP requirements to all low stress pipelines not currently regulated. The IMP requirement is one of the two most costly requirements in terms of operator compliance, and makes up the vast majority of this cost. It is, therefore, excluded to better determine its relationship to the size and distribution of benefits. This follows the OMB suggestion to vary alternatives by stringency. Therefore, the benefits and costs of this alternative are largely the same as those in Alternative 1 except for one sub-portion of low stress pipelines.

The benefit-cost ratio for Alternative 6 is 3.2, which as expected is similar to Alternative 1. The net benefit, at $222.2 million, is also similar to Alternative 1. Six companies provided estimates of compliance costs related to this alternative. The benefit-cost ratio for this alternative, which excludes the IMP, is higher than Alterative 1, which includes the IMP. As was the case for Subpart H, this indicates a relatively low benefit-cost ratio for the IMP. However, the IMP still provides slightly more benefits than costs.

Regulatory Analyses and Notices

A Regulatory Flexibility Analysis, Preliminary Environmental Assessment, Paperwork Reduction Analysis, Executive Order 13211 Energy Analysis and Unfunded Mandates Analysis were conducted in conjunction with the Regulatory Analysis.

Regulatory Flexibility Analysis

PHMSA, through the Volpe Center, has made an extensive effort to identify small and other operators of rural low stress lines. In addition to distributing surveys through several Federal Register notices and posting on the PHMSA Online Data Entry website, PHMSA and the Volpe Center worked with the American Petroleum Institute, the Association of Oil Pipelines, and the Independent Petroleum Association of America to announce and distribute the survey to their members via their email newsletter.

Despite this effort, only one small entity was identified as being economically impacted by the rulemaking. Therefore, under section 605 of the Regulatory Flexibility Act, this rulemaking will not have a significant impact on a substantial number of small entities.

Preliminary Environmental Assessment

The preliminary environmental assessment found that the proposed rule would not significantly affect the quality of the environment. This proposed rule will require only limited physical modification or other work that would disturb pipelines, such as identifying segments of pipelines meeting the regulatory definitions, inspection and testing, installing and maintain line markers, implementing corrosion controls, pipeline cleaning, and establishing integrity assessment programs. A minor to moderate positive

environmental impact from reducing spills and incidents may offset the negligible negative environmental impacts associated with implementing the proposed rule.

Paperwork Reduction Analysis

In total, this proposed rule will slightly increase the paperwork burden for affected rural low stress pipeline operators. In the first year after implementation, PHMSA expects this proposed rule to add 1,860 burden hours with a cost of $120,435. In subsequent years, PHMSA expects this proposed rule to add 1,140 burden hours with a cost of $73,815.

Executive Order 13211

This proposed rule is not a "significant energy action" under Executive Order 13211. It is not likely to have a significant adverse effect on the supply, distribution, or use of energy. In fact, since this rulemaking is designed to reduce pipeline incidents and spills, it is expected to have a positive effect on the supply, distribution and use of energy.

Unfunded Mandates

This rulemaking does not impose unfunded mandates under the Unfunded Mandates Reform Act of 1995. It does not result in costs of $141.3 million[4] or more to state, local, or tribal governments, in the aggregate, or to the private sector, and is the least burdensome alternative that achieves the objective of the proposed rulemaking.

[4] This is the inflation updated $100 million cost figure from the Unfunded Mandates Reform Act of 1995.

1. INTRODUCTION

The Pipeline and Hazardous Materials Safety Administration (PHMSA) is proposing to extend pipeline safety regulations in 49 CFR Part 195 to rural low stress hazardous liquid pipelines (referred to as "low stress pipelines") that have not previously been subject to regulation. This regulatory analysis identifies and examines the benefits and costs of the proposed amendments. It is prepared in accordance with Executive Order 12866, the Regulatory Flexibility Act of 1980, as amended, and the Unfunded Mandates Act.

Volume I of the regulatory analysis identifies potential regulatory alternatives and presents the conclusions of the regulatory analysis. Volume I contains the following chapters:

- **Chapter 1: Introduction** – summarizes the need and intent of the rulemaking, and reviews previous regulatory and legislative actions.
- **Chapter 2: Regulatory Alternatives** – describes the alternatives considered in the previous Low Stress Phase I, reviews criteria for the development of regulatory alternatives suggested by the Office of Management and Budget and presents the six alternatives considered for this regulatory action.
- **Chapter 3: Low Stress Characteristics** – presents estimates of affected Phase II low stress pipeline mileage, compliance costs and traditional and nontraditional benefits of the proposed rulemaking.
- **Chapter 4: Cost Benefit Analysis** – describes the benefit-cost analytic framework and utilizes the data presented in Chapter 3 to derive cost-benefit ratios and net benefit values for each of the six alternatives.
- **Chapter 5: Regulatory Analyses and Notices** – provides the Regulatory Flexibility Analysis, a summary of the Preliminary Environmental Assessment, the Paperwork Reduction Analysis, Executive Order 13211 Energy Analysis and the Unfunded Mandates Analysis.

The remainder of this introductory chapter provides a brief overview of the rulemaking initiative and identifies the key components of the completed regulatory analysis. This chapter consists of the following subsections:

- **Section 1.1** need and intent of regulation
- **Section 1.2** rationale for a regulatory assessment
- **Section 1.3** review of previous regulatory and legislative actions

1.1 Need and Intent of Regulation

Regulatory intervention results from a statutory directive, the Pipeline Inspection, Protection, Enforcement, and Safety Act of 2006 (PIPES Act). The PIPES Act, signed December 29, 2006, reauthorized federal pipeline safety programs, which are administered by PHMSA, for Fiscal Years 2007 through 2010 (Pub. L. 109–468). Section Four of the PIPES Act (codified in 49 U.S.C. 60102(k)) requires that PHMSA issue regulations subjecting all rural low stress hazardous liquid transmission pipeline mileage to the same standards and regulations as other hazardous liquid transmissions pipelines.

The PIPES Act followed a series of costly low stress hazardous liquid incidents. Low stress pipeline regulatory evaluations started in 1990 after the Exxon Arthur Kill incident, of which total remediation

costs were estimated to range from $49 million to $66 million.[5] More recently, the 2006 BP low stress oil incident in Prudhoe Bay, Alaska spilled more than 200,000 gallons. An analysis of PHMSA's F 7000-1 (1-2001; Accident Report Form) database shows that from 2002-2008 there are approximately 3.5 low stress incidents per thousand miles of low stress pipe and approximately 0.5 non low stress incidents per thousand miles of non low stress pipe, or approximately 7 times more low stress incidents per mile than non low stress pipeline incidents.[6,7] In addition, costs per mile for low stress pipeline incidents are approximately twice that of non-low stress pipelines, at approximately $600 compared to $300.

PHMSA presented the plan for rulemaking to the Technical Hazardous Liquid Pipeline Safety Standards Committee (THLPSSC) in January 2007. For low stress pipelines, PHMSA proposed to develop regulations in two phases. Phase I would extend all of 49 CFR Part 195 to large diameter low stress pipelines within ½ mile of an USA. PHMSA previously determined that USAs require extra protection because they contain sole-source drinking water intakes, endangered species, and other ecological resources that could be adversely affected by pipeline spills. Phase II would address the remaining unregulated low stress pipelines. This phased approach would bring the higher-risk pipelines under immediate regulation, while allowing PHMSA time to gather comprehensive data on lower-risk unregulated low stress pipelines.

Phase I became effective on July 3, 2008. In Phase I, PHMSA brought under Part 195 regulation those rural low stress steel or plastic pipelines having a nominal diameter equal or greater than 8⅝ inches located within ½ mile of an USA. In addition, PHMSA adopted reporting requirements for all low stress pipelines.

Through the current Phase II rulemaking, PHMSA will determine if and how safety regulations should be applied to all other low stress pipeline not previously regulated by 49 CFR Part 195. The pipelines affected by this proposed rule include those low stress pipeline of any diameter that are more than outside ½ mile of an USA and low stress pipeline less than 8⅝ inches in diameter and within ½ mile of an USA.

The examination of pipeline industry failures to substantially reduce low stress pipeline incident risks may be addressed in the context of Executive Order 12866. The Executive Order states, "Each agency shall identify the problem that it intends to address (including where applicable, the failures of private markets or public institutions that warrant new agency action) as well as assess the significance of that problem." Negative environmental externalities are the primary market failure associated with low stress pipelines. This rulemaking seeks to moderate these externalities. The primary rationale for regulatory action is to reduce the number of low stress pipeline incidents and subsequent environmental consequences, as required by the PIPES Act. This will in effect have a positive effect on public confidence in the national pipeline system. Other types of market failure that commonly require regulatory action include market power and inadequate or asymmetric information. These market failures, however, do not apply to low stress pipelines.

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[5] Advanced Resources International, 1993. "Economic Impacts of Oil Spills: Spill Unit costs for Tankers, Pipelines, Refineries, and Offshore Facilities." http://www.ntis.gov/search/product.aspx?ABBR=DE94001248

[6] This analysis excludes spills that are less than five barrels due to reporting requirements.

[7] There is no specified reporting field for stress level, and thus the proxy equation in Exhibit 3-15 is used. This methodology was developed and approved by PHMSA technical staff Dewitt Bordeaux of the Training and Qualifications Division and Piyali Talukdar of the Program Development Division.

1.2 Rationale for Regulatory Assessment

Executive Order 12866, which replaces Executive Order 12291, gives direct regulatory development oversight authority to the Office of Management and Budget (OMB). Under the Executive Order, agencies are required to submit all their rules to the OMB at the Advance Notice of Proposed Rulemaking (ANPRM), Notice of Proposed Rulemaking (NPRM) and Final Regulatory stages, with some minor exceptions outlined in Section 3(d) of the Order. The Executive Order also defines the principal requirements for the regulatory analysis of each rulemaking proposal for all regulatory agencies.

Section 1 of the Executive Order defines the regulatory philosophy and the principles for regulatory analysis. The Executive Order mandates that regulatory agencies assess all costs and benefits of available regulatory alternatives, including the option of not applying any regulation. Agencies must evaluate such regulatory alternatives as the provision of economic incentives (such as user fees and marketable permits) to encourage the desired behavior or the provision of information based on which the public can make its own informed choices. The Executive Order requires agencies to select regulatory alternatives with the highest net benefit or the lowest net cost.

If an agency deems that creating a regulation is the best available method of achieving the statutory mandate, agencies are required to design the regulation in the most cost-effective manner. The determination of the most cost-effective approach involves such considerations as incentives for innovation in the regulated community, consistency, predictability, flexibility, distributive impacts and equity, in addition to the costs of enforcement and compliance. Agencies are also required to consider the degree and nature of the risks posed by the activities subject to regulation and to assess the costs and benefits of the intended regulation.

Section 6 of the Executive Order lays out additional requirements for those actions determined to be significant. For each Significant Regulatory Action (SRA), the regulatory agency is required to provide the OMB with an assessment of the action's anticipated costs and benefits. If the SRA has an annual impact of $100 millión or more as described in (Section 3(f) (1)), the agency is required to submit additional information to the OMB that includes an assessment of costs and benefits of potentially effective and reasonably feasible alternatives. The additional information must also clearly present the underlying analysis that aided the agency's decision-making process. More specifically, the agency is required to submit a regulatory impact assessment that includes an explicit analysis of the proposed regulatory action's anticipated costs and benefits on the economy as a whole, private markets (including productivity, employment, and competitiveness), government, health and safety, and the natural environment (Section 6(c)). The assessment must also include cost-benefit analyses of the reasonably feasible alternatives.

1.3 Review of Previous Regulatory and Legislative Actions

Congress and PHMSA have undertaken a number of relevant legislative and regulatory actions in recent years that affect low stress hazardous pipelines. These recent and important legislative and regulatory actions include:

- PHMSA's publication of a NPRM on Protecting USAs from Rural Onshore Hazardous Liquid Gathering Lines and Low-stress Lines (71 FR 52504) on September 6, 2006[8]
- The PIPES Act enacted on December 29, 2006[9]
- PHMSA's publication of a Supplemental Notice of Proposed Rule Making (SNPRM) (72 FR 28008) on May 18, 2007
- PHMSA's publication of a Final Rule on Protecting USAs From Rural Onshore Hazardous Liquid Gathering Lines and Low-stress Lines (73 FR 31634) on June 3, 2008[10]

The following sections present a summary of the key legislative and regulatory actions affecting pipeline operations.

PHMSA Notice of Proposed Rule Making (71 FR 52504)

PHMSA published an NPRM titled "Protecting Unusually Sensitive Areas from Rural Onshore Hazardous Liquid Gathering Lines and Low-stress Lines" on September 6, 2006 (71 FR 52504). The NPRM proposed to extend certain threat-focused pipeline safety regulations to rural onshore low stress hazardous liquid pipelines within a defined buffer of previously defined USAs. As mentioned earlier, USAs are areas requiring extra protection because of the presence of sole-source drinking water resources, endangered species, or other ecological resources that accidents or leaks on hazardous liquid pipelines could adversely affect.

Low stress hazardous liquid pipelines, except those that are in populated areas or cross commercially navigable waterways, have not been subject to the safety regulations in 49 CFR Part 195[11]. The NPRM proposed to define a category of regulated rural onshore low stress lines as rural lines operating at or below 20 percent of specified minimum yield strength (SMYS), with a diameter of eight and five-eighths inches or greater, located in or within a quarter-mile of an USA. The NPRM would require operators of these lines to comply with a threat-focused set of requirements in 49 CFR Part 195 that already apply to other hazardous liquid pipelines.

The proposed safety requirements addressed the most common threats, corrosion and third party damage, to the integrity of these rural lines. The proposal intended to provide additional integrity protection, to avoid significant adverse environmental consequences, and to improve public confidence in the safety of unregulated low stress lines.

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[8] PHMSA, Notice of Proposed Rulemaking, 71 FR 52504 http://www.phmsa.dot.gov/portal/site/PHMSA/menuitem.ebdc7a8a7e39f2e55cf2031050248a0c/?vgnextoid=6265ab1002b78110VgnVCM1000009ed07898RCRD&vgnextchannel=2dd0d95c4d037110VgnVCM1000009ed07898RCRD&vgnextfmt=print

[9] PIPES Act of 2006, http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=109_cong_public_laws&docid=f:publ468.109.pdf

[10] PHMSA, Final Rule, 73 FR 31634 http://www.phmsa.dot.gov/portal/site/PHMSA/menuitem.ebdc7a8a7e39f2e55cf2031050248a0c/?vgnextoid=6da79c5cd1a7b110VgnVCM1000009ed07898RCRD&vgnextchannel=c021d95c4d037110VgnVCM1000009ed07898RCRD&vgnextfmt=print

[11] Transportation of Hazardous Liquids by Pipeline (PHMSA 49 CFR Part 195). This Code of Federal Regulation (CFR) prescribes safety standards and reporting requirements for pipeline facilities used in the transportation of hazardous liquids or carbon dioxide. http://www.access.gpo.gov/nara/cfr/waisidx_06/49cfr195_06.html

Pipeline Inspection, Protection, Enforcement and Safety Act of 2006

The PIPES Act was signed into law on December 29, 2006 (Pub. L. No. 109– 468). The PIPES Act included provisions affecting hazardous liquid pipelines operating at low stress, specifically hoop stress less than 20 percent SMYS. The PIPES Act required that PHMSA issue regulations subjecting low stress hazardous liquid pipelines to the same standards and regulations as other hazardous liquid pipelines. The Act allowed the regulations to be phased in.

PHMSA Publication of Supplemental Notice of Proposed Rule Making (72 FR 28008)

The 2006 NPRM did not satisfy the broad mandate of the PIPES Act. Accordingly, PHMSA issued an SNPRM on May 18, 2007. The SNPRM proposed a two-phased approach to implementing the PIPES Act requirements. Phase I would extend all the safety requirements of 49 CFR Part 195 to higher-risk, larger-diameter low stress pipelines. With respect to smaller-diameter low stress pipelines, PHMSA would collect infrastructure data and risk information by requiring such pipelines to comply with existing reporting requirements. Based on the data gathered, PHMSA would initiate a future Phase II rulemaking. One of the main reasons for the two-phase approach is the lack of available data on smaller-diameter low stress pipelines.

PHMSA Final Rule on Protecting Unusually Sensitive Areas from Rural Onshore Hazardous Liquid Gathering Lines and Low-Stress Lines (73 FR 31634)

On June 3, 2008, PHMSA published the final rule covering rural onshore low stress and gathering hazardous liquid pipelines, 73 FR 31634. The rule sought to address the most significant risks posed by higher-risk, larger-diameter rural onshore low stress and gathering lines to USAs. This final rule adopted the regulations proposed in the 2007 SNPRM. The primary intended benefits from the final rule were improved safety performance and reliability of these pipelines, as the expectation was that the number of incidents and their consequences would decline. The final rule may also prevent supply disruptions caused by pipeline failures. In line with the SNPRM, the Final Rule required the collection of infrastructure data and risk information on pipelines affected by a Phase II rulemaking. Based on the data gathered, PHMSA would initiate a Phase II rulemaking at a future date.

2. REGULATORY ALTERNATIVES

The OMB Circular A-4 provides OMB's guidance to Federal agencies on the development of regulatory analysis as required under Executive Order 12866.[12] According to the OMB Circular, agencies need to consider alternative regulatory approaches. However, the number and choice of alternatives selected for detailed analysis is a matter of judgment. To determine the appropriate set of Phase II rulemaking alternatives for analysis, PHMSA has considered the alternatives evaluated in the Phase I rulemaking as well as the OMB guidance for selection of regulatory alternatives.

This chapter includes three sections. The first section discusses the alternatives that PHMSA considered during the Phase I rulemaking. The second section describes the OMB guidance for selection of alternatives recommended in the OMB Circular A-4. The third section provides the alternatives PHMSA considered in the Phase II regulatory analysis and provides explanations for their selection.

2.1 Regulatory Alternatives Considered in the Phase I Rulemaking

Following the PIPES ACT of 2006, PHMSA considered several alternatives to ensure the necessary protection from potential incidents on low stress pipelines. These alternatives are reviewed to show how PHMSA came to a two-phase approach. The alternatives were:

- No Action
- Complete the currently outstanding rulemaking relating to low stress pipelines and then apply Part 195 to all rural onshore low stress lines at the same time.
- Apply Part 195 to the rural onshore low stress pipelines in two phases, with the initial phase covering those lines posing the greatest risk to the environment.

The evaluations for the alternatives considered by PHMSA in Phase I follow below.

No Action

Section 4 of the PIPES Act of 2006 requires Part 195 to apply to all low stress pipelines. Not taking action would have been unresponsive to the Congressional mandate and was, therefore, not considered further. For the same reason, this alternative will not be considered in the Phase II analysis.

Complete the outstanding rulemaking relating to low stress pipelines and then apply Part 195 to all rural onshore low stress lines at the same time

On September 6, 2006, PHMSA published an NPRM proposing extending limited threat-focused requirements to larger diameter low stress pipelines within ¼- mile of an USA. Those limited threat-focused requirements were less than "the same standards and regulations as [apply to] other hazardous liquid pipelines" required by the PIPES Act. Finalizing that proposal without change would have imposed some requirements on affected pipelines, only to be followed by additional regulations imposing further requirements. PHMSA considers such sequential application of requirements to be inefficient and to pose an unnecessary additional burden on pipeline operators. Therefore, this alternative was not considered further. If a sequential application of requirements were considered for the Phase II analysis, the first round of threat-focused requirements would apply to the remaining unregulated universe. However, it is still inefficient and costly to impose multiple requirements in sequential order. In addition, the remaining unregulated low stress pipeline in Phase II poses less risk than the large diameter low stress

[12] Office of Management and Budget, Circular A-4, http://www.whitehouse.gov/omb/circulars_a004_a-4/#c

pipelines within ½ mile of an USA in Phase I. Therefore, a sequence of requirements would be even more inefficient for Phase II. This alternative will not be considered for the Phase II rulemaking analysis.

Apply Part 195 to the rural onshore low stress pipelines in two phases, with the initial phase covering those lines posing the greatest risk to the environment

The September 2006 NPRM proposed limited threat-focused requirements for certain low stress pipelines within ¼ mile of an USA. After PHMSA issued the NPRM, the PIPES Act was signed into law on December 29, 2006. Section 4 of the PIPES Act requires PHMSA to "issue regulations subjecting low-stress hazardous liquid pipelines to the same standards and regulations as other hazardous liquid pipelines" with some limited exceptions. The Act allowed the new regulations to be phased in.

In response to the PIPES Act requirement, on May 18, 2007, PHMSA published a SNPRM to apply all of Part 195 to the low-stress pipelines proposed for coverage in the NPRM, except that the buffer was extended from ¼ mile to ½ mile (72 FR 28008).

PHMSA decided to regulate low stress pipelines in two phases after the PIPES Act of 2006. Due to the fact that Phase I eligible low stress pipeline were higher risk and only a portion of total low stress pipeline, PHMSA elected to apply all Part 195 requirements to Phase I. In Phase II, the eligible low stress pipeline is of relatively less risk and incorporates more segments (remaining large diameter low stress pipeline and all small diameter low stress pipeline). For this reason, multiple alternatives are considered for the Phase II rulemaking. Section 2.2 provides the OMB guidelines for selecting regulatory alternatives and Section 2.3 provides the selected Phase II alternatives and explanations for the selection.

2.2 OMB Circular A-4 Additional Regulatory Alternatives

The OMB Circular A-4, Regulatory Analysis, states that the number and choice of alternatives selected for detailed analysis is a matter of judgment. There must be some balance between thoroughness and the practical limits on analytical capacity. The OMB Circular A-4 lists criteria for alternative regulatory actions that agencies should take into consideration. The following paragraphs describe each of the suggestions raised by the OMB Circular and PHMSA's approach to each.

Different Choices Defined by Statute

The OMB Circular states that when a statute establishes a specific regulatory requirement and the agency is considering a more stringent standard, the agency should examine the benefits and costs of reasonable alternatives that reflect the range of the agency's statutory discretion, including the specific statutory requirement.

In this particular case, the statutory requirement of the PIPES Act is to subject "low-stress hazardous liquid pipelines to the same standards and regulations as other hazardous liquid pipelines." The PIPES Act allows for regulation in phases, which let PHMSA regulate the higher-risk larger diameter low stress pipeline first and then further analyze remaining low stress pipeline to determine if further regulation is necessary. The purpose of this Regulatory Analysis is to examine the risk posed by the remaining unregulated low stress pipelines and to examine the cost effectiveness of further regulation.

Different Compliance Dates

The OMB Circular states that the timing of a regulation may also have an important effect on its net benefits. Benefits may vary significantly with different compliance dates where a delay in implementation may result in a substantial loss of future benefits. Similarly, the cost of a regulation may vary substantially with different compliance dates for an industry that requires a year or more to plan its production runs.

Delays due to regulatory compliance often postpone both costs and benefits. The major timing concern for the rulemaking is to allow adequate lead time for operators to plan and implement compliance programs, as inadequate lead times could increase costs. For the proposed rulemaking, delays in implementation are not expected to affect the relative ranking of the alternatives or to result in a substantial loss of future benefits.

Different Enforcement Methods

The OMB Circular states that compliance alternatives for Federal, State, or local enforcement include on-site inspections, periodic reporting, and noncompliance penalties structured to provide the most appropriate incentives. When alternative monitoring and reporting methods vary in their benefits and costs, the OMB Circular suggests that agencies should identify the most appropriate enforcement framework. For example, in some circumstances random monitoring or parametric monitoring will be less expensive and nearly as effective as continuous monitoring.

This criterion is not applicable in Phase II, as the enforcement methods for pipelines are already fixed and operators are already required by Phase I to report all low stress mileages and incidents.

Different Degrees of Stringency

The OMB Circular notes that, in general, both the benefits and costs associated with a regulation will increase with the level of stringency (although marginal costs generally increase with stringency, whereas marginal benefits may decrease). Alternative levels of stringency should be studied to understand more fully the relationship between stringency and the size and distribution of benefits and costs among different groups.

This OMB suggestion is used in the creation of Phase II alternatives. The IMP and Subpart H (corrosion control programs) are removed in various alternatives. Varying the applicable subparts will help determine the relationship of benefit and cost to levels of stringency in this rulemaking.

Different Requirements for Different Sized Firms

According to the OMB Circular, different requirements for large and small firms should be considered, basing the requirements on estimated differences in the expected costs of compliance or in the expected benefits. The balance of benefits and costs can shift depending on the size of the firms being regulated. Small firms may find it more costly to comply with the rulemaking, especially if there are large fixed costs required for regulatory compliance. On the other hand, it is not efficient to place a heavier burden on one segment of a regulated industry solely because it can better afford the higher cost. This has the potential to load costs disproportionately on the most productive firms.

The Phase II alternatives will not consider differential impacts by firm size. However, information on affected firms has been collected and a separate Regulatory Flexibility Act analyzes differential compliance costs for small firms.

Different Requirements for Different Geographic Regions

The OMB Circular notes that rarely do all regions of the country benefit uniformly from government regulation. It is also unlikely that costs will be uniformly distributed across the country. Where there are significant regional variations in benefits and/or costs, the OMB Circular suggests that agencies should consider the possibility of setting different requirements for the different regions.

The precedent for varying alternatives by region was set in Phase I, and will be used again in Phase II. The regional criterion in this rulemaking is whether or not the low stress pipeline is within ½ mile of an USA, which has implications for the benefits and costs of the rulemaking.

Performance Standards Rather than Design Standards

Performance standards express requirements in terms of outcomes rather than specifying the means to those ends. They are generally superior to engineering or design standards because performance standards give the regulated parties the flexibility to achieve regulatory objectives in the most cost-effective way.

The proposed rulemaking will extend existing pipeline regulations to currently unregulated low stress pipelines, which is a small subset of the universe of all hazardous liquid pipelines. As such, the alternatives that will be considered will not include a general change in regulatory methods from design to performance standards. In general, performance standards are not applicable to pipelines because due to the low frequency and high consequence of events, any performance standard that allows for any significant incident rate or size of spill would not be acceptable public policy.

Market-Oriented Approaches Rather than Direct Controls

The OMB Circular A-4 also suggests that agencies explore market-oriented approaches that use economic incentives. These alternatives include fees, penalties, subsidies, marketable permits or offsets, changes in liability or property rights (including policies that alter the incentives of insurers and insured parties), and required bonds, insurance, and warranties.

As with performance standards, changes to the general methods for regulations will not include new regulatory schemes, as the proposed regulations extend existing regulations to a small subset of pipelines. These market approaches may also not be viable because some causes of pipeline incidents are out of the control of operators (e.g. third party excavation or natural causes).

Informational Measures Rather than Regulation

If intervention is contemplated to address a market failure that arises from inadequate or asymmetric information, informational remedies will often be preferred. Measures to improve the availability of information include government establishment of a standardized testing and rating system (the use of which could be mandatory or voluntary), mandatory disclosure requirements (e.g., by advertising, labeling, or enclosures), and government provision of information (e.g., by government publications, telephone hotlines, or public interest broadcast announcements). A regulatory measure to improve the availability of information, particularly about the concealed characteristics of products, provides consumers a greater choice than a mandatory product standard or ban.

Current pipeline regulations include informational measures such as those involving third party excavations. These aspects of current regulation are extended to unregulated pipelines in the evaluated

alternatives. However, no general shift to new regulatory schemes is evaluated due to the small population of additional pipelines subject to the proposed rulemaking.

2.3 PHMSA Phase II - Regulatory Alternatives

PHMSA has determined that six alternatives should be considered for Phase II. These alternatives are structured to allow the examination of the benefits and costs of regulating various parts of the low stress pipeline system or regulating to different levels of stringency. These alternatives are largely determined by geographic location, pipe diameter, or regulatory subpart. The rational for the division by pipe diameter is derived from Phase I, which regulated large diameter low stress pipelines within ½ mile of an USA. The rational for the division by proximity to an USA is derived both from Phase I and the OMB suggestion for alternatives based on geographic region. The alternatives based on Part 195 Subparts follows from the OMB suggestion to vary alternatives by stringency in order to better understand the benefit-cost relationship between additional requirements. The following six alternatives are analyzed for the Phase II rulemaking:

1. **Apply all Part 195 requirements to all eligible low stress pipeline.** This alternative applies a majority of the Part 195 requirements to all rural low stress pipelines. The only difference is that operators are not required to perform could affect analysis to determine the applicability of the IMP requirements. Instead the operators would utilize the ½-mile buffer zone. It is PHMSAS opinion that this alternative complies with the intent of the PIPES Act, and has a positive benefit cost ratio. Therefore, this alternative is selected for regulatory action.

2. **Apply all Part 195 requirements to small diameter low stress pipelines within ½ mile of an USA.** Low Stress Phase I covered large diameter low stress pipelines within ½ mile of an USA. This alternative regulates the remaining low stress pipelines within ½ mile of USAs and follows the OMB suggestion to differ alternatives based on geographic location. Alternatives 2, 3 and 4 differ in region and/or pipe size analyzed. Geographic region is an important criterion in this rulemaking because, all else equal, an incident within ½ mile of an USA is likely to cause larger environmental impacts and have larger cleanup and remediation costs than an incident outside ½ mile of an USA. This alternative, as well as the two following alternatives, examine a portion of the low stress pipeline system to be regulated. This allows the examination of the benefits and costs of these sub-portions by geographic area and pipe size.

3. **Apply all Part 195 requirements to large diameter low stress pipelines outside ½ mile of an USA.** This alternative regulates the remaining unregulated large diameter low stress pipelines, as all large diameter low stress pipelines within ½ mile of USAs were regulated by Phase I. It also follows the OMB suggestion to differ alternatives based upon geographic location.

4. **Alternative 4: Apply all Part 195 requirements to small diameter low stress pipelines outside ½ mile of an USA.** This alternative regulates all small diameter low stress pipeline outside ½ mile of an USA. It follows the OMB suggestion to differ alternatives based upon geographic location and allows for an examination of the effectiveness of the system's regulatory sub-portions.

5. **Apply all Part 195 requirements, except Subpart H (Corrosion Control), to all low stress pipelines not currently regulated.** Subpart H is composed of corrosion control requirements such as cathodic protection and external corrosion direct assessments. It is one of the two most costly subparts in terms of operator compliance and is thus excluded in this alternative in an attempt to vary stringency while minimizing cost. Excluding Subpart H in this alternative

follows the OMB suggestion to vary alternatives by stringency and it provides further information on the relationship between corrosion control and the size and distribution of benefits and costs.

6. **Apply all Part 195 requirements, except the Integrity Management Program, to all low stress pipelines not currently regulated.** The Integrity Management Program (IMP) is part of Subpart F. Subpart F is also one of the two most costly subparts in terms of operator compliance, and the IMP makes up the vast majority of this cost. It is thus excluded in the alternatives analysis to better determine its relationship to the size and distribution of benefits. This follows the OMB suggestion to vary alternatives by stringency.

3. MILEAGE, COMPLIANCE COSTS AND BENEFITS

In order to evaluate the benefits and costs of the proposed rulemaking, including the various alternatives, extensive background research was conducted. This research was both necessitated and complicated by the fact that there was a paucity of data due to the lack of previous data collected on unregulated pipelines. This chapter provides a summary of this research, including the following information on currently unregulated low stress pipelines: 1) pipeline mileages, 2) compliance costs, 3) traditional benefits, and 4) nontraditional benefits.

3.1 Pipeline Mileages

It is challenging to develop estimates of pipeline mileage for a very specific subset of the pipeline system, such as the pipelines that will be subject to this rulemaking. The applicability of this set of proposed regulations to a particular pipeline depends on the location of the pipeline, the product carried, the length, the type of material the pipeline is made of, the operating pressure, and other characteristics. Operators build new pipelines, take existing pipelines out of service, sell or buy pipelines amongst each other, and switch the use of pipelines among products and operating pressures. Moreover, since this set of pipelines was previously unregulated, pipeline operators may have incomplete data on their assets and may not even be aware that new data collection is ongoing or applies to their systems. The purpose of this section is to review the available data and estimates of the potentially affected pipeline mileage.

Exhibit 3-1 reports the current regulatory status of pipelines. As shown in Exhibit 3-1, these proposed Phase II regulations would affect three major groups of pipelines:

- Small diameter low stress pipeline within ½ mile of an USA
- Small diameter low stress pipeline outside ½ mile of an USA
- Large diameter low stress pipeline outside ½ mile of an USA

Exhibit 3-1: Regulatory Status of Pipelines

Nominal Diameter	Part 195.1 (a) covers any pipeline that: 1) Transports an HVL 2) Non-Gathering Line Operating at Stress > 20% SMYS 3) Crosses a Navigable Waterway 4) Gathering line in Non-Rural Area	Rural Low Stress (Operating at Stress < 20% SMYS)		Gathering Line in a Rural Area (Operating at Stress > 20% SMYS)
		Located within half mile of an USA	Located outside half mile of an USA	
Less than 6 ⅝"	Regulated Previously to Phase I			Unregulated
From 6 ⅝" to 8 ⅝"		Phase II	Phase II	Regulated in Phase I
Greater or equal to 8 ⅝"		Regulated in Phase I	Phase II	Unregulated
Part 195.1(b) exempts ten categories of pipelines including transport of a hazardous liquid (1) in a gaseous state (2) through a pipeline by gravity (3) a pipeline subject to Coast Guard regulations (4) a pipeline less than one mile long. For the other exceptions see 49 Code of Federal Regulations Part 195—Transportation of Hazardous Liquids By Pipeline § 195.1 "Which pipelines are covered by this part."				

Reported estimates of the miles of energy pipelines in the U.S. vary considerably. Four important sources of estimates of low stress pipeline mileage include:

- The Regulatory Analysis for the Low-Stress I Final Rule by PHMSA published in September 2007
- The Volpe Center survey of operators of low stress pipelines

- The annual mileage data pipeline operators report to PHMSA
- Mileage estimates reported to the National Pipeline Mapping System (NPMS)

Pipeline Mileage Estimates from the Phase I Rulemaking

In the Regulatory Analysis for the Final Rule published in September 2007, an estimate was made of low stress pipeline mileage.[13] While the collection of additional information has superseded many of the estimates and estimating methodologies, these estimates are important because they represent a "top-down" approach to developing mileages. This type of approach is useful in that it can act as a reality check against data collected at a micro-level, especially where that data has potential for underreporting. A key estimate is the American Petroleum Institute's estimate that there are a total of 200,000 miles of pipeline in the U.S. Currently regulated, gathering line, and exempt inter-facility pipeline mileage can be compared to the American Petroleum Institute's total pipeline mileage estimate. Exhibit 3-2 summarizes the estimates of affected mileages.

Exhibit 3-2: Summary of Impacted Mileage from the Low Stress I Regulatory Analysis

Category	Mileage Specification	Miles
Rural Gathering Lines	Gathering line mileage impacted	599
Rural Low Stress Pipelines	Low stress mileage brought under 49 CFR Part 195 safety requirements	803
	Additional low stress mileage for which annual reports must be filed	3,921

Pipeline Mileage Estimates from the Volpe Center Survey

Historically, federal safety regulations have not regulated pipelines operating at low stress in rural areas. Therefore, the extent of these types of pipelines is unclear due to a lack of available and consistent data. In order to address this data gap, PHMSA and the Volpe Center, surveyed low stress pipeline operators. Respondents to the survey included 115 regulated companies, which accounted for approximately 73 percent, or about 120,905 miles, of the nation's total regulated hazardous liquid pipeline mileage. In addition, eleven additional companies not on the list of filers in PHMSA's 2006 annual report responded and provided information. Exhibit 3-3 summarizes the results of the survey. In total, operators reported 1,233 miles of low stress pipeline. Nineteen companies operate these pipelines, with three companies operating 52 percent (645 miles) of the total low stress pipeline miles. Mileage responses for those operating low stress pipelines ranged from 1 mile to 242 miles.

Exhibit 3-3: Volpe Center Low stress Pipeline Survey Response Summary

Survey Variable	Reported Mileage (Rounded to Miles)	% of Total Rural LSP
Total number of miles of rural LSP (including interplant pipelines < 1 mile)	1,233	100
Number of interplant pipelines less than 1 mile in length	83	7
Number of miles with a nominal diameter of 8 ⅝ inches or greater	753	61
Number of miles of steel pipe pipeline	1,016	82
Number of miles of non-metallic pipe pipeline	1	0.08
Total number of miles of rural LSP operated within 1/2 mile of unusually sensitive area	228	18
Number of breakout tanks associated with total number of rural LSP reported	42	3

The Volpe Center report used the survey data to develop estimates of U.S. low stress mileage. Exhibit 3-4 summarizes these estimates. The shaded cells provide the results of each calculation and the cell below each shaded cell provides the details of the calculation. The U.S. total estimate of 1,575 miles begins with the total reported miles and subtracts interplant pipelines of less than one mile in length, as these

[13] U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration, "Pipeline Safety: Protecting Unusually Sensitive Areas from Rural Onshore Hazardous Liquid Gathering Lines and Low-Stress Pipelines," Regulatory Analysis For Final Rule, September 2007, Docket No. PHSMA-2003-15864.

pipelines are exempt from regulation. The remaining calculations expand the mileage to account for non-respondents. The Volpe Center estimates the miles of large diameter low stress pipeline within and outside ½ mile of USAs by applying the percentage of these pipes reported in the survey to the national mileage estimate of these types of pipelines. This estimation method is not performed for small diameter low stress pipelines because the Volpe Center assumes companies do not have USA-proximity data for those types of pipelines.

Exhibit 3-4: Volpe Center Low stress Pipeline Estimates Summary

Total US Mileage Estimate = 1,575 Miles
• 1,233 reported miles – 83 interplant = 1,150 miles • 1,150 miles/120,905 regulated miles of responders = 0.0095 • 165,624 total regulated miles – 120,905 regulated miles of responders = 44,719 miles • 44,719 miles * 0.0095 = 425 estimated additional LSP miles • 425 estimated additional miles + 1,150 known miles = 1,575 miles
Mileage 8 ⅝" Inches or Greater in Diameter = 1,040
• 754 of 1,150 miles, or 65.5 percent reported to have a diameter of 8 ⅝ inches or greater • 0.66 * 1,575 = 1,040
Mileage 8 ⅝" Inches or Greater in Diameter within ½ mile of an USA = 312
• 228 of the 754 miles with a diameter of 8 ⅝" inches or greater, or 30 percent, were within 1/2 mile of an USA • 0.30 * 1,040 = 312 • Companies are not expected to have USA-proximity data for its smaller diameter LSP

The survey results are subject to several uncertainties. First, 173 companies in the known population did not respond to the survey. It is unknown whether these non-respondents did not respond because they did not have any low stress mileage or whether they just chose not to respond. Operators with significant low stress mileage were more likely to respond and, therefore, there is potential response bias. Second, the data collection methodology may under-represent companies that operate unregulated lines exclusively, although the Volpe Center attempted to notify such companies and industry experts expect the number of operators to be small. Third, there appears to be a reasonable possibility that the classification of pipelines causes significant difficulty for operators to estimate pipeline mileage for specific subgroups.

Exhibit 3-5 provides mileage estimates by pipeline diameter and USA status based on the Volpe Center survey data. These estimates start with the total U.S. estimate of 1,575 low stress pipeline miles and the analysis distributes them by pipeline diameter and USA status based on the Volpe Center data. The results shown in bold text would be subject to the proposed Phase II regulation. The estimate of total affected miles is 1,384.3.

Exhibit 3-5: Pipeline Mileage Estimates by Diameter and USA Status

Pipeline Diameter	Percent by Diameter	Miles Inside USA	Miles Outside USA	Total
Percent Inside/Outside USA		18.5%	81.5%	100.0%
Less Than 8 5/8"	34.5%	**100.5**	**443.2**	543.7
Greater or Equal to 8 5/8"	65.5%	190.7	**840.6**	1,031.3
Total	100.0%	291.2	1,283.8	1,575.0
Bolded miles are subject to the Low-Stress Phase II proposed regulations =				**1,384.3**

Pipeline Mileage Estimates from Collected Annual Reports

PHMSA has collected and published annual records of the mileage of regulated pipelines since 1984. Pipeline operators are required to report the mileage of their regulated pipeline networks to PHSMA annually. PHMSA's decision to regulate low stress pipelines in two phases was due at least in part to a decision by the agency to immediately regulate large diameter pipe in the most environmentally sensitive areas while simultaneously collecting more data on other types of low stress pipelines. As a result, the

Phase I regulation included a revision of 49 CFR Part 195 adding 195.1 (a) (6), which required that low stress operators file annual accident and safety-related condition reports.[14] Consequently, 2008 marked the first year operators were required to report the mileage of low stress pipelines both unregulated and newly regulated.

The initial expectation after the introduction of the new reporting requirements was that the total mileage of low stress pipelines reported by operators would increase rather dramatically from 2007 to 2008 because of the new requirement in 195.1 (a) (6). However, this was not the case. Exhibit 3-6 summarizes the low stress pipeline mileage reported to PHMSA for 2007 and 2008. The increase was only about 319 miles. The initial conclusion was that operators misunderstood the new requirements. For example, one possibility is that operators thought they were not supposed to report these new mileages until the 2009 annual report. However, a more detailed examination of the data reveals that there was actually quite a large amount of newly reported low stress mileage. For all low stress pipeline miles including highly volatile liquids, 38 operators reported 1,565 less miles in 2008 than in 2007, 81 reported the exact same mileage and 35 reported 1,884 more miles in 2008. Therefore, it is possible that the new requirement caused some operators to report new mileage while other operators reexamined their segments and reclassified them as not low stress.

Exhibit 3-6: PHMSA Low Stress II Mileage Estimates for 2007 and 2008

	Number of Operators	2007 Miles	2008 Miles	Change +/-
Low-Stress Miles Not Including HVLs				
Operators Reporting Less Mileage in 2008	38	2,513	948	(1,565)
Operators Reporting Identical Mileage in 2007 and 2008	81	1,030	1,030	-
Operators Reporting More Mileage in 2008	35	955	2,838	1,884
Total	**154**	**4,498**	**4,817**	**319**
Low-Stress Miles Not Including HVLs (Similar Named Operators Combined)				
Operators Reporting Less Mileage in 2008	30	2,685	1,468	(1,217)
Operators Reporting Identical Mileage in 2007 and 2008	65	950	950	-
Operators Reporting More Mileage in 2008	23	864	2,400	1,536
Total	**118**	**4,498**	**4,817**	**319**

One possibility for the discrepancies was that operators may have switched assets from one subsidiary of a parent company to another or sold assets to other operators. To account for these possibilities, the analysis was amended to combine like name companies and to identify any potential transfers of assets.[15] The bottom half of the exhibit reports the data with similar named operators combined. Combining the operators reduces the number of operators reporting and the number of delisted and newly listed miles. However, there is still an unaccounted net increase of 319 miles and 23 operators reporting 1,536 new low stress miles.

One of the major limitations of the PHMSA mileage data is the inability to sort low stress pipeline mileage data by numerous attributes. While each operator reports low stress pipeline mileage and high consequence area mileage, data is not available on the extent to which the low stress pipeline miles are inside or outside a high consequence area. This is understandable given the additional reporting burden;

[14] See 49 CFR Part 195.1 (a) (6) that now states that "For purposes of the reporting requirements in subpart B, a rural low stress pipeline of any diameter." For the full text of 195.1, see Appendix A.

[15] For example, if a company reported a drop of 230 low stress miles, a search was made to determine if there was a corresponding 230 mile low stress increase.

however, the unavailability of mileage by detailed characteristics is a major obstacle in calculating incident frequencies.

National Pipeline Mapping System (NPMS) Mileage Data

The National Pipeline Mapping System (NPMS) data consists of gas transmission pipelines and hazardous liquid trunk lines. Prior to the Low-Stress I Rulemaking, the NPMS could not differentiate low stress mileage. Since PHMSA published the rule, the NPMS added a low stress field to the data.[16] If the hazardous "liquid low-stress pipeline has a nominal diameter of less than 8.625 inches, you don't need to submit" data to the NPMS.[17] However, based on a limited sampling of operators that submitted data to the Volpe survey, study staff formed a general impression that presently unregulated low stress pipelines have generally submitted such information to NPMS even though they are not required to do so. Exhibit 3-7 summarizes state-level data on low stress pipeline mileage excluding highly volatile liquid lines, pipelines within "highly populated areas" or "other populated areas," pipelines that are both greater than 8.625" diameter and within ½ mile of an USA, and offshore pipeline mileages either in state waters or OCS. In total, the NPMS reports 1,672.9 miles of pipelines, which were subject to the annual reporting required by the Phase I rule but were not subject to Part 195.

Exhibit 3-7: NPMS Low Stress Pipeline Mileage per State

State	Mileage	State	Mileage	State	Mileage	State	Mileage
AK	12.4	IL	56.8	MO	0.5	OH	201.9
Al	13.5	IN	9.8	MS	77.1	OK	38.5
AR	4.2	KS	24.0	MT	324.2	PA	1.2
AZ	1.6	KY	0.6	ND	0.6	TX	312.2
CA	43.4	LA	6.1	NJ	0.5	VA	0.2
CO	9.5	MD	0.1	NM	41.5	WA	3.1
CT	0.2	MI	7.9	NV	1.0	WV	7.7
FL	3.8	MN	0.9	NY	0.1	WY	432.7
GA	10.0					Total	1672.9

Summary and Conclusion

This section has reviewed four sources of data that provide varying levels of detail, information and data on low stress pipeline mileages. Each source of data has limitations. This may be partially because this is the first time PHMSA asked operators to report mileage information for these unregulated pipeline segments. For example, PHMSA collected the Volpe Center survey data on a one-time voluntary basis. Both the PHMSA Annual Report and NPMS data collected data on these segments for the first time. In fact, detailed examination of some of the mileages reported by individual operators has raised questions as to their accuracy. It appears that some operators have difficulty identifying unregulated non-HVL low stress pipelines. However, this analysis has not removed any questionable mileage from the estimates, as it might create a downward bias.

In analyzing the data, the first step was to examine the overall level of mileages eligible for Phase II low stress pipelines. There was a consensus among three of the four data sources that the mileage was somewhere in the range of 1,500 miles. For example, the Volpe Center estimates 1,575 miles, including miles subject to Phase I and excluding intra-plant miles. This estimate drops to 1,384.3 with miles

[16] Email correspondence from NPMS staff received Thursday, October 29, 2009 at 10:27 AM.
[17] Email correspondence from Amy Nelson, GIS Manager of the Program Development of PHMSA on Wednesday, October 28, 2009 at 10:37 AM.

subject to Phase I excluded. The NPMS reports 1672.9 miles, excluding intra-plant and low stress lines regulated in Phase I. The PHMSA annual report database includes 1,536 newly reported low stress pipeline miles. The top-down estimates included in the Phase I Regulatory Analysis appears to have been a high-end estimate of low stress pipeline mileage at 5,624 miles. Thus, the remainder of this regulatory analysis relies on this consensus of the other three data sources.

Since the Volpe Center data includes a variety of other information used in this analysis including characteristics of the reported mileage, this regulatory analysis relies on that data source for Phase II LSP mileage estimates. This analysis assumes the miles subject to the proposed regulation are as follows (as shown in Exhibit 3-5):

- Pipe of less than 8 ⅝ inch nominal diameter within ½ mile of an USA = 100.5 miles
- Pipe of less than 8 ⅝ inch nominal diameter outside ½ mile of an USA = 443.2 miles
- Pipe of greater than or equal to 8 ⅝ inch nominal diameter outside ½ mile of an USA = 840.6 miles

3.2 Compliance Costs

The evaluation of the Phase II rulemaking includes estimates of the costs associated with the new procedures, technologies, and other requirements of the proposed rulemaking. To determine these compliance cost factors, the following research and analysis was made:

- A summary of compliance cost categories, data sources, and resulting estimates published in the Regulatory Analysis for the Low-Stress I Final Rule
- An analysis of a recent Volpe Center survey that solicited input on Phase II compliance costs from major pipeline operators
- An independent engineering assessment of Phase II compliance costs

The remainder of this section presents a brief summary of the key results and findings of each activity.

Phase I Rulemaking Estimates of Compliance Costs

The study team examined previous PHMSA rulemaking and regulatory evaluations to collect data and develop a methodology to calculate compliance costs. Exhibit 3-8 below identifies the compliance cost categories and resulting estimates developed by PHMSA under the Phase I rulemaking published in September 2007.[18] PHMSA developed these estimates using information submitted by pipeline operators and industry associations.

[18] Docket No. RSPA-2003-15864

Exhibit 3-8: Summary of Phase I Compliance Costs

Cost Component	Unit Cost per Mile		Additional Costs (In thousands of dollars)		
	Initial Costs	Recurring Costs	Year 1	Years 2 through 6	Years 7 and on
Proximity to a USA	$105	$0	$135	$0	$0
Corrosion Control	$15,022	$393	$2,824	$74	$74
Line Markers	$514	$134	$66	$17	$17
Damage Prevention	$226*	$226	$73*	$73	$73
Public Education	$173*	$173	$222*	$222	$222
MOP	NA	Negligible	$0	$0	$0
Reporting	NA	Negligible	$0	$0	$0
Pipeline Design, Construction, and Testing	$0	$0	$0	$0	$0
Drug and Alcohol Testing	$0	Negligible	$0	$0	$0
Operator Qualification	Negligible	Negligible	$0	$0	$0
Integrity Assessment Program	Various*†	Various††	$1,554*	$1,554**	$441
Leak Detection Program	$0	$0	$0	$0	$0
Total			**$4,874**	**$1,940**	**$827**

Notes: NA = Not applicable
* = Recurring costs will be incurred in the initial year, as well as in all subsequent years.
** = Initial costs will be incurred in the second through sixth years, as well as in the initial year.
† = $0 for operators choosing direct assessment, $19,535 for operators choosing in-line inspection.
†† = $4,649 for operators choosing direct assessment, $3,084 for operators choosing in-line inspection.

The strength of this data is that it was collected by subpart of the regulation and includes initial and recurring costs. However, it was collected in 2003 and largely represents cost estimates submitted by one company for gas pipelines. The association that originally provided the data did not have any more up-to-date or complete estimates. In addition, this Phase I data was not available by pipe diameter.

Volpe Center Survey Estimates of Phase II Compliance Costs

In July 2008, the Volpe Center, under a contract (form approval OMB No. 21370623) with PHMSA's Office of Pipeline Safety (OPS), transmitted a request to operators of low stress pipelines to complete a voluntary survey. The survey solicited information on pipeline mileages by state and by diameter, along with products transported, pipe material, and breakout tank information. The Volpe Center also conducted a follow up survey in March of 2009 that collected information on estimated compliance costs to comply with Part 195 for the top nine operators in terms of mileage. Of the nine survey responses collected, only four were usable for the purposes of this analysis due to partially missing data in some entries. Exhibit 3-9 below summarizes the four usable responses.

Exhibit 3-9: Summary of the Volpe Center Survey Compliance Costs per Pipeline Mile (Dollars)

Cost Component	MarkWest	Plains All American Pipeline	Marathon	ConocoPhillips
Markers	$300	$125	NA	$2,000
Public Education	$500	$25	$113	$73
Damage Prevention	$600	$33	$887	$50
Cathodic Protection	$800	$10,000	$1,132	$6,400
Integrity Management Program	$1,000	$29,000	$18,000	NA
Total	$3,200	$39,183	$20,132	$8,523

The strength of this data is that it reports current costs for actual current operators of unregulated low stress hazardous liquid pipelines. Data are available for the major parts and subparts of the proposed rulemaking. However, the data are not separated between initial and recurring costs, which make them difficult to interpret. With only four relevant responses it is difficult to separately estimate costs by pipe diameter and by segment of inside versus outside ½ mile of USAs.

Independent Engineering Estimates of Compliance Costs

As part of this regulatory analysis, an independent engineering assessment was performed to estimate the compliance costs faced by affected pipeline operators. The assessment included a thorough review of the technical requirements and costs to comply with Part 195. In addition, the assessment included a review of the Volpe Center survey results to verify and collect additional detail on the incremental Phase II regulatory cost impact on pipeline operators, including a breakdown of initial and recurring costs. The study team analyzed the data and contacted many of the respondents to clarify and verify their submissions to the Volpe Center and to collect additional cost data. The operators targeted for this follow-up survey are identified in Exhibit 3-10 and the information they disclosed is provided.

Exhibit 3-10: Pipeline Operators Contacted and Survey Results

Company	Survey Result
Praxair, Inc.	Praxair did not respond to follow-up. Excluded from analysis due to potential non low stress pipe for CO2 commodity.
BMC Holdings, Inc.	Excluded from rulemaking analysis due to finding that the line is permitted as non-rural with the Texas Railroad Construction Commission.
ExxonMobil US Production, a division of Exxon Mobil Corporation	Contacted operator. Used internal data for cost estimating purposes upon agreement with operator since operator did not have such data.
ConocoPhillips Alaska, Inc.	Contacted operator and confirmed Volpe Center survey information.
Montana Refining Company, Inc.	Not applicable to Phase II based upon review of Volpe Center data submittal.
Shell Pipeline Company, LP	Not applicable to Phase II based upon review of Volpe Center data submittal.
DCP Midstream	Reviewed data, website of operations and contacted DCP. Based upon data review, concluded that reported mileage is already regulated or excluded. Would not be subject to Phase II. DCP Midstream concurred.
Holly Energy Partners	Reviewed website of operations and Volpe Center survey data. Contacted operator and confirmed corrected mileage data based upon review of operator data. No cost impact.
ConocoPhillips Pipe Line	Unable to contact operator. Possible reorganization. Used information based upon Volpe Center survey and internal cost estimate factors for compliance.
Oiltanking Houston L.P.	Excluded from analysis because mileage was less than threshold for applicability of potential rulemaking. Confirmed by review of 2008 annual report. Reviewed Texas Railroad Construction Commission permit records. Permitted as non-rural.
BP	Contacted operator. Operator reanalyzed mileage data and concluded that potential Phase II regulations would have little cost impact. Only total mileage was given, so segment mileage assumptions are made on additional data.
Marathon Pipe Line LLC	Contacted operator. Operator unable to provide more detailed information on potential cost impact. Used internal cost factors. Only total mileage was given, so segment mileage assumptions are made on additional data.
Sunoco Pipeline LP	Contacted operator. Potential Phase II regulated mileage reduced from Volpe Center survey. Used cost data in absence of operator cost data with operator concurrence. Operator is reevaluating information. Only total mileage was given, so segment mileage assumptions are made on additional data.
ExxonMobil Pipeline Company	Contacted pipeline public information personnel per PHMSA website. Received phone call. Would have to refer request to others. Excluded mileage as Not-Applicable" due to review of Volpe Center data pending response. No call-back was received.
Mobil Pipe Line Company	Contacted pipeline public information official per PHMSA website. Received phone call. Would have to refer request to others. Excluded mileage as Not-Applicable" due to review of Volpe Center data pending response. No call-back was received.
Plains All American Pipeline, L.P.	Contacted operator. Operator had slightly revised mileage based upon further analysis. Revised cost impact based upon internal cost estimate factors and revised operator data.
McCain Pipeline Company	Contacted operator. Discussed potential cost impact. Agreed to use internal cost factors. Factors in agreement with operator's experience for such activities.
MarkWest Michigan Pipeline L.L.C.	Used conclusions for revised mileage and cost based upon e-mail from PHMSA official Lane Miller.
Westlake Petrochemicals	Reviewed website and annual report regarding operations. Contacted operator. Reviewed potentially mileage and pipelines with operator. Updated mileage. Discussed potential cost impacts due to regulation. Used internal estimates.
Chevron Pipe Line Company	Contacted operator. Mileage is best estimate at this time. Cost impact subject to operator review of records when rulemaking is known due to other priorities. Operator complies with Part 195.

In total, 20 pipeline operators were contacted. Twelve of the operators that responded to the survey had low stress pipelines that could be subject to the Phase II rulemaking and provided cost information. Exhibit 3-11 provides the detailed costs reported by these 12 pipeline operators. The strength of this data is the coverage of a sample of pipeline operators with detail by subpart of the regulation. Organizing the pipeline operators by the diameter and location of their pipelines allows development of costs for the different parts of the unregulated population of pipelines. In total, these data represent approximately half of the estimated mileage of unregulated low stress pipelines.

Exhibit 3-11: Reported Phase II Pipeline Mileages & Compliance Costs By Pipeline Operator

Operator Name	Compliance with Part 195: Percent Substantially in Compliance	Percent Out of Compliance	Phase II Mileage: Total	≥ 8⅝" non-USA	< 8⅝" non-USA	Initial Cost by Subpart: Subpart A	Subpart B	Subpart F	Subpart G	Subpart H	Part 195 Data & Records	Total Initial $ Cost	Initial $ Cost per Mile	Total Recurring Costs: Every Year	Every 5 Year	Recurring Costs Description	Recurring Costs (per mile): Every Year	Every 5 Years
Data by Individual Operator																		
Praxair, Inc.			0	0	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -		$ -	$ -			
BMC Holding, Inc.			0	0	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -		$ -	$ -			
ExxonMobil US Production	100%		2.7	0	2.7	$ 137,000	$ -	$ 27,000	$ -	$ 15,000	$ -	$ 179,000		$ 2,000	$ -	100% Subpart F – IMP		
ConocoPhillips Alaska, Inc.	100%		32.8	32.8	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -		$ -	$ -			
Montana Refining Company, Inc.			0	0	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -		$ -	$ -			
Shell Pipeline Company, LP			0	0	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -		$ -	$ -			
DCP Midstream			0	0	0	$ -	$ -	$ -	$ -	$ -	$ -	$ -		$ -	$ -			
Holly Energy Partners	100%		30.3	0	18.8	11.5 $ -	$ -	$ -	$ -	$ -	$ -	$ -		$ -	$ -			
ConocoPhillips Pipe Line	100%		24.0	0	24.0	0 $ 5,000	$ -	$ -	$ 10,000	$ -	$ -	$ 15,000		$ 3,000	$ -	100% Subpart G		
Oiltanking Houston L.P.			0	0	0	0 $ -	$ -	$ -	$ -	$ -	$ -	$ -		$ -	$ -			
BP*	100%		2.8	0.9	0.9	0.9 $ -	$ -	$ -	$ -	$ -	$ -	$ -		$ -	$ -			
Marathon Pipe Line LLC*		100%	82.9	78.6	4.4	0.0 $ 5,000	$ -	$ 640,000	$ -	$ -	$ -	$ 645,000		$ -	$ 268,000	100% Subpart F – IMP		
Sunoco Pipeline LP*		100%	45.0	15.0	15	15 $ -	$ -	$ 500,000	$ -	$ -	$ -	$ 500,000		$ -	$ 500,000	100% Subpart F – IMP		
ExxonMobil Pipeline Company			0	0	0	0 $ -	$ -	$ -	$ -	$ -	$ -	$ -		$ -	$ -			
Mobil Pipe Line Company			0	0	0	0 $ -	$ -	$ -	$ -	$ -	$ -	$ -		$ -	$ -			
Plains All American Pipeline, L.P.		100%	178.7	0.0	178.7	0 $ 5,000	$ -	$ 143,000	$ -	$ 13,484,100	$ -	$ 13,632,100		$ 564,500	$ 5,691,200	$268,000 – Subpart A per year $140,000 – Subpart F per year $156,500 – Subpart H per year $5,691,200 – Subpart H every 5 years		
McCain Pipeline Company		100%	4.0	4.0	0	0 $ 335,000	$ -	$ 125,000	$ -	$ 15,000	$ -	$ 475,000		$ -	$ 100,000	100% Subpart F – IMP		
MarkWest Michigan Pipeline L.L.C.	100%		100.0	0	100.0	0 $ -	$ -	$ -	$ -	$ -	$ -	$ -		$ -	$ -			
Westlake Petrochemicals		100%	6.3	4.0	2.3	0 $ 5,000	$ -	$ 106,500	$ -	$ 10,000	$ -	$ 121,500		$ -	$ 100,000	100% Subpart F – IMP		
Chevron Pipe Line Company	100%		37.0	0	37.0	0 $ -	$ -	$ -	$ -	$ -	$ -	$ -		$ -	$ -			
Totals for Regulatory Subgroups																		
Total < 8,5/8 " USA	0.25	0.75		135.2									$ 1,728,651	$ 12,781	$ -	$ 968,000		$ -	$ 7,157
Total ≥ 8,5/8 " non USA	0.47	0.53			381.0								$ 13,659,949	$ 35,852	$ 567,500	$ 6,258,700		$ 1,489	$ 16,427
Total < 8,5/8 " non USA	0.49	0.51				30.1							$ 179,000	$ 5,941	$ 2,000	$ 2,000		$ 66	$ 66
All Miles	0.42	0.58	546.4																

* These operators only inidicated total low stress mileage. Mileage segments for these companies are assumptions based on additional data.

The top section of Exhibit 3-11 provides data by individual operator. The first column in this section provides the operator name, followed by two columns which describe the pipeline in terms of whether it is substantially in compliance or out of compliance. The next four columns provide mileages subject to Phase II – both totals and mileages by diameter and USA status. The remaining columns provide data on costs, starting with initial costs and initial costs per mile, followed by recurring costs and recurring costs per mile.

The second section of Exhibit 3-11 summarizes the data by regulatory subgroup, which is defined by diameter and USA status. These data are simply summations of the data based on each pipelines regulatory status. For example, there are 135.2 miles of small diameter pipe inside USA. This includes the mileage of Conoco Phillips Alaska, Inc., most of the mileage of Marathon Pipeline LCC, a third of the mileage of Sunoco Phillips, the mileage of McCain Pipeline Company and 4 miles of Westlake Petrochemicals. The costs for each regulatory subgroup is provided to the right of listed mileages, in categories of total initial cost, initial cost per mile, total recurring costs and recurring costs per mile. For example, the total initial cost of low stress pipeline less than 8, 5/8" and within ½ mile of an USA is $1,728,651. However, this is not a simple summation of total initial costs of individual pipeline operators in the applicable column cells above, because some operators have mileage in multiple regulatory subgroups. Westlake Petrochemicals has 4.0 miles of less than 8, 5/8" and within ½ mile of an USA pipe and 2.3 miles of greater than 8, 5/8" and outside ½ mile of an USA pipe. The total initial cost of Westlake Petrochemicals for the regulatory subgroup less than 8, 5/8" and within ½ mile of an USA is calculated as follows: ($5,000 + $6,500 + $10,000)*(4.0/6.3) + $100,000 = $113,651. Westlake Petrochemical's Subpart A cost is $5,000, Subpart F cost not related to IMP is $6,500, and Subpart H cost is $10,000. These costs are added and weighted by the respective mileage. The IMP cost of $100,000 is added but not weighted because IMP costs only apply to this regulatory subgroup (pipeline less than 8, 5/8" and within ½ mile of an USA). This method of weighting Subpart costs for mileages and adding or excluding IMP costs was repeated for each operator to determine the total initial and recurring costs for each regulatory subgroup.

The per mile initial and recurring costs is a simple division of total initial and recurring costs by the collected regulatory subgroup mileages. For example, the total every year recurring cost for the regulatory subgroup of pipeline greater than 8 and 5/8" and outside ½ mile of an USA is $567,500. The total sample mileage for this subgroup is 381.0 miles. Therefore, the per mile every year recurring cost for the regulatory subgroup of pipeline greater than 8 and \z5/8" and outside ½ mile of an USA is $1,489 ($567,500/381.0).

Summary of Compliance Costs

The most accurate and up-to-date estimation of Phase II compliance costs comes from the independent engineering analysis as shown in Exhibit 3-11. These figures were derived largely from follow-up with pipeline operators and analysis of the Volpe Center survey. Of the 20 pipeline operators contacted, it was determined that at least 12 had applicable pipelines and compliance costs related to the Phase II rulemaking. Of these 12 pipeline operators, seven had small or no compliance costs: Exxon Mobile US, Conoco Phillips Alaska, Holly Energy Partners, Conoco Phillips Pipeline, BP, and Mark West Michigan. The remaining five operates had relatively large compliance costs: Marathon Pipeline, Sunoco Pipeline, Plains All American Pipeline, McCain Pipeline, and Westlake Petrochemicals. This finding is important for the benefit calculations in the next chapter, as separate benefit estimates are made for bringing a pipeline almost in compliance into full compliance and bringing a pipeline largely out of compliance into full compliance.

Exhibit 3-12 summarizes the initial and recurring costs by each alternative on a per mile basis. The initial and recurring per mile costs for Alternative 1 are a mileage weighted summation of per mile costs for

Alternatives 2, 3 and 4.[19] The initial and recurring costs for Alternatives 2, 3 and 4 come directly from Exhibit 3-11. Alternatives 5 and 6 are calculated as a mileage weighted summation of Alternatives 2, 3 and 4 without the costs of Subpart H and the IMP.

Exhibit 3-12: Per Mile Compliance Costs by Alternative

Alternative	Initial Cost (per mile)	Recurring Cost (per mile) Every Year	Every 5 Year
1. All low stress	$ 24,601	$ 926	$ 10,516
2. Small diameter inside ½ mile of USA	$ 12,781	$ -	$ 7,157
3. Large diameter outside ½ mile of USA	$ 35,852	$ 1,489	$ 16,427
4. Small diameter outside ½ mile of USA	$ 5,941	$ 66	$ 66
5. All except Subpart H	$ 2,922	$ 676	$ 1,196
6. All except the IMP	$ 23,873	$ 926	$ 9,996

To derive total costs, the per mile costs in Exhibit 3-12 are multiplied by the estimated mileages (in bold) in Exhibit 3-5. These mileages, again, are: Alternative 1 – 1,384.3, Alternative 2 – 100.5, Alternative 3 – 840.6, Alternative 4 – 443.2, Alternative 5 – 1,384.3, and Alternative 6 – 1,384.3 In order to be meaningful, a benefit-cost analysis must not only express all benefits and costs in monetary terms, it must also account for the change in the value of the dollar over time. Exhibit 3-13 provides tables deriving the 30 year total present value costs for each alternative. The interest rate used to discount future cost outlays in this analysis is 2.7 percent. The real discount rate was taken from a memorandum by the Executive Office of the President updating Appendix C of the OMB's Circular No. A-94 (Revised December 2008) entitled "Discount Rates for Cost-Effectiveness, Lease Purchase, and Related Analyses.[20]

The estimated total 30 year present value compliance costs for each alternative in millions of dollars are provided in bold at the bottom of each table. The first column provides the year, the second column provides the nominal per mile compliance cost for each year (all provided in Exhibit 3-12) and the third column provides the present value per mile compliance cost for each year when an annual discount rate of 2.7 is applied.

[19] For example, the initial per mile cost of Alternative 1 is calculated as $12,781*(100.5/1,384.3) + $25,852*(840.6/1,384.3) + $5,941*(443.2/1,384.3) = $24,601.

[20] Memorandum from Executive Office of the President, Office of Management and Budget. "Discount Rates for OMB Circular No. A-94. December 12, 2008.
http://www.whitehouse.gov/omb/assets/omb/memoranda/fy2009/m09-07.pdf

Exhibit 3-13: 30 Year Present Value Cost Tables by Alternative

Alternative 1

Year	Per Year Per Mile Cost	Per Year Per Mile PV
1	24,601	24,601
2	926	901
3	926	878
4	926	855
5	926	832
6	10,516	9,204
7	926	789
8	926	768
9	926	748
10	926	728
11	10,516	8,056
12	926	691
13	926	672
14	926	655
15	926	638
16	10,516	7,052
17	926	604
18	926	589
19	926	573
20	926	558
21	10,516	6,172
22	926	529
23	926	515
24	926	502
25	926	488
26	10,516	5,402
27	926	463
28	926	451
29	926	439
30	926	427
Per Mile 30 Year PV		75,781
Eligible Mileage		1384.3
Total 30 Year PV Cost (In Millions)		**104.9**

Alternative 2

Year	Per Year Per Mile Cost	Per Year Per Mile PV
1	12,781	12,781
2	-	-
3	-	-
4	-	-
5	-	-
6	7,157	6,265
7	-	-
8	-	-
9	-	-
10	-	-
11	7,157	5,483
12	-	-
13	-	-
14	-	-
15	-	-
16	7,157	4,799
17	-	-
18	-	-
19	-	-
20	-	-
21	7,157	4,201
22	-	-
23	-	-
24	-	-
25	-	-
26	7,157	3,677
27	-	-
28	-	-
29	-	-
30	-	-
Per Mile 30 Year PV		37,206
Eligible Mileage		100.5
Total 30 Year PV Cost (In Millions)		**3.7**

Alternative 3

Year	Per Year Per Mile Cost	Per Year Per Mile PV
1	35,852	35,852
2	1,489	1,450
3	1,489	1,412
4	1,489	1,375
5	1,489	1,339
6	16,427	14,378
7	1,489	1,269
8	1,489	1,236
9	1,489	1,204
10	1,489	1,172
11	16,427	12,585
12	1,489	1,111
13	1,489	1,082
14	1,489	1,053
15	1,489	1,026
16	16,427	11,015
17	1,489	973
18	1,489	947
19	1,489	922
20	1,489	898
21	16,427	9,641
22	1,489	851
23	1,489	829
24	1,489	807
25	1,489	786
26	16,427	8,439
27	1,489	745
28	1,489	725
29	1,489	706
30	1,489	688
Per Mile 30 Year PV		116,517
Eligible Mileage		840.6
Total 30 Year PV Cost (In Millions)		**97.9**

Alternative 4

Year	Per Year Per Mile Cost	Per Year Per Mile PV
1	5,941	5,941
2	66	65
3	66	63
4	66	61
5	66	60
6	66	58
7	66	57
8	66	55
9	66	54
10	66	52
11	66	51
12	66	50
13	66	48
14	66	47
15	66	46
16	66	45
17	66	43
18	66	42
19	66	41
20	66	40
21	66	39
22	66	38
23	66	37
24	66	36
25	66	35
26	66	34
27	66	33
28	66	32
29	66	31
30	66	31
Per Mile 30 Year PV		7,264
Eligible Mileage		443.2
Total 30 Year PV Cost (In Millions)		**3.2**

Alternative 5

Year	Per Year Per Mile Cost	Per Year Per Mile PV
1	2,922	2,922
2	676	659
3	676	641
4	676	624
5	676	608
6	1,196	1,047
7	676	576
8	676	561
9	676	546
10	676	532
11	1,196	916
12	676	504
13	676	491
14	676	478
15	676	466
16	1,196	802
17	676	442
18	676	430
19	676	419
20	676	408
21	1,196	702
22	676	387
23	676	376
24	676	366
25	676	357
26	1,196	614
27	676	338
28	676	329
29	676	321
30	676	312
Per Mile 30 Year PV		18,175
Eligible Mileage		1,384.3
Total 30 Year PV Cost (In Millions)		**25.2**

Alternative 6

Year	Per Year Per Mile Cost	Per Year Per Mile PV
1	23,873	23,873
2	926	901
3	926	878
4	926	855
5	926	832
6	9,996	8,749
7	926	789
8	926	768
9	926	748
10	926	728
11	9,996	7,658
12	926	691
13	926	672
14	926	655
15	926	638
16	9,996	6,703
17	926	604
18	926	589
19	926	573
20	926	558
21	9,996	5,867
22	926	529
23	926	515
24	926	502
25	926	488
26	9,996	5,135
27	926	463
28	926	451
29	926	439
30	926	427
Per Mile 30 Year PV		73,280
Eligible Mileage		1,384
Total 30 Year PV Cost (In Millions)		**101.4**

3.3 Traditional Benefits

Introduction

PHMSA expects the proposed rulemaking to reduce the number of incidents and the incident costs and consequences. Data on incident costs, which PHMSA traditionally collects, include property damage, product loss, environmental damage, and environmental spill cleanup activities. The ability of the proposed rulemaking to reduce or avoid these costs are considered to be the primary benefit of the rulemaking and are referred to as traditional benefits. Data on incident costs for low stress pipelines are generally not available by virtue of the fact that PHMSA has not regulated these pipelines in the past. Moreover, the reduction in costs that the rulemaking would cause is also unknown. Therefore, as part of this regulatory analysis, several data sources and approaches are examined in order to evaluate the potential avoided costs. These approaches include:

1. Utilization of data from the 1990 ANPRM / Low-stress Phase I
2. Compilation of PHMSA's 7000-1 data for low stress pipelines
3. Collection of data from individual states
4. Time series trend-line analysis

An examination of the costs and current levels of compliance for individual pipelines, as discussed in Section 3.2, revealed that pipelines fell into two distinct subgroups. The first group of pipelines was generally in compliance with the regulations and faced small costs in order to comply with the proposed rulemaking. The second group of pipelines did not currently comply with the rulemaking and faced significant costs in order to comply with the proposed rulemaking. With this in mind, it is important to estimate the benefits for bringing a pipeline that is substantially in compliance into full compliance and bringing a pipeline that is substantially out of compliance into full compliance. The following paragraphs summarize the methodology of each benefit estimation approach and present the resulting analysis.

Data from the 1990 ANPRM / Low Stress Phase I

PHMSA based the estimation of benefits in the low stress Phase I Regulatory Analysis on data originally collected for the 1990 Advance Notice of Proposed Rulemaking (ANPRM). The 1990 ANPRM collected data from pipeline companies on incident costs for regulated and unregulated pipelines. In 1992, the Volpe Center conducted an economic evaluation using the 1990 ANPRM data.[21] The Volpe Center concluded that it was cost beneficial to bring low stress pipelines into compliance with Part 195. In the 2007 Phase I Regulatory Analysis, the benefits from implementing Phase I were determined by updating the results presented in the 1992 Economic Evaluation for inflation.[22] Following the method and data sources used in the Phase I Regulatory Analysis, the study team has developed estimates for 2009. Exhibit 3-14 compares the regulated and unregulated cost and resulting benefit for each year, including the 1992 Economic Evaluation, the 2007 Phase I Regulatory Analysis, and this 2009 Phase II regulatory analysis. It also includes the GDP deflators used to calculate the inflation-updated cost estimates.

[21] "Economic Evaluation of Regulating Certain Hazardous Pipelines Operating at 20% or Less of Specified Minimum Yield Strength," Volpe National Transportation Systems Center, 1992.

[22] These figures were updated for inflation (to 2005 dollars) using the Implicit Price Deflators for Gross Domestic Product. For a recent compilation of these data see "Table 1.1.9. Implicit Price Deflators for Gross Domestic Product." Bureau of Economic Analysis, September 30, 2009.

Exhibit 3-14: Comparison of Estimates

Type of Estimate	1992 Economic Evaluation	2007 Phase I	2009 Phase II
GDP Deflator	74.76	100.00	108.48
Cost per mile per year **not in** compliance	$3,692	$4,969	$5,391
Cost per mile per year **in** compliance	$105	$141	$153
Benefit per mile per year	$3,587	$4,828	$5,238

This method provides a good attempt to estimate the benefits from bringing a fully unregulated line into full compliance. However, the data collected for the ANPRM are dated. Over the past twenty years, there have been significant improvements in general pipeline operation and cleanup methods have changed. Solely updating the ANPRM results for inflation will likely understate the benefits from regulation.

Compile PHMSA's 7000-1 Incident Data for Low Stress Pipelines

Description of the 7000-1 Accident Report Database

This section presents an analysis of ***PHMSA's F 7000-1 (1-2001; Accident Report Form)*** database. The database collects information on every incident on low stress pipelines, including information on location, cause, and consequence. Operators fill out either a one page (short-form) or four-page (long-form) accident report, depending on the severity of the incident. For breadth of information, the analysis often can only include incidents reported on the long form. For consistency in reporting across years, and to reflect current practices, the analysis only covers incidents from 2002 to 2008.

According to the data, from 2002 to 2008 there were 2,887 pipeline incidents, of which 1,368 were long-form filings. Excluding 255 offshore and/or highly volatile liquid incidents (not encompassed by the rulemaking), there are 1,113 onshore, non-highly volatile liquid incidents, long form incidents to be evaluated.

There is no specified field in the 7000-1accident report form for percent SMYS, and thus no way to directly assign incidents by stress level. Instead, Exhibit 3-15 provides a proxy developed during Phase I research.[23]

Exhibit 3-15: Percent SMYS Formula

$$PercentSMYS = \frac{InternalDesignpressure * Diameter}{2 * SMYS * Wallthickness}$$

With the use of this proxy formula and data items from the long form, the analysis can accurately classify 473 of the 1,113 onshore, non-HVL incidents by percent SMYS. Of these incidents, 117 (25%) were identified as low stress while 356 (75%) were identified as not low stress. The analysis uses these incidents for all analyses that incorporate percent SMYS. For any analysis that does not incorporate percent SMYS, the 1,113 onshore, non-HVL incidents are used.

[23] This methodology was developed and approved by PHMSA technical staff Dewitt Bordeaux of the Training and Qualifications Division and Piyali Talukdar of the Program Development Division. Acknowledgment and further explanation of proxy cited in email correspondence on 9/25/09.

Issue with the 7000-1.1 Annual Report Database on Miles

PHMSA's 7000-1.1 Hazardous Liquid Annual Report, which is different from the 7000-1 Accident Report, lists pipeline mileage by various categories. Unfortunately, the data is marginally distributed and not contingently distributed. For example, it is possible to tell how many miles of small diameter pipe exist and how many miles of inside high consequence areas exist, but it is not possible to tell how many miles of small diameter pipeline inside high consequence area pipe exist. This is not a problem for the Accident Report incident database – it is possible to tell if an incident was a small diameter pipeline inside high consequence area incident. However, because the miles data cannot be distributed this way, the analysis cannot convert all cost estimates to a per mile basis. For example, the analysis cannot calculate the per-mile cost of small diameter low stress pipeline incidents within high consequence areas.

Analysis of the Databases

Two analyses conducted using the PHMSA 7000-1 Accident Report database follow. Analysis I is a general analysis of incident statistics. It is assumed that operators do not report unregulated incidents, and it is, therefore, an analysis of regulated incidents. Analysis II uses the cost per mile figure of current regulated low stress pipeline incidents determined in Analysis I to update the estimates made in Phase I (inflation updates) for changes in methods, operation, and pipeline practices.

Analysis I: General Statistics

Over the seven-year period from 2002 to 2008, the average annual incident cost per mile is almost $300 higher for low stress pipeline incidents than for other types of pipeline. The average annual cost per mile for low stress pipeline incidents is $615, and the average annual cost per mile for other type of pipeline incidents is $330. These figures were determined as follows. The total incident cost for low stress pipeline incidents over the entire period 2002 to 2008 is $20,749,392. The respective miles of low stress pipeline, as determined in the 7000-1.1 Annual Report for 2008, is 4,817. Dividing the total low stress pipeline cost figure by the miles gives a total per mile cost for low stress pipeline incidents of $4,308. Dividing $4,308 by seven (2002 to 2008) gives an average annual per mile cost of low stress pipeline incidents of $615. The respective figures for other types of pipeline incidents are: total incident cost - $245,122,197; 2008 Annual Report miles – 106,116; over seven years, average annual per mile cost is $330.

The average annual number of incidents per thousand miles is approximately seven times greater for low stress pipelines than non-low stress pipelines (note the denominator here is 4,817 for low stress incidents and 106,116 for non-low stress incidents). On a per incident basis, non-low stress pipeline incidents are more costly, as outlying incidents with atypically high costs tend to occur at higher percent SMYS. An examination of low stress pipeline incidents by cause shows that corrosion is by far the leading cause of incidents (61 of 117).

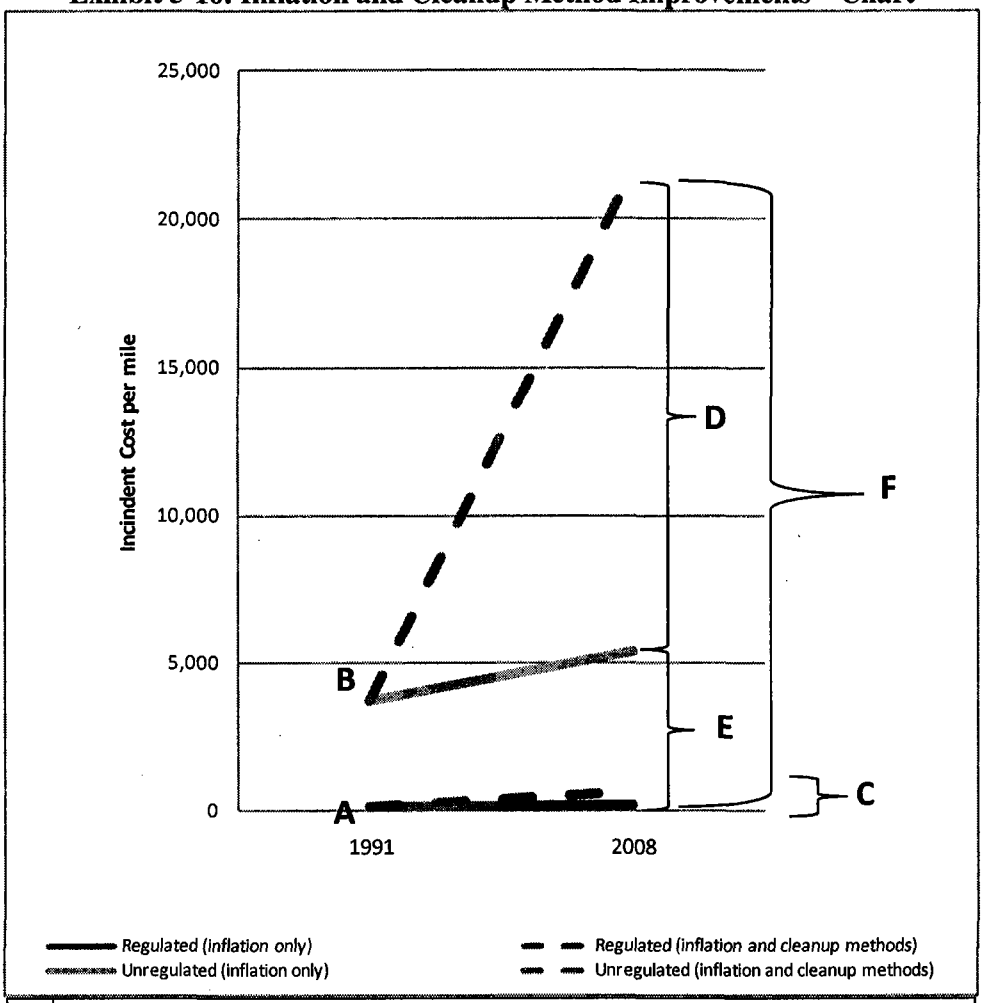
Analysis II: Combination of ANPRM and 7000-1

A primary limitation of the ANPRM method described in the "Data from the 1990 ANPRM / Low stress Phase I" section above, is that the data is twenty years old. Updating the cost estimates from the ANPRM will not encompass all the changes that have occurred since that time in pipeline systems – environmental remediation techniques and the regulatory environment have changed significantly. The following analysis compares the per mile costs for currently regulated lines – $615, as derived from the PHMSA 7000-1 Accident Report database and stated in Analysis I in the section above – to the Phase I inflation-updated costs for ANPRM regulated lines – $153. The difference in the figures, $462 (Gap C in Exhibit 3-16), provides an estimate of the increases in costs beyond inflation.

Expressed as a factor, the $615 current incident cost is 4.02 times above the $153 inflation-updated incident cost. Applying this factor to the ANPRM inflation-updated unregulated cost per mile creates an estimate for current unregulated costs. The application of this factor to the Phase II inflation-updated cost per mile of unregulated low stress pipelines, $5,391 in Exhibit 3-17, results in total unregulated incident cost of $21,670 ($5,391 x 4.02, also provided in Exhibit 3-17). Graphically, the difference in inflation-updated unregulated cost and inflation and methods-updated unregulated cost is provided by Gap D in Exhibit 3-16.

The benefit when only updating for inflation is represented by Gap E in Exhibit 3-16, or $5,238 in Exhibit 3-17. The benefit when updating for inflation and for changes in cleanup practices is represented by Gap F in Exhibit 3-16, or $21,055 in Exhibit 3-17.

Exhibit 3-16: Inflation and Cleanup Method Improvements – Chart



A	Regulated incident cost in 1991 (ANPRM)
B	Unregulated incident cost in 1991 (ANPRM)
C	Additional regulated incident cost due to improved cleanup methods
D	Additional unregulated incident cost due to improved cleanup methods
E	Benefit from regulation (updating for inflation only)
F	Benefit from regulation (updating for inflation and improved cleanup methods)

Exhibit 3-17: Inflation and Cleanup Method Improvements – Table

Type of Estimate	1991 $	2008 $
Cost per mile per year **not in** compliance (inflation only)	$3,692	$5,391
Cost per mile per year **not in** compliance (inflation and practices)	$3,692	$21,670
Cost per mile per year **in** compliance (inflation only)	$105	$153
Cost per mile per year **in** compliance (inflation and practices)	$105	$615
Benefit per mile per year (inflation only)	$3,587	$5,238
Benefit per mile per year (inflation and practices)	$3,587	$21,055

Collect Data from Individual States

The study team attempted to collect state data on low stress pipelines. The conclusion of this search is that there is not enough information available presently.

The results of the 2009 Volpe Center follow-up survey to the 2008 Volpe Center "Rural Low-Stress Hazardous Liquid Pipelines Survey" provided no additional data.[24] Five of the seven responding state agencies did not have any incident information on low stress pipelines.[25] The remaining two state agencies indicated that they may have information on low stress pipeline incidents, but acquiring the information was too large a burden on staff members.

The analysis conducted for this regulatory analysis also made inquires to elicit statistics from California, Texas, Kansas, Oklahoma, and Louisiana. California is the only state that responded with data, however, that data only included mileage and not specific incident statistics.

Time Series Incident-Cause Trend Line Analysis

Trend estimation of time series data is a statistical technique to aid interpretation of data. When a series of measurements of a process are treated as a time series, then the application of trend estimation can be used to make and justify statements about trends in the data. In particular, it may be useful to determine if measurements exhibit an increasing or decreasing trend which is statistically distinguished from random behavior.

An analysis of time series data on rates for specific types of pipeline failures, such as corrosion and excavation is a common approach in pipeline regulatory analysis. For example, PHMSA and the California State Fire Marshal provide time series examinations of trends in causes of incidents over time.[26,27,28]

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[24] Volpe "Low Stress Pipeline Survey State and Company Follow-Up," March 2009.
[25] These five states are: Michigan, Montana, New Mexico, N. Dakota and California
[26] Johnson, Joshua. "Internal Corrosion: PHMSA Data and History." Engineering & Emergency Support, Office of Pipeline Safety. Workshop on Internal Corrosion in Hazardous Liquid Pipelines, Atlanta Georgia World Congress Center, March 29, 2009.
[27] West, John. "Significant Pipeline Incidents Caused by Excavation Damage," from PHMSA presentation "Organization and Regulatory Overview"
http://www.kcc.state.ks.us/pipeline/2008_seminar/PHMSA_Organization_and_Rule_Update.pdf
[28] "Hazardous Liquid Pipeline Risk Assessment." California State Fire Marshal, conducted by EDM Services, Inc. Page 96. March 1993.

Following the time series approach, one can look at the rate of hazardous liquid pipeline incidents by cause over time. Examining regulated incident rates from 1986 gives an idea of what a substantially, but not completely, regulated line might look like. The analysis examined PHMSA's Hazardous Liquid Significant Incidents databases for the years 1986-2008. The analysis examined six causes including external corrosion, internal corrosion, equipment, incorrect operation, material and/or weld failure, and excavation.

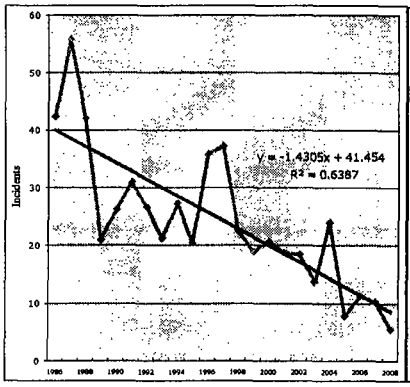
To determine the benefits of regulation, the analysis compared changes in incident rates from 1986 to 2008. The 1986 rates (presented graphically as the left end point of each trendline in Exhibit 3-18 and numerically in the third column of Exhibit 3-19) provide a rough picture of what incidents rates would have been for that cause on a substantially regulated line. The 2008 figure (presented graphically as the right end point of each trendline in Exhibit 3-18 and numerically in the second column of Exhibit 3-19) is what incident rates might look like on a current and fully regulated line. Dividing the 1986 rate by the 2008 rate gives a "substantially regulated factor" (the fourth column in Exhibit 3-19) which is then multiplied by current average incident costs per mile (the fifth column in Exhibit 3-19) to get an idea of the average incident costs per mile in 1986 (the sixth column in Exhibit 3-19).[29] Again, these estimated average incident costs per mile from regulated lines in 1986 are an idea of what a substantially regulated line might look like today. The difference in these two figures provides a proxy of the benefit of bringing a substantially regulated line into full compliance (the final column in Exhibit 3-19).

Exhibit 3-18 provides examples of the trend lines analyzed, and Exhibit 3-19 provides a chart of the estimated benefits from bringing a substantially regulated line into full compliance. The benefit estimates for each incident type are provided in the final column of Exhibit 3-19, and are then summed to determine the total benefit from bringing a substantially regulated line into full compliance. This estimate is $674 per mile.

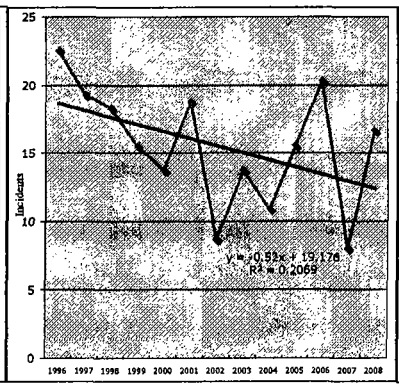
[29] Costs used are the 2002-2008 incident costs updated for inflation to 2009 dollars using the Bureau of Economic Analysis Implicit Price Deflator for GDP. Miles used are the 111,000 hazardous liquid onshore non-HVL miles reported on the 2008 Annual Report.

Exhibit 3-18: Trend line Analyses

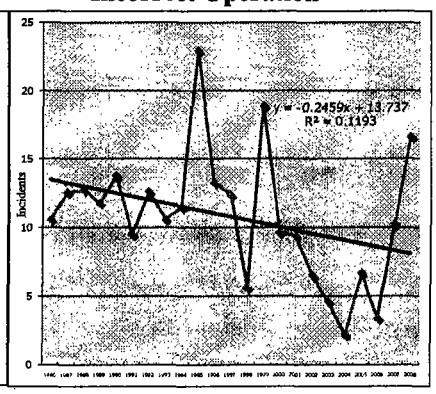
External Corrosion



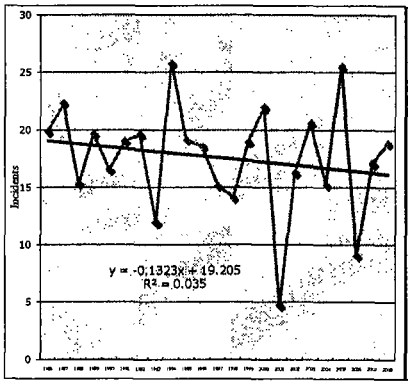
Internal Corrosion



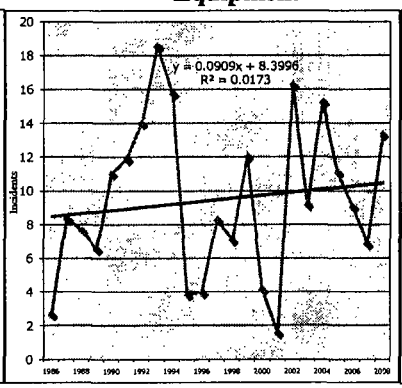
Incorrect Operation



Material and/or Weld Failure



Equipment



Excavation

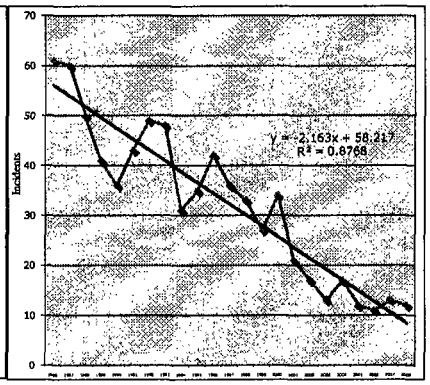


Exhibit 3-19: Cause Incidents per Mile, Cost per Mile, and Sum of Benefits

Incident Cause	Regulated Incident Rate per mile	"Substantially in Compliance" Incident Rate per mile	"Substantially in Compliance" Factor	Regulated Cost per mile	"Substantially in Compliance" Cost per mile	"Substantially in Compliance" Benefit per mile
External Corrosion	10.0	41.5	4.2	$101	$419	$318
Internal Corrosion	12.5	25.4	2.0	$27	$55	$28
Incorrect Operation	8.3	13.7	1.6	$13	$21	$8
Material And/Or Weld Failure	16.3	19.2	1.2	$189	$223	$34
Equipment	10.4	12.6	1.2	$19	$23	$4
Excavation	10.6	58.2	5.5	$63	$345	$282
Total	68.1	170.6		$412	$1,087	**$674**

Exhibit 3-18 provides the R^2 values for the trend lines. These values show the correlation between incident rate and time. The two major incident causes, External Corrosion and Excavation, are also highly correlated with R^2 values of 0.64 (R = 0.80) and 0.88 (R = 0.94), respectively. The estimated benefit per mile of these incident types are also the largest, at $318 and $282, respectively. The R^2 values for the other incident types are not as large and the estimated benefits per mile for each are also quite small. These benefits range from $4 to $34 per mile. If it were assumed there was no benefit to the rates of these incident causes with low trend line R^2 values, the total estimated benefit from bringing a substantially regulated line into full compliance would be $600. This $74 difference has a nominal effect on the final benefit estimates of bringing an unregulated line into compliance, and, therefore, the remainder of the analysis uses the $674 benefit estimate for bringing a pipeline already substantially in compliance into full compliance.

Summary of Benefits

An examination of the costs of compliance and the current levels of compliance for individual pipelines revealed that pipelines fell into two distinct subgroups. The first group of pipelines was generally already in compliance with the regulations and faced small costs to comply with the proposed rulemaking. For operators that are largely in compliance and with few costs to implementation, the analysis assumes that the conservative trend line analysis benefit is the most appropriate measure of the benefits from regulation. The resulting benefits estimate for bringing pipelines already substantially in compliance into full compliance is $674 per mile. Of the 12 operators for which detailed cost information was available, seven have small or no compliance costs.

The second group of operators operated low stress lines that did not comply with the proposed regulations and face significant costs to comply with the proposed rulemaking. In some cases, operators that face higher costs are smaller operators or operators who had recently purchased pipelines from previously unregulated smaller operators. To estimate the benefits for regulating these pipelines, an update of the 1990 ANPRM data for inflation and changes in pipeline practices and cleanup methods was used. The resulting benefits estimate for bringing pipelines not in compliance into full compliance is $21,055 per mile. This estimate was calculated by subtracting the cost of a fully regulated line ($615 as determined from PHMSA's 7000-1 incident database) from the estimated cost of an out of compliance line ($21,670 +++as explained in Exhibits 3-16 and 3-17). Of the 12 operators for which detailed cost information was available, five have relatively large compliance costs.

Assigning benefits in this manner is effective for weighing the mileage by expected benefits. The operators largely in compliance do not benefit as greatly from regulation, whereas operators with large implementation costs experience greater benefits from regulation.

Exhibit 3-20 provides the per mile benefit estimates for each alternative. The final per mile benefit for each alternative is a combination of the above benefits, $674 for largely in compliance lines and $21,055 for lines not in compliance. Exhibit 3-21 provides the total 30 year present value benefit estimates for each alternative. A detailed description of the estimation process for per mile benefits is provided for each of the Phase II alternatives as follows.

Exhibit 3-20: Per Mile Benefits by Alternative

Alternative	Annual Benefits ($ per mile)
1. All low stress	$ 11,266
2. Small diameter inside ½ mile of USA	$ 12,167
3. Large diameter outside ½ mile of USA	$ 13,247
4. Small diameter outside ½ mile of USA	$ 7,305
5. All except Subpart H	$ 7,404
6. All except the IMP	$ 11,173

Alternative 1: All Eligible Low Stress Pipelines

The benefit estimate for Alternative 1 is calculated by summing the benefit estimates for Alternatives 2, 3, and 4. This provides the most detailed and comprehensive estimation of Alternative 1 because Alternatives 2, 3, and 4 are calculated by mileage segment, which is a more in-depth level of estimation. Summing the total 30 year present value benefit estimates for Alternatives 2, 3, and 4 results in a total 30 year present value benefit for Alternative 1 of $326.5 million. On an annual per mile basis, this is the

equivalent of $11,266 per mile for Alternative 1. The per mile benefit of Alternative 1 is a weighted sum of the per mile benefits of Alternatives 2, 3 and 4.[30] As the benefit estimate for Alternative 1 is a summation of the benefits of all Phase II eligible segments, the detailed explanations of the benefit calculations for Alternatives 2, 3 and 4 follow below.

Alternative 2: Apply all Part 195 requirements to small diameter low stress pipelines within ½ mile of an USA

Of the 12 operators who responded to the follow up survey, six have small diameter low stress pipelines that are within ½ mile of an USA. In terms of compliance, approximately 25 percent of those miles are largely in compliance and 75 percent are substantially out of compliance (as shown in Exhibit 3-11). Therefore, the two benefit estimates of $674 for substantially in compliance pipelines and $21,055 for out of compliance pipelines will be weighted by these respective percentages for small diameter low stress pipeline within ½ mile of an USA. However, the analysis cannot apply these percentages to the two benefit estimates directly. An evaluation of incident cost by diameter and pipeline segments within and outside ½ mile of USAs shows that each is different from incident costs over the entire system.

Therefore, a determination of how the overall per mile benefits of $674 and $21,055 vary by diameter size, USA proximity classification, and Subpart is analyzed in the remaining five alternatives. The following methodology was utilized to make these calculations.

1. *Pipe Diameter* – To determine how the $674 and $21,055 per mile benefits differ for pipe diameter, two simultaneous linear equations are solved. The goal of this exercise is to determine the relative makeup of the overall estimated benefits in terms of small diameter benefit and large diameter benefit. The two equations are as follows:

$$\text{Equation 1: } (0.32)\,S + (0.68)\,L = 674$$
$$\text{Equation 2: } (1.77)\,S = L$$

Equation 1 represents the makeup of the $674 per mile benefit ($21,055 could just as easily be substituted, but because the ultimate goal is to derive the relative small and large diameter percentages, either benefit figure can be used). S represents the per mile cost of small diameter pipe, and L represents the per mile cost of large diameter pipe. S and L are each weighted by the respective percentages of miles of each over the entire system. Approximately 32 percent of the entire system is comprised of small diameter pipe, and 68 percent of the system is comprised of large diameter pipe. These percentages are taken from the PHMSA 7000-1.1 Annual Report database for all pipelines in 2008 – there are approximately 35,499 miles of small diameter low stress pipeline and 76,258 miles of large diameter low stress pipeline. Therefore S is weighted by 0.32 and L by 0.68.

Equation 2 represents the relative cost per mile of small and large diameter low stress pipeline incidents over the entire system. PHMSAs 7000-1 incident database shows over the period 2002 to 2008, small diameter incidents cost on average $2,099 per mile and large diameter low stress pipeline incidents cost on average $3,732 per mile. Therefore, large diameter low stress pipeline incidents are 1.77 times more costly per mile than small diameter low stress pipeline incidents.

Solving the two equations simultaneously gives:

[30] $12,167*(100.5/1,384.3) + $13,247*(840.6/1,384.3) + $7,305*(443.2/1,384.3) = $11,266

S = $442
L = $782

Therefore, separating the overall $674 substantially in compliance estimated benefit by diameter results in an estimated $442 per mile benefit from regulating substantially in compliance small diameter pipe and $782 per mile benefit from regulating substantially in compliance large diameter pipe. The $442 small diameter pipe benefit estimate represents 66 percent of the overall benefit of $674 for substantially in compliance pipelines. To determine the respective benefit small diameter low stress pipelines benefit for out of compliance pipelines, there are two options. The same simultaneous equation approach can be applied to $21,055 in Equation 1, or the benefit can be estimated by applying the 66 percent to $21,055. Either method results in a benefit of $13,803 (correcting for rounding error) from regulating out of compliance small diameter pipeline.

In conclusion, two benefit estimates were derived for small diameter pipe – substantially in compliance small diameter pipe and out of compliance small diameter pipe. This is the first step to estimating the Alternative 2 benefit. The second step, which follows next, is to determine how these two benefit estimates are calculated when USA proximity is included.

2. *USA Status* – An analysis of the high consequence area statistics in PHMSA's 7000-1 incident database is used to determine the benefit of small diameter pipe within ½ mile of an USA. As explained in the analysis of PHMSA's database, USA proximity is not a field reported on the incident report form. Therefore, high consequence area status is used as a proxy for USA status. In terms of within ½ mile versus outside ½ mile of an USA, the potential difference in benefit can be attributed solely to the IMP because the IMP only applies to low stress pipelines within ½ mile of an USA.

   One objective of an IMP is to detect and prevent corrosion, the approach taken to estimate benefits inside high consequence areas is to examine incidents caused by corrosion inside and outside of high consequence areas. In PHMSAs 7000-1.1 Annual Report on miles for 2008, there are 52,608 miles of estimated pipeline inside high consequence areas, and 58,325 miles outside high consequence areas. In PHMSA's 7000-1 incident database from 2002 to 2008, there were 102 corrosion-related incidents inside high consequence areas and 218 corrosion-related incidents outside high consequence areas. This is the same as 1.94 corrosion-related incidents per 1,000 miles within high consequence areas and 3.74 corrosion-related incidents per 1,000 miles outside of high consequence areas. Incident frequency is analyzed as opposed to incident cost because of the inherent cost bias in high consequence area incidents - the amount of resources directed at cleaning a high consequence area spill is greater than cleaning a spill in a non-high consequence area.

   The difference in corrosion-related incidents per mile inside and outside high consequence areas is largely attributable to the IMP because the IMP is the only regulatory difference in the two areas. Therefore, the estimate is that the IMP prevents approximately 1.80 incidents per thousand miles, which is the difference in incidents per thousand miles within and outside of high consequence areas (3.74 - 1.94).

   The trend line analysis attributes $346 of the total $674 per mile preventable costs to corrosion-related incidents: $318 per mile to external corrosion and $28 per mile to internal corrosion (provided in Exhibit 3-19). Corrosion-related regulatory oversight includes Subpart F and Subpart H, with the IMP making up the vast majority of Subpart F costs. As explained above, the incident rate per thousand miles for lines without IMP (outside high consequence areas) is 3.74.

To determine the additional incidents avoided by Subpart H, an estimate of pipeline incidents per thousand miles for a completely unregulated pipeline is necessary. In other words, the difference between the per thousand mile incident rate of a completely unregulated pipeline and the per thousand mile incident rate of a pipeline without IMP (3.74) will provide an estimate of additional incidents per thousand miles avoided by Subpart H.

To estimate the per thousand mile incident rate for a completely unregulated line, the average corrosion-related incident rate per thousand miles is multiplied by an unregulated factor. The average corrosion-related incident per thousand miles in the PHMSA's 7000-1 incident database is 2.88 (320 incidents over 110,933 miles). This is multiplied by the factor of unregulated corrosion incident costs to regulated corrosion incident costs, a proxy for additional costs associated with an unregulated (in terms of corrosion) pipeline. The factor is derived from the figures provided in Exhibit 3-19. The estimated corrosion-related incident costs from 1986 (419+55) are divided by the current 2008 corrosion-related incident costs (101+28). This factor is equal to 3.67. Multiplying the 3.67 unregulated factor by the average corrosion-related incident per thousand miles of 2.88 produces an unregulated (without Subpart H and without IMP) corrosion-related incident rate per thousand miles of approximately 10.60. Therefore, 1.80 (3.74 - 1.94) incidents per thousand miles are estimated as prevented by IMP and 6.86 (10.60 – 3.74) incidents per thousand miles are estimate as prevented by Subpart H. The remaining 1.94 incidents per thousand miles that occur within high consequence areas are assumed to be unpreventable incidents under current regulations.

Of the entire spectrum of corrosion-related incidents, therefore, approximately 18 percent (1.94/10.60) are unpreventable, 17 percent (1.8/10.60) are preventable by the IMP and 65 percent (6.86/10.60) are preventable by Subpart H. Within preventable incidents, the IMP prevents approximately 21 percent (1.8/8.66) while by Subpart H can prevent approximately 79 percent (6.86/8.66). Therefore, of the $346 corrosion-related costs per mile, approximately $71 is attributable to the IMP and $275 to Subpart H. Adding $71 in costs avoided by the IMP, realized on pipelines within ½ mile of USAs, to the $442 in costs avoided by regulating small diameter pipeline, gives $513 in costs avoided by regulating small diameter pipe within ½ mile of an USA. The $513 is approximately 76 percent of the overall $674 benefit from regulating a pipeline that is substantially in compliance. Applying 76 percent to the benefit of $21,055 from regulating a pipeline out of compliance, results in an estimate of approximately $16,032 per mile.

3. The final step in determining the Alternative 2 per mile benefit is to weight $513 and $16,032 by the proportion of operator miles that are substantially in compliance and out of compliance. As explained in the first paragraph of the Alternative 2 summary, these percentages are 25 percent and 75 percent respectively (shown in Exhibit 3-11). The benefit per mile is thus comprised of $128 ($513 x 0.25) from regulating substantially in compliance small diameter low stress pipeline within ½ mile of an USA and $12,039 ($16,032 x 0.75)[31] from the regulating out of compliance small diameter low stress pipelines within ½ mile of an USA. The final per mile benefit of Alternative 2 is the sum of these two figures: $12,167.

Alternative 3: Apply all Part 195 requirements to large diameter low stress pipelines outside ½ mile of an USA

The per mile benefit for large diameter low stress pipelines can be estimated using step 1 from Alternative 2. Solving the two simultaneous equations for L (large diameter pipe outside ½ mile of an USA) gives a

[31] Note: rounding errors are corrected for in the analysis and thus some presented calculations are slightly different from cited result.

per mile benefit estimate of $782 from regulating substantially in compliance large diameter pipelines. This is approximately 116 percent of the $674 trend line benefit. The corresponding benefit for out of compliance large diameter pipeline is 116 percent of $21,055 or $24,431.

Next, the two benefit estimates must be weighted by the proportion of large diameter low stress pipelines outside ½ mile of an USA that apply to substantially in compliance and out of compliance pipelines. These percentages are 47 and 53 respectively (as shown in Exhibit 3-11). The per mile benefit is thus comprised of $370 ($782 x 0.47) from regulating substantially in compliance large diameter low stress pipelines outside ½ mile of an USA and $12,877 ($24,431 x 0.53) from regulating out of compliance large diameter low stress pipelines outside ½ mile of an USA (corrected for rounding error). The final per mile benefit of Alternative 3 is $13,247.

Alternative 4: Apply all Part 195 requirements to small diameter low stress pipelines outside ½ mile of an USA

The per mile trend line benefit of small diameter low stress pipelines outside ½ mile of an USA was estimated in Alternative 2 step 1 above. The benefit is estimated to be $442 per mile. This is approximately 66 percent of the overall $674 benefit from regulating substantially in compliance pipeline. The corresponding benefit from regulating out of compliance pipeline is approximately 66 percent of $21,055, or $13,803.

The two benefit estimates must be weighted by the proportion of small diameter low stress pipelines outside ½ mile of an USA that apply to substantially in compliance and out of compliance pipelines. These percentages are 49 and 51 respectively (as shown in Exhibit 3-11). The per mile benefit is thus comprised of $215 ($442 x 0.49) from regulating substantially in compliance small diameter low stress pipelines outside ½ mile of an USA and $7,091 ($13,803 x 0.51) from regulating out of compliance small diameter low stress pipelines outside ½ mile of an USA (corrected for rounding error). The final per mile benefit of Alternative 4 is $7,305.

Alternative 5: Apply all Part 195 requirements, except Subpart H (Corrosion Control), to all low stress pipelines not currently regulated

Subpart H is comprised of corrosion control measures. As explained in steps 2 and 3 of Alternative 2, the per mile benefit from Subpart H for pipelines substantially in compliance is $275, or approximately 41 percent of the total $674 benefit for lines substantially in compliance. Excluding it from the regulation, however, is equivalent to subtracting the $275 from $674. This is $399, or 59 percent of the $674 benefit from regulating lines substantially in compliance. The corresponding benefit for lines that are out of compliance is approximately 59 percent of $21,055, or $12,476 with no rounding error.

The two benefit estimates must be distributed by the proportion of all miles that apply to substantially in compliance and out of compliance pipelines. These percentages are 42 and 58 respectively (as shown in Exhibit 3-11). The per mile benefit is thus comprised of $168 ($399 x 0.42) from substantially in compliance pipelines without Subpart H and $7,236 ($12,476 x 0.58) from out of compliance pipelines without Subpart H (corrected for rounding error). The final per mile benefit of Alternative 5 is $7,404.

Alternative 6: Apply all Part 195 requirements, except the Integrity Management Program, to all low stress pipelines not currently regulated

Alternative 6 applies all Part 195 requirements, except IMP, to all low stress pipelines not currently regulated. The benefit per mile is, therefore, a combination of the benefits from Alternatives 3 and 4, and a slightly modified benefit from Alternative 2. As explained in steps 2 and 3 of Alternative 2 above, the

per mile benefit of IMP on substantially regulated pipelines is $71. This is approximately 11 percent of the overall benefit of $674 from bringing a substantially regulated line into full compliance. To estimate the benefit of Alternative 2 without the IMP, 11 percent of the $12,167 per mile benefit is removed. This figure, without rounding error, is $10,878 ($12,167 x 0.89).

The final calculation is a weighted average of Alternatives 3, 4 and the modified Alternative 2. The modified Alternative 2 per mile benefit of $10,878 is weighted by small diameter low stress pipeline within ½ mile of an USA (100.5/1,384.3), Alternative 3 per mile benefit of $13,247 is weighted by large diameter low stress pipelines outside ½ mile of an USA (840.6/1,384.3), and the Alternative 4 per mile benefit of $7,305 is weighted by small diameter low stress pipelines outside ½ mile of an USA (443.2/1,384.3). This weighted average is $11,173, and is the final per mile benefit of Alternative 6.

Exhibit 3-21 shows derivations of the 30 present value benefits for each alternative. The interest rate used to discount future cost outlays in this analysis is 2.7 percent, as required in the OMB Circular A-94. The estimated total 30 year present value benefits for each alternative in millions of dollars are provided in bold at the bottom of each table. The first column provides the years, the second column provides the per mile benefits for each year (also shown in Exhibits 3-20), and the third column provides the per mile present value of the benefit for each year when an annual discount rate of 2.7 percent is applied.

Exhibit 3-21: 30 Year Present Value Benefit Tables by Alternative

Alternative 1

Year	Per Mile Benefit	Per Mile PV
1	11,266	11,266
2	11,266	10,970
3	11,266	10,681
4	11,266	10,401
5	11,266	10,127
6	11,266	9,861
7	11,266	9,602
8	11,266	9,349
9	11,266	9,103
10	11,266	8,864
11	11,266	8,631
12	11,266	8,404
13	11,266	8,183
14	11,266	7,968
15	11,266	7,759
16	11,266	7,555
17	11,266	7,356
18	11,266	7,163
19	11,266	6,974
20	11,266	6,791
21	11,266	6,612
22	11,266	6,439
23	11,266	6,269
24	11,266	6,104
25	11,266	5,944
26	11,266	5,788
27	11,266	5,636
28	11,266	5,487
29	11,266	5,343
30	11,266	5,203
Per Mile 30 Year PV		235,834
Eligible Mileage		1384.3
Total 30 Year PV Benefit (In Millions)		**326.5**

Alternative 2

Year	Per Mile Benefit	Per Mile PV
1	12,167	12,167
2	12,167	11,847
3	12,167	11,536
4	12,167	11,232
5	12,167	10,937
6	12,167	10,650
7	12,167	10,370
8	12,167	10,097
9	12,167	9,831
10	12,167	9,573
11	12,167	9,321
12	12,167	9,076
13	12,167	8,838
14	12,167	8,605
15	12,167	8,379
16	12,167	8,159
17	12,167	7,944
18	12,167	7,735
19	12,167	7,532
20	12,167	7,334
21	12,167	7,141
22	12,167	6,954
23	12,167	6,771
24	12,167	6,593
25	12,167	6,419
26	12,167	6,251
27	12,167	6,086
28	12,167	5,926
29	12,167	5,770
30	12,167	5,619
Per Mile 30 Year PV		254,694
Eligible Mileage		100.5
Total 30 Year PV Benefit (In Millions)		**25.6**

Alternative 3

Year	Per Mile Benefit	Per Mile PV
1	13,247	13,247
2	13,247	12,899
3	13,247	12,559
4	13,247	12,229
5	13,247	11,908
6	13,247	11,595
7	13,247	11,290
8	13,247	10,993
9	13,247	10,704
10	13,247	10,423
11	13,247	10,149
12	13,247	9,882
13	13,247	9,622
14	13,247	9,369
15	13,247	9,123
16	13,247	8,883
17	13,247	8,649
18	13,247	8,422
19	13,247	8,201
20	13,247	7,985
21	13,247	7,775
22	13,247	7,571
23	13,247	7,372
24	13,247	7,178
25	13,247	6,989
26	13,247	6,805
27	13,247	6,626
28	13,247	6,452
29	13,247	6,283
30	13,247	6,117
Per Mile 30 Year PV		277,298
Eligible Mileage		840.6
Total 30 Year PV Benefit (In Millions)		**233.1**

Alternative 4

Year	Per Mile Benefit	Per Mile PV
1	7,305	7,305
2	7,305	7,113
3	7,305	6,926
4	7,305	6,744
5	7,305	6,567
6	7,305	6,394
7	7,305	6,226
8	7,305	6,062
9	7,305	5,903
10	7,305	5,748
11	7,305	5,597
12	7,305	5,450
13	7,305	5,306
14	7,305	5,167
15	7,305	5,031
16	7,305	4,899
17	7,305	4,770
18	7,305	4,645
19	7,305	4,522
20	7,305	4,404
21	7,305	4,288
22	7,305	4,175
23	7,305	4,065
24	7,305	3,958
25	7,305	3,854
26	7,305	3,753
27	7,305	3,654
28	7,305	3,558
29	7,305	3,465
30	7,305	3,374
Per Mile 30 Year PV		152,925
Eligible Mileage		443.2
Total 30 Year PV Benefit (In Millions)		**67.8**

Alternative 5

Year	Per Mile Benefit	Per Mile PV
1	7,404	7,404
2	7,404	7,209
3	7,404	7,019
4	7,404	6,835
5	7,404	6,655
6	7,404	6,480
7	7,404	6,310
8	7,404	6,144
9	7,404	5,982
10	7,404	5,825
11	7,404	5,672
12	7,404	5,523
13	7,404	5,378
14	7,404	5,236
15	7,404	5,099
16	7,404	4,965
17	7,404	4,834
18	7,404	4,707
19	7,404	4,583
20	7,404	4,463
21	7,404	4,345
22	7,404	4,231
23	7,404	4,120
24	7,404	4,012
25	7,404	3,906
26	7,404	3,804
27	7,404	3,704
28	7,404	3,606
29	7,404	3,511
30	7,404	3,419
Per Mile 30 Year PV		154,982
Eligible Mileage		1,384.3
Total 30 Year PV Benefit (In Millions)		**214.5**

Alternative 6

Year	Per Mile Benefit	Per Mile PV
1	11,173	11,173
2	11,173	10,879
3	11,173	10,593
4	11,173	10,314
5	11,173	10,043
6	11,173	9,779
7	11,173	9,522
8	11,173	9,272
9	11,173	9,028
10	11,173	8,791
11	11,173	8,560
12	11,173	8,335
13	11,173	8,115
14	11,173	7,902
15	11,173	7,694
16	11,173	7,492
17	11,173	7,295
18	11,173	7,103
19	11,173	6,917
20	11,173	6,735
21	11,173	6,558
22	11,173	6,385
23	11,173	6,217
24	11,173	6,054
25	11,173	5,895
26	11,173	5,740
27	11,173	5,589
28	11,173	5,442
29	11,173	5,299
30	11,173	5,160
Per Mile 30 Year PV		233,879
Eligible Mileage		1,384
Total 30 Year PV Benefit (In Millions)		**323.8**

3.4 Nontraditional Benefits

In the previous section, emphasis was placed on the evaluation of traditional benefits such as avoided clean-up costs, cost of lost product, and property damage. This section examines the nontraditional benefits of regulating currently unregulated low stress pipelines. Each potential benefit is examined in detail and previous studies are reviewed to estimate each benefit. Where possible, the economic impacts of these nontraditional benefits are normalized to a spill unit value per barrel or per pipeline mile. Although traditional benefits are quantified in this section, they are not included in the benefit-cost analysis. Nontraditional benefits are not included in the benefit-cost analysis to provide a conservative assessment of the benefits of the Phase II rulemaking.

Injury and Loss of Life

A reduction in loss of life and in the number of injuries is a potential benefit of further regulating low stress pipelines. A USDOT memorandum provides an economic value for each human injury and fatality prevented.[32] The total value of injuries and fatalities that result from the operation of hazardous liquid pipelines can be calculated by multiplying these values by the number of injuries and fatalities reported to PHMSA. Using PHMSA incident data and the USDOT cost estimates, the cost per mile per year of fatalities is estimated to be $720, while the cost per mile per year of injuries is estimated to be $396.

Energy Security - Domestic Supply Disruption

The potential energy security benefit from regulation stems from a reduction in short-term supply disruption and oil product shortages. Some recent studies suggest that incidents on large low stress pipelines may cause a significant loss of productivity and economic profit for pipeline operators. Two of these studies, one by the National Academy of Sciences (NAS) and the other by the Oak Ridge National Laboratory (ORNL), provide per-barrel cost estimates of incident disruption and adjustment.[33,34] However, not everyone agrees about the impact of incidents on domestic supply disruption. For example, the RAND Corporation concluded in a recent study that domestic supply disruptions are not economically significant.[35] The NAS and ORNL study estimate the average disruption and adjustment cost per-barrel to be $5. Using this estimate and incident data from the PHMSA 7000-1 database, the average disruption and adjustment cost for low stress pipeline incidents is estimated to be $400 per incident.

Energy Security - Dependency on Foreign Oil

A second component of energy security is dependence on foreign oil. Following a spill, there is an increased demand for oil to replace lost product. To meet this demand, some portion of the additional oil is likely to be imported. Two separate studies by the Oak Ridge National Laboratory in 2005 and 2007

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[32] USDOT, Office of the Secretary of Transportation Memorandum on "Treatment of the Economic Value of a Statistical Life in Departmental Analyses – 2009 Annual Revision," March 18, 2009. http://ostpxweb.dot.gov/policy/reports/VSLpercent20Guidancepercent20031809percent20a.pdf

[33] Greene, David L. and Sanjana Ahmad. "Cost of U.S. Oil Dependence: 2005 update." Oak Ridge National Laboratory, February 2005. http://cta.ornl.gov/cta/Publications/Reports/ORNL_TM2005_45.pdf

[34] Leiby, Paul. Oak Ridge National Laboratories. "Estimating the Energy Security Benefits of Reduced U.S. Oil Imports", February 2007. http://www.epa.gov/OTAQ/renewablefuels/ornl-tm-2007-028.pdf

[35] Crane, Keith and Andreas Goldthau, Michael Toman, Thomas Light, Stuart E. Johnson, Alireza Nader, Angel Rabasa, Harun Dogo. "Imported Oil and U.S. National Security." Rand Infrastructure, Safety, & Environment; National Security Research Division, 2009.

respectively are used to calculate an energy security benefit of changes in oil imports. The energy security benefit in the 2005 and 2007 Oak Ridge National Laboratory studies for reducing the import of one barrel of oil is $82 ($2009) and $14.10 ($2009), respectively. The difference in the two values is largely due to the larger range of benefits included in the 2005 study, such as loss of output and the transfer of wealth from oil consumers to oil producers due to monopolistic pricing, that were excluded in the 2007 study.[36, 37]

Additional Environmental Impacts

Pipeline operators report environmental remediation costs to PMHSA. These costs, however, do not measure the full environmental effects of remediation. The period for reporting costs is set at 30 days and operators are not required to report costs after this period. Hence, full remediation costs are not always captured. In addition, operators may not perform full remediation for some of the environmental impacts and, therefore, the true cost of these impacts will not be included in the PHMSA database. For example, a review of incidents reveals numerous incidents where operators report environmental impacts but no remediation costs.

To evaluate the magnitude of these impacts the study team reviewed three case studies that reported additional social values of environmental damage due to oil spills beyond directly expended costs. These case studies examined the Exxon Valdez, Arthur Kill, and Texaco Anacortes incidents.[38, 39, 40, 41] The additional environmental damage estimates in these case studies range from 5 percent to 31 percent of total remediation costs. The average net amount spilled per low stress incident is 81 barrels according to the PHMSA 7000-1 database. The average total cost for cleanup is estimated to be $814 per barrel. Using the estimated range of 5 percent to 31 percent, the dollar value of additional environmental damages is estimated at $41 to $252 per barrel for an incident occurring on a low stress pipeline.

Air Pollution Impacts

The PHMSA incident database only measures environmental remediation costs. The environmental impact of incidents involving fires and explosions that release polluting emissions into the air may not be fully reflected in site remediation cost estimates. The social value of reducing emissions to the air is, therefore, a potentially unaccounted benefit from the rulemaking. To value the costs of air pollution a series of linkages are made between emissions and the dollar value of environmental damage using the results from a study by the National Academy of Sciences.[42] Fortunately, explosions on pipelines are rare. In all incidents reported in the PHMSA incident database there has only ever been one explosion of a pipeline. The average spill size of a low stress incident is estimated to be 81 barrel according to

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[36] Greene, David L. and Sanjana Ahmad. "Cost of U.S. Oil Dependence: 2005 update." Oak Ridge National Laboratory, February 2005. http://cta.ornl.gov/cta/Publications/Reports/ORNL_TM2005_45.pdf

[37] Leiby, Paul. Oak Ridge National Laboratories. "Estimating the Energy Security Benefits of Reduced U.S. Oil Imports", February 2007. http://www.epa.gov/OTAQ/renewablefuels/ornl-tm-2007-028.pdf

[38] Victoria Transport Policy Institute,"Water Pollution and Hydrologic Impacts." http://www.fws.gov/policy/NRDA-7.pdf, Page 5.

[39] Advanced Resources International "Economic Impact on Oil Spills: Spill Unit Costs for Tankers, Pipelines, Refineries and Offshore Facilities". http://www.osti.gov/bridge/purl.cover.jsp?purl=/10186611-aXJ8ID/native/ Page 72

[40] Addressing Uncertainty and Data Limitation in Damage Assessment. http://74.125.113.132/search?q=cache:uYSvazDUIB0J:policy.fws.gov/NRDA- Page 17

[41] A case study of the BP incident with relevant additional environmental impact costs was not available for use in the case study review.

[42] National Academy of Sciences. "Hidden Cost of Energy: Unpriced Consequences of Energy Production and Use", 2009. http://www.nap.edu/catalogue/12794.html. Page 15.

information in the PHMSA 7000-1 database. A fire or explosion that evaporates 81 barrels of oil would release about 26 tons of CO_2 emission into the atmosphere.[43] At an estimated cost of \$30/ton CO_2 emission, the value of decreasing air pollution of one low stress pipeline explosion is \$9.52 per barrel.[44]

Standardization and Federalization

Extending Part 195 to the remaining low stress pipelines will mean that virtually all pipelines will be subject to the same standardized federal pipeline regulations. There exist potential savings from a more complete federal coverage and from the standardization of regulations across pipeline sub-categories. By analyzing three different reports on federal and state regulation, qualitative conclusions about the benefits of federalization and standardization can be extrapolated. A study titled "Pipeline Safety and Security: Federal Programs" provides an overview of current federalization and standardization measures.[45] Another study on the BP pipeline failure states that the costs for compliance with a more comprehensive standardization scheme would not be large and not having this standardization results in likely higher costs to society.[46] A third case study by the German Institute for Standardization suggests standardization reduces transaction costs and suggests increased participation of states in the federal legislative process regarding pipeline safety.[47]

Public Confidence

PHMSA emphasized in the Phase I regulatory analysis that public confidence is very important and changes must be made so that the public can live, work, and congregate near pipelines and have a high degree of confidence that their safety is assured. Since it is difficult to quantify a loss of public confidence, the benefit transfer methodology is used to estimate the per barrel cost in the loss of public confidence after an oil spill. A study by Argonne National Laboratory on the effects of terrorism on public confidence is used for this purpose.[48] The Argonne National Laboratory study estimates a loss in confidence of \$0.08 per person per-barrel spilled in one day. Using the PHMSA 7000-1 dataset, the average loss in public confidence for the average number of barrels spilled in one year by regulated low stress pipelines is between \$14,893 and \$29,782. Another approach to estimate the value of public confidence can be derived from a study titled "A Meta-Analysis of the Effect of Environmental Contamination and Positive Amenities on Residential Real Estate Values."[49] It is assumed that estimates of loss of public confidence are positively correlated to the decline in residential property values located in close proximity to a pipeline incident. This study suggests a value reduction per house of about \$163 to \$386 per barrel spilled. This is similar to an average loss in confidence per household of \$274 per barrel spilled.

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[43] Bliss, Jim. "Carbon dioxide emissions per-bbl of crude oil". March 2008. http://numero57.net/?p=255. Page 1.Note: Jim Bliss estimated that 3.15 barrels of crude oil are equal to1 ton of CO_2 emission.

[44] Bliss, Jim. "Carbon dioxide emissions per-bbl of crude oil". March 2008. http://numero57.net/?p=255. Page 1.

[45] Parfomak, Paul. "Pipeline Safety and Security: Federal Programs". February 2008. Page 1.

[46] BP Pipeline Failure: Its Effects on Oil Supply and How to Prevent a Recurrence: Hearing. Before the S. Comm. on Energy and Natural Resource, 109th Cong. 24 (2006) (statement of Peter Van Tuyn). Page 20

[47] DIN German Institute for Standardization. "Economic Benefits of Standardization". http://docs.google.com/gview?a=v&q=cache:3Lg1oavarHQJ:www.din.de/sixcms_upload/media/2896. Page 13.

[48] Argonne National Laboratory (AGN),"The Effect of Terrorism on Public Confidence: An ExploratoryStudy," 2008

[49] Simons. "A Meta-Analysis of the Effect of Environmental Contamination and Positive Amenities on Residential Real Estate Values.". 2009. http://redorbit.com/modules/news/tools.php?toll=print&id=424785. Page 6.

Summary of Nontraditional Benefits

According to the OMB's Circular A-4, it will not always be possible to express in monetary units all of the important benefits and costs involved in the evaluation of the benefits and costs of a program or project. In such cases, the OMB recommends that agencies should exercise professional judgment in determining how important the non-quantified benefits or costs may be in the context of the overall analysis. If the non-quantified benefits and costs are likely to be important, agencies should carry out a "threshold" analysis to evaluate their significance. In addition to threshold analysis agencies should indicate, where possible, which non-quantified effects are most important and why.

In the case of the proposed rulemaking, non-quantified benefits are likely to be significant. For example, estimates of additional environmental costs are 5 to 31 percent of traditional incident costs. However, these nontraditional benefits are not likely to vary significantly across alternatives and would not alter the basic ranking of the alternatives. If nontraditional benefits were included in the benefit-cost equation, they would increase the final benefit estimates and increase the already positive net benefits of all the alternatives.

4. BENEFIT-COST ANALYSIS

The OMB Circular A-4, Part D prescribes that a benefit-cost analysis and/or cost-effectiveness analysis be completed for proposed rulemakings. A cost-effectiveness analysis should be prepared for all major rulemaking for which the primary benefits are improved public health and safety to the extent that a valid effectiveness measure can be developed to represent expected health and safety outcomes. For all other major rulemaking, a benefit-cost analysis should be carried out. As mentioned in Section 3.4 of this Regulatory Analysis, fatalities and injuries from low stress pipeline incidents are rare. For the Phase II rulemaking, the primary benefits are reduced low stress pipeline incidents and greater environmental protection. This chapter presents a brief description of the benefit-cost evaluation method, the rationale behind using discounting rates, an explanation of the economic analysis methodology, and concludes with the results of the benefit-cost analysis of the regulatory alternatives. Section 4.3 provides a risk and uncertainty analysis, which discusses how the results vary with plausible changes in assumptions, choices of input data, and alternative analytical approaches.

4.1 Benefit-Cost and Net Present Value Analysis

A distinctive feature of benefit-cost analysis is that both benefits and costs are expressed in monetary units, which allows for the evaluation of different regulatory options with a variety of attributes using a common measure. By measuring incremental benefits and costs of successively more stringent regulatory alternatives, the alternative that maximizes net benefits can be identified. Benefit and cost quantities can be analyzed in many ways, such as total benefits minus total costs (i.e. net benefits) or benefits divided by costs (i.e. benefit-cost ratio). As stated in the OMB Circular A-4 Part D, the size of net benefits – the absolute difference between the projected benefits and costs – indicates whether one policy is more efficient than another. However, in order to be meaningful, a benefit-cost analysis must not only express all benefits and costs in monetary terms, it must also account for the change in the value of the dollar over time.

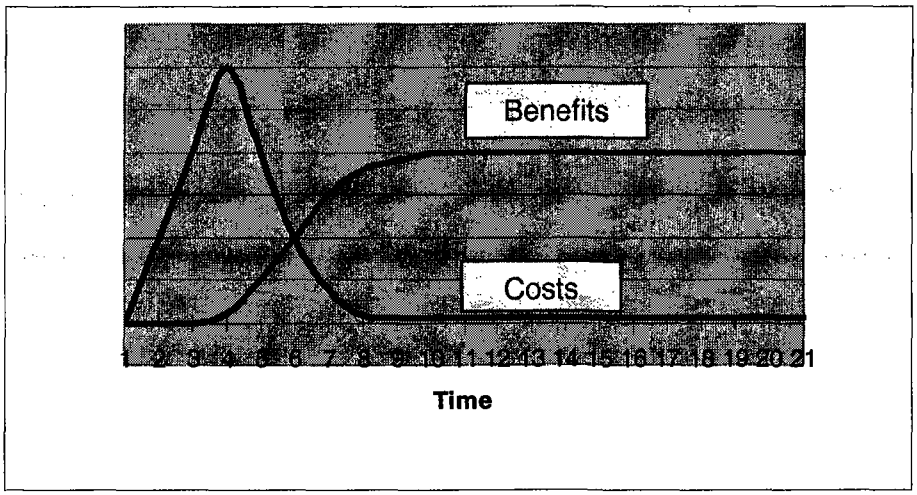
The value of a dollar changes with time due to the time value of money and inflation. The time value of money relates to the fact that a dollar received today is more valuable than a dollar received on a later day since a dollar received today can be invested and appreciate more than a dollar received at a later day; this is true when all other circumstances are held constant. Inflation is a rise in the general level of prices of goods and services in an economy over a period of time. When the price level rises, each unit of currency buys fewer goods and services; consequently, annual inflation erodes the purchasing power of money.

An economic concept called "net present value," accounts for the time value of money and inflation. The concept of net present value is important because the timing of costs and benefits of a regulation are often different.

A frequent observation in regulation and public infrastructure projects is that costs are experienced both immediately and over time, while benefits are derived over time after the costs have been incurred. Exhibit 4-1 provides a sample of typical benefit and cost flows. Costs, as considered by an engineer for example, are inflated over time to reflect generally accepted increases in the costs for goods and services. This provides an estimate of the cash that is going to be necessary to complete a project. However, benefits, as considered in economics, are discounted as they move into the future. Net present value provides the common ground against which costs and benefits can be considered.

This study assumes a 30year project lifetime horizon. This time period was selected because pipeline infrastructure typically provides streams of benefits and costs that last for 30 years or more. For example, the majority of pipeline infrastructure in the U.S. was built in the mid-20th century.

Exhibit 4-1: Sample Costs and Benefit Streams



As a first step, the annual time stream of benefits and costs expected to result from the rule must be presented and it must be clearly identified when the benefits and costs are expected to occur. The beginning point for the stream of estimates should be the year in which the final rule will begin to have effects, even if that is expected to be some time in the future. The ending point should be far enough in the future to encompass all the significant benefits and costs likely to result from the rule.

In presenting the stream of benefits and costs, it is important to measure them in constant dollars to avoid the misleading effects of inflation. If the benefits and costs are initially measured in prices reflecting expected future inflation, they can be converted to constant dollars by dividing through by an appropriate inflation index, one that corresponds to the inflation rate underlying the initial estimates of benefits or costs. All of the cost and benefit estimates in this study are measured in constant 2009 dollars, such that no inflation or deflation to current dollars is required.

The interest rate used to discount future cost outlays in this analysis is 2.7 percent. This real discount rate was taken from a memorandum by the Executive Office of the President updating Appendix C of the OMB's Circular No. A-94 (Revised December 2008) entitled "Discount Rates for Cost-Effectiveness, Lease Purchase, and Related Analyses."[50] The Appendix defines the real discount rates as "A forecast of real interest rates from which the inflation premium has been removed. These real rates are to be used for discounting constant-dollar flows, as is often required in cost-effectiveness analysis." The discount rate for periods of 20 and 30 years is 2.7 percent. The Appendix also noted, "Analyses of programs with terms different from those presented above may use a linear interpolation. For example, a four-year project can be evaluated with a rate equal to the average of the three-year and five-year rates. Programs with durations longer than 30 years may use the 30-year interest rate." If the dollars were expressed in nominal values, then the discount rate would need to incorporate an estimate of future inflation, however, this is not the case in this analysis.

[50] Memorandum from Executive Office of the President, Office of Management and Budget. "Discount Rates for OMB Circular No. A-94. December 12, 2008.
http://www.whitehouse.gov/omb/assets/omb/memoranda/fy2009/m09-07.pdf

4.2 Benefit-Cost Analysis

This section addresses the expected benefits and costs of the proposed regulatory alternatives and discusses the expected net benefit and benefit-cost ratio. As stated in the OMB Circular A-4, Part D, the size of net benefits – the absolute difference between the projected benefits and costs – indicates whether one policy is more efficient than another. The benefit-cost ratio presents a quick measure of relative benefits and costs and whether the proposed alternative is expected to yield a net benefit. It should be noted that, unless otherwise specified, all dollar amounts in this section are given in constant 2009 dollars.

Exhibit 4-2 below presents the 30 year present value of benefits, costs, and net benefit on a per mile basis and a total basis, for each proposed alternative. The total measures reflect the benefits and costs when applied to all low stress pipelines relevant to a specific alternative. The per mile and total present value costs are obtained from Exhibit 3-13 and the per mile and total present value benefits are obtained from Exhibit 3-23. The net benefit columns are the differences in per mile and total benefits and costs. The last column shows the benefit-cost ratio for each proposed alternative of the rulemaking, which is a simple division of benefits over costs (i.e. benefits/costs). A comparative chart of the benefit-cost ratios is presented in Exhibit 4-3. The BC ratio for each alternative is greater than 1, signifying the present value benefits are greater than the present value costs for each of the six proposed Phase II alternatives. A comparative chart of the present value net benefits by alternative is presented in Exhibit 4-4.

Exhibit 4-2: Benefit-Cost Summary of Proposed Alternatives (Present Value, 30 years)[51]

Alternative	Per Mile			Total			Benefit-Cost Ratio
	Benefit	Cost	Net Benefit	Benefit ($Millions)	Cost ($Millions)	Net Benefit ($Millions)	
1. All low stress	$ 235,834	$ 75,781	$ 160,053	$ 326.5	$ 104.9	$ 221.6	3.1
2. Small diameter within ½ mile of USA	$ 254,694	$ 37,206	$ 217,488	$ 25.6	$ 3.7	$ 21.9	6.8
3. Large diameter outside ½ mile of USA	$ 277,298	$ 116,517	$ 160,781	$ 233.1	$ 97.9	$ 135.2	2.4
4. Small diameter outside ½ mile of USA	$ 152,925	$ 7,264	$ 145,660	$ 67.8	$ 3.2	$ 64.6	21.1
5. All except Subpart H	$ 154,982	$ 18,175	$ 136,806	$ 214.5	$ 25.2	$ 189.3	8.5
6. All except the IMP	$ 233,879	$ 73,280	$ 160,599	$ 323.7	$ 101.4	$ 222.2	3.2

[51] A 2.7 real discount rate is applied as suggested by OMB Circular No. A-94 for 30 year net present values

Exhibit 4-3: Benefit-Cost Ratios for Proposed Alternatives

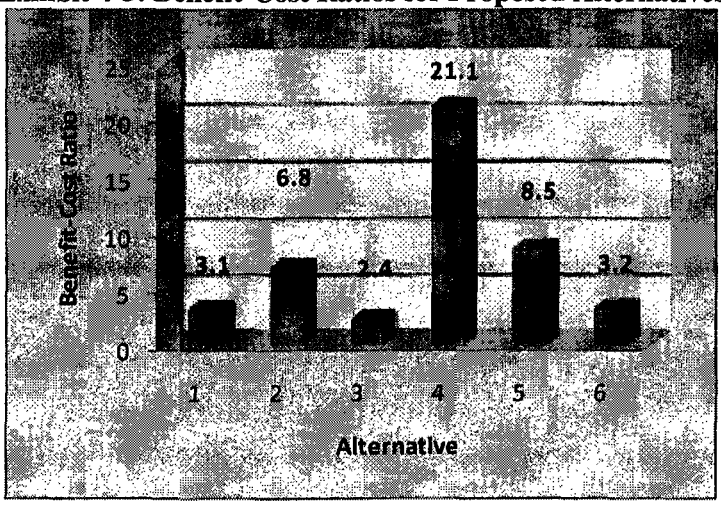
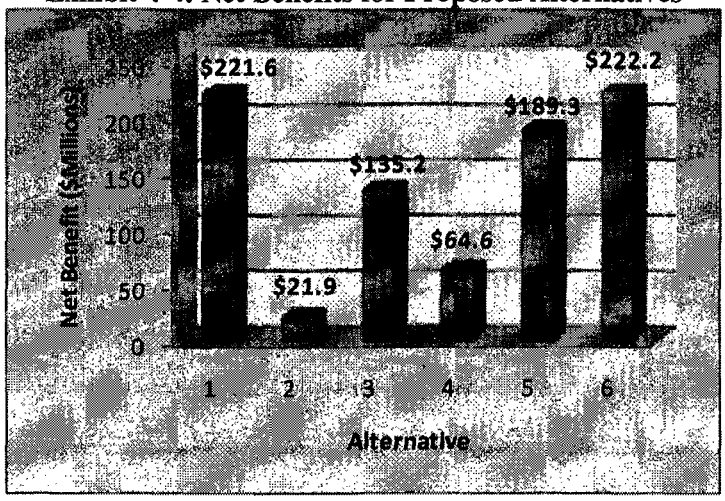


Exhibit 4-4: Net Benefits for Proposed Alternatives



Alternative 1: Apply all Part 195 requirements to all eligible low stress pipelines

This alternative applies a majority of the Part 195 requirements to all rural low stress pipelines. The only difference is that operators are not required to perform could affect analysis to determine the applicability of the IMP requirements. Instead the operators would utilize the ½-mile buffer zone. It is PHMSAS opinion that this alternative complies with the intent of the PIPES Act, and has a positive benefit cost ratio. Therefore, this alternative is selected for regulatory action.

The benefit-cost ratio for Alternative 1 is 3.1, indicating that the benefits of the rulemaking exceed the costs. This benefit-cost ratio would be even higher if nontraditional benefits were included. This alternative's benefit-cost ratio of 3.1 is relatively low compared to the other alternatives. However, this can be misleading when trying to determine the total overall benefit from the rulemaking. Alternative 1 has a net present value over 30 years of approximately $221.6 million. In terms of net benefit, this is the second largest of all the alternatives, and only slightly less than the net benefit of Alternative 6, which has the largest net benefit at $222.2 million.

PHMSA estimated the cost of this rulemaking based on costs either submitted or reviewed by operators of approximately 50 percent of the pipeline mileage subject to the rulemaking. Therefore, these costs estimates are assumed to be relatively reliable. The total cost of this rulemaking is well below the $100 million threshold for a significant regulatory action as defined by Executive Order 12866.

Alternative 1 has a positive benefit cost ratio and fully complies with the requirements of the PIPES Act. Therefore, it is the selected alternative for regulatory action. Alternatives 2 through 6 are examined in this Regulatory Analysis for the purpose of comparing benefits and costs.

Alternative 2: Apply all Part 195 requirements to small diameter low stress pipelines within ½ mile of an USA

Alternative 2 applies only to small diameter low stress pipelines within ½ mile of USAs. There are about 100 miles of this type of low stress pipeline. This sub-portion of low stress pipelines is unique because it is the only unregulated sub-portion in which the IMP is applicable. The IMP is important to the rulemaking both because a greater amount of corrosion is detectable as a result of the IMP and also because the IMP is relatively costly compared to other Part 195 subparts. In addition, applying the IMP to small diameter pipe may be difficult due to the size of the pipe restricting certain technologies such as pigging.

Alternative 2 allows for an examination of the benefits and costs by geographical sub-portion of the system where environmental impacts are of a greater concern. Alternatives 3 and 4 also examine sub-portions of the eligible low stress pipelines by geographic region, but only effect regions where environmental impacts are of less concern.

The benefit-cost ratio for Alternative 2 is relatively high at 6.8. However, the net benefit is relatively low at $21.9 million. The relatively low net benefit value reflects relatively low mileage for this sub-portion of the low stress pipeline system. Cost estimates for this sub-portion of low stress pipelines are relatively reliable as data was available for six operators. Companies that reported costs provided estimates of the costs of implementing Subpart F, and in general these costs were not particularly large.

Alternative 3: Apply all Part 195 requirements to large diameter low stress pipelines outside ½ mile of an USA

This alternative applies to all unregulated large diameter pipes. There are about 840 miles of this type of low stress pipeline. As all large diameter pipeline within ½ mile of an USA was regulated in Phase I, this alternative applies only to large diameter low stress pipelines outside ½ mile of an USA. This alternative examines a geographic sub-portion of eligible low stress pipelines where environmental impacts are of less concern.

The benefit-cost ratio for Alternative 3 is relatively low at 2.4. However, the net benefit is relatively high at $135.2 million. As expected, benefits for this alternative reflect the high cost of incidents and spill volumes for large diameter pipe. However, costs are also high due to the extremely high costs reported by Plains All American Pipeline, largely reflecting high Subpart H and Subpart F corrosion programs necessary for their particular pipeline. A factor in the large net benefit estimate is the relatively large number of eligible miles for the sub-portion. Cost estimates for this sub-portion of low stress pipelines are relatively reliable as data was available for eight operators.

Alternative 4: Apply all Part 195 requirements to small diameter low stress pipelines outside ½ mile of an USA

Alternative 4 will regulate only small diameter pipe outside ½ mile of USAs. It is estimated there are around 443 miles of this type of low stress pipeline. This alternative examines a geographic sub-portion of eligible low stress pipelines where environmental impacts are of less concern than an USA. The benefit-cost ratio for Alternative 4 is the highest of all the alternatives at 21.1. Alternative 4's net benefit is the second smallest of any alternative at $64.6 million, but is still substantially higher than Alternative 2, which has the smallest net benefit. The extremely high benefit-cost ratio reflects the relatively low costs reported by pipeline operators in this sub-portion of eligible low stress pipelines.

Alternative 5: Apply all Part 195 requirements, except Subpart H (Corrosion Control), to all low stress pipelines not currently regulated

Alternatives 5 and 6 differ from alternatives 2 through 4 in that they examine the subparts of the requirements as opposed to the subparts of the low stress pipeline system. Alternative 5 proposes the removal of Subpart H from all eligible miles of low stress pipeline. This subpart is composed of corrosion control requirements such as cathodic protection and external corrosion direct assessments. It is one of the two most costly subparts in terms of operator compliance and is thus excluded in this alternative in an attempt to vary regulatory stringency while minimizing cost. Excluding Subpart H in this alternative follows the OMB suggestion to vary alternatives by stringency; it provides further information on the relationship between corrosion control and the size and distribution of benefits and costs.

The benefit-cost ratio for Alternative 5 is relatively high at 8.5, and the net benefit is $189.3 million. While benefits are significantly reduced by this alternative, costs are also largely reduced, preserving a relatively high net benefit. Costs are fairly reliable with four companies providing estimates of compliance costs.

The benefit-cost ratio for this alternative, which excludes Subpart H, is higher than Alterative 1, which includes Subpart H. This indicates a relatively low benefit-cost ratio for Subpart H. However, Subpart H still provides slightly more benefits than costs.

Alternative 6: Apply all Part 195 requirements, except the Integrity Management Program, to all low stress pipelines not currently regulated

Alternative 6 applies all Part 195 requirements, except the IMP requirements to all low stress pipelines not currently regulated. The IMP requirement is one of the two most costly requirements in terms of operator compliance, and makes up the vast majority of this cost. It is, therefore, excluded to better determine its relationship to the size and distribution of benefits. This follows the OMB suggestion to vary alternatives by stringency.

The benefits and costs of this alternative are largely the same as those in Alternative 1 but with alterations to one sub-portion of low stress pipelines. The three primary methods used to assess pipeline integrity are in-line inspection, hydrostatic testing, and direct assessment. These inspections, tests, and assessments will need to be performed periodically.

The benefit-cost ratio for Alternative 6 is 3.2, which as expected is similar to Alternative 1. The net benefit, at $222.2 million, is also similar to Alternative 1. Costs are reliable with six companies providing estimates of compliance costs.

The benefit-cost ratio for this alternative, which excludes the IMP, is slightly higher than Alterative 1, which includes the IMP. As was the case for Subpart H, this indicates a relatively low benefit-cost ratio for the IMP.

4.3 Risk and Uncertainty

OMB Circular A-4 provides guidance to Federal agencies on the development of regulatory analysis as required under Executive Order 12866.[52] According to the OMB Circular:

> "The precise consequences (benefits and costs) of regulatory options are not always known for certain, but the probability of their occurrence can often be developed. The important uncertainties connected with your regulatory decisions need to be analyzed and presented as part of the overall regulatory analysis."

For rules that exceed a $1 billion annual threshold, the OMB Circular states that a formal quantitative analysis of uncertainty is required. For rules with annual benefits and/or costs in the range from $100 million to $1 billion, the OMB Circular states that agencies should still seek to use rigorous approaches, especially where net benefits are close to zero. This rulemaking, with annual benefits less than $10 million for each alternative, does not require such formal analysis of uncertainty. Although an uncertainty analysis is not required for a rulemaking with costs as small as the rulemaking under consideration, a brief discussion of risks and uncertainties is provided in this section.

The OMB Circular suggests that agencies consider the following analytical approaches that entail increasing levels of complexity:

- Disclose qualitatively the main uncertainties in each important input to the calculation of benefits and costs.
- Use a numerical sensitivity analysis to examine how the results vary with plausible changes in assumptions, choices of input data, and alternative analytical approaches.
- Apply a formal probabilistic analysis.

The following three sections describe the major uncertainties in the calculation of pipeline mileages, benefits, and costs. The following section provides a simplified numerical sensitivity analysis. A concluding section provides some observations on the prospects for developing a formal probabilistic model and analysis.

Pipeline Mileages

There is a certain amount of uncertainty with respect to the mileages of pipelines subject to the proposed rulemaking. PHMSA made a substantial effort to identify operators of low stress pipelines. However, quite often the operators that reported low stress mileage in this analysis actually did not operate such lines, as was determined after in depth examination. The estimate of mileage that is used is conservative, in that it both includes some segments that might not be low stress pipelines and assumes operators that did not respond to the survey operate the same relative proportions of low stress pipeline miles as operators who did respond.

Pipeline mileages are important in this analysis for two key reasons. First, even with the conservatively high estimate of mileage, there is no evidence that the cost of the rulemaking is within an order of magnitude that would qualify it as a major rule. Second, the benefits and costs of the rule appear to vary directly with the number of miles subject to the rulemaking. Therefore, even though there is uncertainty

[52] Office of Management and Budget, Circular A-4, http://www.whitehouse.gov/omb/circulars_a004_a-4/#c

with respect to the number of miles subject to the rulemaking, there is great certainty that there are not enough miles to qualify this as a major rule. There is also little risk that the estimate of miles will affect whether the rulemaking is cost beneficial.

Costs of the Regulation

There is also uncertainty in the costs of the rulemaking; however, PHMSA believes that the estimates are conservatively high. In general, PHMSA's study team collected the cost estimates directly from the operators or developed them in direct consultation with the operators. The operators would not have an incentive to underestimate costs. In fact, several operators appeared to include compliance costs that would bring all of the portions of their system in compliance with all of the requirements of Part 195 even for portions of the systems that are not in compliance. For example, Plains All American Pipeline appeared to include costs to comply with IMP even on their rural non-USA portions of their system, which are exempt from IMP requirements.

Benefits of the Regulations

The largest source of uncertainty in the analysis is the estimate of benefits. The major source of benefits of the proposed rulemaking is the reduction in costs associated with pipeline incidents. Ideally, this analysis would compare incident costs for unregulated segments with incident costs for regulated segments, with the benefit calculated as the avoided costs. However, since PHMSA has not historically collected incident data on unregulated pipeline segments, PHMSA could not calculate benefits using this approach. Attempts to collect data on unregulated segments from state agencies or foreign countries were also largely unsuccessful.

In addition, even if such data were available, the results of such an analysis may still be unreliable, due to the small number of unregulated pipeline miles and the extremely low frequency of pipeline incidents. Therefore, it would require many years of data to develop a robust probabilistic model of incidents.

Simplified Numerical Sensitivity Analysis

The available data do not allow for a formal quantitative analysis of the relevant uncertainties about benefits and costs. However, a simplified sensitivity analysis can identify the degree to which the results would change with changes in the level of benefits and costs. According to the OMB Circular A-4 "Sensitivity analysis usually proceeds by changing one variable or assumption at a time, but it can also be done by varying a combination of variables simultaneously to learn more about the robustness of your results to widespread changes."

Exhibit 4-5 provides a simplified sensitivity analysis that examines the effect on the final benefit-cost ratio of increasing costs and decreasing benefits individually or simultaneously by 10, 25 and 50 percent. As shown in the exhibit, even increasing the cost estimate by 50 percent and simultaneously decreasing the benefit estimate by 50 percent, still results in a positive benefit-cost ratio.

Exhibit 4-5: Sensitivity Analysis

Sensitivity Scenario	Benefits ($, Millions)	Costs ($, Millions)	B/C Ratio
Alternative 1 benefits and costs	$ 326.5	$ 104.9	3.11
Increase costs by 10%	$ 326.5	$ 115.4	2.83
Decrease benefits by 10%	$ 293.9	$ 104.9	2.80
Increase costs by 10% and decrease benefits by 10%	$ 293.9	$ 115.4	2.55
Increase costs by 25%	$ 326.5	$ 131.1	2.49
Decrease benefits by 25%	$ 244.9	$ 104.9	2.33
Increase costs by 25% and decrease benefits by 25%	$ 244.9	$ 131.1	1.87
Increase costs by 50%	$ 326.5	$ 157.4	2.07
Decrease benefits by 50%	$ 163.3	$ 104.9	1.56
Increase costs by 50% and decrease benefits by 50%	$ 163.3	$ 157.4	1.04

A Formal Probabilistic Model

For regulatory proposals that cost more than $1 billion, the OMB Circular A-4 requires a formal probabilistic analysis. The proposed rulemaking cost significantly less than the $1 billion threshold. However, PHMSA recognizes that the development of a probabilistic risk model for pipeline incidents would facilitate the analysis of this rulemaking as well as the future development of pipeline regulations. The key component to the development of such a model would be the collection of more detailed data on the characteristics of each unique segment of pipeline such that PHMSA could match up the detailed causes of each incident with the mileage of the affected type of pipelines. This would require substantial increases in reporting burdens on pipeline operators. It has been reported to the PHMSA study team that at least one Canadian natural gas pipeline operator has made a preliminary attempt to create a probabilistic risk model for natural gas pipelines. In the future, PHMSA will consider evaluating the data requirements and benefits of developing such models.

5. REGULATORY ANALYSES AND NOTICES

This chapter presents the Regulatory Flexibility Analysis, Preliminary Environmental Assessment, Paperwork Reduction Analysis, Executive Order 13211 Energy Analysis and Unfunded Mandates Analysis.

5.1 Regulatory Flexibility Analysis

Under the Regulatory Flexibility Act (5 U.S.C. 601 et seq.), PHMSA must consider whether rulemaking actions would have a significant economic impact on a substantial number of small entities. The purpose of this Act is to fit regulatory and informational requirements to the scale of the businesses, organizations, and governmental jurisdictions subject to regulation.

Need for the Rulemaking

This proposed rulemaking covers certain unregulated rural low stress pipelines. Beginning in 1991, Congress paid greater attention to the risks that hazardous liquid and natural gas pipelines pose to the environment. In the Pipeline Safety Act of 1992 (Pub. L.102-508), Congress gave the USDOT greater authority to protect the environment from risk that pipelines pose. Congress continued to emphasize the need to better protect the environment from the risks pipelines pose in the Accountable Pipeline Safety and Partnership Act of 1996 (Pub. L.104-304). With the PIPES Act of 2006 (Pub. Law No. 109-468), Congress went further and instructed the USDOT to apply all Part 195 requirements to unregulated low stress pipelines.

It should be noted that, with respect to unregulated low stress pipelines, PHMSA has decided to undertake the effort to apply all Part 195 requirements as a two-phase process. The decision was based on an analysis of its alternatives. The first phase, completed by the previous ruling, covered large diameter low stress pipelines within ½ mile of an USA. This was the highest risk low stress pipeline segment. The second phase, which is covered by this rulemaking, covers the remaining unregulated low stress pipelines. This includes small diameter pipelines within ½ mile of an USA, small diameter pipelines outside ½ mile of an USA, and large diameter pipelines outside ½ mile of an USA.

Description of Actions

PHMSA is bringing the remaining rural low stress pipelines not regulated by Phase I under the safety regulation of 49 CFR Part 195. These lines include low stress small diameter pipelines within ½ mile of an USA, small diameter low stress pipelines outside ½ mile of an USA, and large diameter low stress pipelines outside ½ mile of an USA.

Related Federal Rules and Regulations

The Regulatory Flexibility Act section § 603 (b)(5) requires "an identification, to the extent practicable, of all relevant Federal rules which may duplicate, overlap or conflict with the proposed rule." With respect to the safety of transporting hazardous liquids, PHMSA has one previous rulemaking, as described above. Phase I, which became effective on July 3, 2008, extended all of 49 CFR Part 195 requirements to higher risk low stress pipelines. This encompassed large diameter low stress pipelines within ½ mile of an USA. The Regulatory Flexibility conclusion for Phase I was as follows:

> "Based on consultations with the IPAA, which represents over 6,000 independent crude oil and natural gas producers throughout the U.S. and with the Small Business Administration, PHMSA expects a very few small operators to be affected by the rule. Rather, PHMSA expects that the rule will affect major petroleum pipeline companies with more than 1,500 employees."

There are currently no related rules or regulations issued by other department or agencies of the Federal Government.

Identification of Potentially Affected Small Entities

In accordance with size standards published by the Small Business Administration, a pipeline transportation business with 1,500 or fewer employees is considered a small entity.[53] Depending on the products being transported, low stress pipeline operators belong either to the North American Industry Classification System Code (NAICS) Pipeline Transportation of Crude Oil category (486110) or the Pipeline Transportation of Refined Petroleum Products category (486910). For both NAICS codes, a business with 1,500 or fewer employees is considered a small entity.

This regulatory change would affect operators of small diameter low stress pipelines within ½ mile of an USA, small diameter low stress pipelines outside ½ mile of an USA, and large diameter low stress pipelines outside ½ mile of an USA. PHMSA, through the Volpe Center has made an extensive effort to identify small and other operators of low stress pipelines. In 2008, the Volpe Center conducted two surveys of low stress pipeline operators. The objective of these surveys was to provide PHMSA better information about the number of miles and compliance costs of low stress pipelines.

Due to a small sample size and low response rate in the first survey, the Volpe Center's second survey aimed to obtain a more reliable estimate of low stress pipelines by engaging the entire hazardous liquid pipeline industry. Based on data collected by PHMSA from entities that operate regulated low stress pipelines, it was estimated that approximately 288 companies might operate low stress pipelines. In addition, there was the potential for an unknown number of entities that exclusively operated previously unregulated pipelines.

To ensure that the response rate was maximized, PHMSA publicized its plans to conduct the survey in (1) a 60-day Federal Register (FR) notice published on September 6, 2006 (FR volume 71, number 52504), and (2) a 30-day FR notice published on September 7, 2007 (FR volume 72, page number 51489). No comments were submitted to either notice. PHMSA then announced the availability of the survey in a FR notice published on July 31, 2008 (FR volume 73, page number 44800). According to participants in the pre-test low stress pipeline operators tend to read the FR and would be encouraged to participate in the surveys by the notices.

PHMSA delivered the survey and a letter explaining the importance of the study via three methods:

1. A version of the survey that allowed operators to directly input responses was posted on the PHMSA Office of Pipeline Safety's (OPS) Online Data Entry website (ODES). An e-mail announcing the low stress pipeline survey was sent to the contact person responsible for each company's most recent annual report submission.

[53] U.S. Small Business Administration "Table of Small Business Size Standards Matched to North American Industry Classification System Codes. August 22, 2008. http://www.sba.gov/idc/groups/public/documents/sba_homepage/serv_sstd_tablepdf.pdf

2. Respondents were also able to print an electronic version of the survey directly from the e-mail received and mail or fax a completed hard copy to the Volpe Center.

3. Finally, in an effort to reach companies that currently operate unregulated pipelines exclusively, PHMSA and the Volpe Center worked with the American Petroleum Institute, the Association of Oil Pipelines, and the Independent Petroleum Association of America to announce and distribute the survey to their members via their email newsletters.

Of the 112 operators that responded to the survey, 21 reported low stress pipeline mileage. PHMSA then conducted an additional follow-up survey with these operators for Phase II. Only 12 of the 21 operators were identified as actually having low stress pipeline mileage eligible for the Phase II rulemaking. Of the 12 operators, there were 11 enterprises – ConocoPhillips has two operators with Phase II eligible low stress pipelines. Information on these enterprises was collected from a compilation of Dun & Bradstreet data purchased by PHMSA, online company profiles, and a direct phone call to one operator. The enterprise name, number of employees, revenues, profits, compliance costs, and affected mileage are listed in Exhibit 5-1.

Exhibit 5-1: Low Stress Operator Profiles

Operator Enterprise	Number of Employees	Revenue (millions)	Profits (millions)	Affected Mileage	Compliance Costs			Data Source
					Initial	Recurring Every one year	Recurring Every five year	
ExxonMobil US Production	107,000	$ 372,824	$ 40,610	2.7	$ 179,000	$ 2,000	$ -	CNN Financial Profile, http://money.cnn.com/magazines/fortune/global500/2008/snapshots/387.html
ConocoPhillips	32,600	$ 178,558	$ 11,891	56.8	$ 15,000	$ 3,000	$ -	CNN Financial Profile, http://money.cnn.com/magazines/fortune/global500/2008/snapshots/327.html
Holly Energy Partners	1,381	$ 5,867	N/A	30.3	$ -	$ -	$ -	LinkedIn, http://www.linkedin.com/companies/holly-corporation
BP	97,600	$ 291,438	$ 20,845	2.8	$ -	$ -	$ -	CNN Financial Profile, http://money.cnn.com/magazines/fortune/global500/2008/snapshots/6327.html
Marathon Pipe Line LLC	30,360	$ 77,193	$ 3,528	82.9	$ 645,000	$ -	$ 268,000	Marathon Fact Book (2008), http://www.marathon.com/content/documents/investor_center/fact_books/2008_factbook_final.pdf
Sunoco Pipeline LP	14,200	$ 42,101	$ 891	45.0	$ 500,000	$ -	$ 500,000	CNN Financial Profile, http://money.cnn.com/magazines/fortune/global500/2008/snapshots/396.html
Plains All American Pipeline, L.P.	2,000	$ 31,177	$ 217	178.7	$ 13,632,100	$ 564,500	$ 5,691,200	CNN Financial Profile, http://money.cnn.com/magazines/fortune/global500/2008/snapshots/11014.html
McCain Pipeline Company	2	N/A	N/A	4.0	$ 475,000	$ -	$ 100,000	Operator Phone Call
MarkWest Energy Partners	471	$ 1,338	N/A	100.0	$ -	$ -	$ -	Dun&Bradsheet
Westlake Petrochemicals	2,955	$ 2,290	$ 69	6.3	$ 121,500	$ -	$ 100,000	Yahoo Financial Profile, http://finance.yahoo.com/q/pr?s=WLK
Chevron Pipe Line Company	65,035	$ 210,783	$ 18,688	37.0	$ -	$ -	$ -	CNN Financial Profile, http://money.cnn.com/magazines/fortune/global500/2008/snapshots/385.html

Exhibit 5-1 shows that 3 of the 11 enterprises fall under 1,500 employees and are thus considered small entities. These operators are Holly Energy Partners, McCain Pipeline Company, and MarkWest Energy Partners. The cost estimation analysis – described in the Regulatory Analysis – concluded that both Holly Energy Partners and MarkWest Energy Partners are in full compliance with Part 195 and thus have no compliance costs. Therefore, these two small entities will not be adversely affected by the rulemaking. McCain Pipeline Company reports an initial compliance cost of $475,000 and recurring costs of $100,000 every five years. The small entity has 4 miles of affected low stress mileage.

Alternate proposals for small businesses

The Regulatory Flexibility Act directs agencies to establish exceptions and differing compliance standards for small businesses, where it is possible to do so and still meet the objectives of applicable regulatory statutes.

All six alternatives generate a benefit greater than the compliance cost. If the proposed Alternative 1, which regulates all eligible low stress pipelines, is a significant economic burden to McCain Pipeline Company or any other small entity not identified in this Regulatory Flexibility Analysis, PHMSA can consider applying one of the other five alternatives to small businesses to reduce compliance costs.

Conclusion

There will only be an economic impact of this proposed rule to one known small entity. Therefore, in accordance with section 605 of the Regulatory Flexibility Act, this proposed rulemaking will not have a significant impact on a substantial number of small entities. Various alternatives of the Phase II rulemaking are in place to help reduce the economic burden associated with the rulemaking. In addition, if this one entity or any other small entities experience too significant an economic burden to continue operations, they may appeal to PHMSA for review of their regulatory requirements.

5.2 Preliminary Environmental Assessment

The National Environmental Policy Act (NEPA) requires federal agencies to integrate environmental values into their decision making processes by considering the environmental impacts of their proposed actions and reasonable alternatives to those actions. Accordingly, a preliminary environmental assessment was performed to examine the environmental impacts the proposed rulemaking and reasonable alternatives would have on the environment.

The preliminary environmental assessment found that the proposed rule would not significantly affect the quality of the environment. This proposed rule will require only limited physical modification or other work that would disturb pipelines, such as identifying segments of pipelines meeting the regulatory definitions, inspection and testing, installing and maintain line markers, implementing corrosion controls, pipeline cleaning, and establishing integrity assessment programs. It is expected these new requirements will reduce the risks of accidents and spills on applicable pipelines. The preliminary environmental assessment concludes the expected reductions in hazardous liquid spills are a minor to moderate positive environmental impact offsetting the negligible negative environmental impacts associated with implementing the proposed rule. The full preliminary environmental assessment can be found as a separate document.

5.3 Executive Order 13211

This proposed rule is not a ``significant energy action" under Executive Order 13211. It is not likely to have a significant adverse effect on the supply, distribution, or use of energy. In fact, as this rulemaking is designed to reduce pipeline incidents and spills, it is expected to have a positive effect on the supply, distribution and use of energy. The effects of this proposed rulemaking on energy security and disruptions to domestic supply are discussed in the nontraditional benefits section of the regulatory analysis. While difficult to quantify, it is determined that this rulemaking can only positively affect national energy security. Furthermore, this proposed rulemaking has not been designated by the Administrator of the Office of Information and Regulatory Affairs as a significant energy action.

5.4 Unfunded Mandates Reform Act of 1995

This proposed rulemaking does not impose unfunded mandates under the Unfunded Mandates Reform Act of 1995. It does not result in costs of $141.3 million or more to either State, local, or tribal governments, in the aggregate, or to the private sector, and is the least burdensome alternative that achieves the objective of the proposed rulemaking.