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**REVIEW OF PHMSA'S REGULATORY ANALYSIS
FOR THE EXTERNAL PIPING REQUIREMENT**

Prepared for National Tank Truck Carriers, Inc.

By Edgeworth Economics

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REVIEW OF PHMSA'S REGULATORY ANALYSIS FOR THE EXTERNAL PIPING REQUIREMENT

I. Background and Summary of Findings

On January 27, 2011, the Pipeline and Hazardous Materials Safety Administration (PHMSA) issued a notice of proposed rulemaking and a regulatory assessment for a proposed rule regarding external product piping on cargo tanks transporting flammable liquids.¹ PHMSA's proposed rule would restrict the transport of flammable liquids in external exposed piping (known as "wetlines") to no more than one liter per line.² PHMSA's proposal would apply to new tankers beginning two years after promulgation of the rule and would allow a 10-year compliance period for retrofitting the existing fleet.³

PHMSA's proposed rule is essentially identical to one previously proposed by the agency in 2004 and then withdrawn in 2006. At the time, PHMSA stated that it "did not identify a cost-effective approach for addressing the risk of wetlines transportation through regulatory action."⁴ The agency had calculated that the costs associated with the proposed rule would exceed the benefits by approximately 5 percent (i.e., a "benefit-cost ratio" of 0.95).⁵ In the current NPRM, PHMSA now states that it has reopened the regulatory action "[b]ased on the number of wetlines incidents that continue to occur as well as the open NTSB recommendation, as well as concerns regarding the possibility of a low probability high-consequence event associated with a wetlines incident."⁶

In the current Regulatory Assessment, PHMSA estimates the costs of the proposed rule based on the assumed compliance by the trucking industry through installation of purging systems developed by Cargo Tank Concepts, Ltd. ("CTC"). PHMSA estimates benefits based on the avoidable costs associated with historical wetlines incidents. As in its previous analyses, PHMSA again concludes that the costs of the proposed rule will exceed the benefits. Depending on the discount rate applied, PHMSA calculates that the present value of costs will exceed the present value of benefits by 4 to 16 percent.⁷ PHMSA also calculates expected costs and benefits of the proposed rule assuming both longer and shorter compliance periods for retrofits. In the scenario in which no retrofits are required (i.e., compliance in 20 years, the approximate average lifespan of a tanker), PHMSA still finds that the costs of the proposed rule would exceed the benefits by 2 to 13 percent.⁸ Thus, the agency is proposing to implement a rule which, according to its best estimates, would impose a net cost on society. Additionally, PHMSA develops

¹ "Regulatory Assessment and Regulatory Flexibility Analysis – Hazardous Materials: Safety Requirements for External Product Piping on Cargo Tanks Transporting Flammable Liquids," prepared by the Pipeline and Hazardous Materials Safety Administration, January 2011 ("Regulatory Analysis"); and "Hazardous Materials: Safety Requirements for External Product Piping on Cargo Tanks Transporting Flammable Liquids – Notice of Proposed Rulemaking," Federal Register, v. 76, n. 18, January 27, 2011, pp. 4847-4854 ("2011 NPRM").

² 2011 NPRM, p. 4850.

³ *Ibid.*, pp. 4850-4851.

⁴ "Hazardous Materials: Safety Requirements for External Product Piping on Cargo Tanks Transporting Flammable Liquids – Withdrawal of Notice of Proposed Rulemaking," Federal Register, v. 71, n. 109, June 7, 2006, pp. 32909-32911 ("2006 WNPRM").

⁵ PHMSA calculated a present value of benefits of \$50.9 million and a present value of costs of \$53.6 million, based on an assumption that the rule would apply to both the existing fleet as well as new tankers. [2006 WNPRM, p. 32910]

⁶ 2011 NPRM, p. 4849.

⁷ Regulatory Analysis, p. 5.

⁸ *Ibid.*

“sensitivity analyses” using alternate assumptions (which are not based on actual data) and estimates benefit-cost ratios in the range of 0.74 to 1.71.⁹ PHMSA concludes:

Because of the uncertainties inherent in calculating the overall benefits that would accrue and the potential for a wetlines incident to result in catastrophic consequences, we are confident that the costs associated with the proposed requirement will be more than offset by resulting benefits not quantified in this analysis, such as long-term environmental remediation and litigation costs avoided.¹⁰

National Tank Truck Carriers, Inc. (NTTC) asked Edgeworth Economics to review PHMSA’s economic analysis in the 2011 NPRM and Regulatory Assessment and to determine whether the agency’s conclusions are consistent with the best available information and methodologies. Our conclusions can be summarized as follows:

- PHMSA underestimates the costs of the proposed rule by 1) underestimating the cost of purging system equipment by assuming installation of manual purging systems, yet simultaneously assuming no delay at the loading rack; 2) understating both the amount of time required for installation and the per-hour labor cost of install technicians; and 3) understating the likely impact of purging systems on the carrying capacity of tankers.
- Assuming no delay at the loading rack, we calculate that the present value of total costs over a 20-year period will be in the range of \$122.7 million (7 percent discount rate) to \$176.4 million (3 percent). These figures are approximately two times the values estimated by PHMSA for its “Alternative 3” (10-year compliance) scenario. When a delay of two minutes per load is added to the analysis, we calculate that the present value of total costs will be in the range of \$339.1 million (7 percent discount rate) to \$535.5 million (3 percent). These figures are approximately six times the values estimated by PHMSA. These figures do not include any costs related to the risk of “hot work” on in-service tankers, driver training, enforcement, or increased air pollution caused by purging systems—all of which are ignored by PHMSA.
- In its analysis of historical incidents related to wetlines, PHMSA fails to accurately assess the effect that the presence of a purging system would have on the costs associated with the incidents. In particular, when calculating the costs potentially avoidable by purging the wetlines, PHMSA includes 1) incidents in which impingement of the wetlines caused a release of less than one gallon of product; 2) costs of injury and carrier damage in some cases where no fire occurred; 3) costs associated with incidents involving straight trucks as well as those involving trucks carrying combustible (rather than flammable) products; and 4) costs associated with incidents involving a release of greater than 50 gallons of product—i.e., involving a breach of the tank or other equipment failure—without a subsequent fire. The proposed rule would not mitigate the damage caused by such incidents. As a consequence of these errors, PHMSA substantially overestimates the potential benefits of the proposed rule.
- To calculate the expected benefits of the proposed rule, we apply PHMSA’s methodologies and assumptions only to historical incidents for which the presence of a purging system likely would have reduced the extent of damage. We calculate total avoidable costs associated with historic wetlines incidents of approximately \$4.6 million annually, based on implementation across the entire tanker fleet. This figure should be compared to PHMSA’s estimate of approximately \$7.7 million per year.
- Based on these calculations, we estimate benefit-cost ratios for the proposed rule in the range of 0.20 to 0.30 when no delay at the loading rack is considered—i.e., the costs of the proposed rule exceed the

⁹ *Ibid*, pp. 5-6.

¹⁰ 2011 NPRM, p. 4852.

benefits by a factor of at least three. When a two-minute delay is included, the benefit-cost ratios fall to 0.08-0.09—i.e., the costs of the proposed rule exceed the benefits by a factor of more than ten. Since our calculations omit consideration of many other potential costs, such as the risk to repair personnel and increased VOC emissions, it is clear that the proposed rule will impose substantial net costs on society.

- PHMSA’s “sensitivity analysis” provides no relevant information for a cost-benefit analysis. The agency’s alternative assumptions are arbitrary, unsupported by analysis or real-world data, and biased to result in higher estimates of benefits and lower estimates of costs.

This report was prepared by Jesse David with assistance from Chuck Fields at Edgeworth Economics. Edgeworth is a consulting firm that provides analysis and advice on economic and regulatory issues for companies, individuals, industry groups, and government agencies. Dr. David holds a Ph.D. in Economics from Stanford University and has 14 years of experience as a professional economist. Dr. David specializes in the evaluation of regulatory policies, economic impact analysis, and the valuation of assets and businesses in complex commercial transactions and disputes. He has testified before regulatory agencies, such as the Federal Energy Regulatory Commission and the National Energy Board of Canada, as well as in Federal and State courts on a variety of economic issues. Dr. David also has served as a peer reviewer for the Environmental Protection Agency’s STAR grant program. Dr. David has prepared studies for entities such as the National Football League Players Association, the San Diego County Water Authority, the New York Power Authority, and the Ocean Conservancy. Dr. David also has prepared economic analyses of other federal rules affecting the trucking industry.¹¹

II. Costs of the Proposed Rule

The proposed rule would impose a number of different types of costs on the trucking industry and the public, including:

- The costs of equipment and installation associated with purging systems for new tanker trucks and, depending on the regulatory scenario, for some or all of the existing fleet.
- Maintenance costs for the purging systems.
- “Weight penalty” costs related to reduced carrying capacity of tankers when loaded to the maximum allowable weight.
- The cost of delay at the loading rack.
- Additional costs, including: risk to technicians during tanker retrofits; training costs for drivers; enforcement costs; and air pollution caused by the operation of the purging systems.

PHMSA estimates the impact of the proposed rule with regard to the first three categories of costs. However, the agency ignores a number of important components of these costs and underestimates others. PHMSA also ignores the additional categories of costs entirely. In this section, we evaluate the likely impact on the industry based on the best available data.

¹¹ See, for example, “Review of FMCSA’s Regulatory Impact Analysis for the 2010-2011 Hours of Service Rule,” prepared for the American Trucking Associations by Edgeworth Economics, February 15, 2011.

A. Equipment and Installation

For the purging equipment, PHMSA assumes a cost of \$2,300 per system plus 12 hours of labor for installation at \$23.75 per hour.¹² The agency assumes that these costs would apply to both new and retrofitted units.¹³ PHMSA's assumptions are based on testimony before Congress by a representative of CTC, a manufacturer of purging systems. The \$2,300 per-unit cost figure represents CTC's current pricing for a "manual" purging system, which does not include optical sensors and other components necessary to allow operation in the absence of the driver or other person monitoring the purging process.¹⁴ Under PHMSA's assumptions, the total cost of the equipment and installation of these systems ranges from \$3.5 million per year, if only new trucks are covered by the rule, up to \$69.8 million in the first year, if the entire fleet is required to retrofit immediately.¹⁵

There are several problems with PHMSA's assumptions regarding equipment and installation costs. First, PHMSA assumes that all carriers would choose the manual system, which requires monitoring by the driver during the purge. In the Regulatory Assessment, however, PHMSA claims that "operation of a manual purging system can be done immediately following loading of a compartment and *will not require any additional time from the driver* or from terminal employees to operate."¹⁶ Similarly, in the 2011 NPRM the agency asserts that "[t]he purge can be completed after the CTMV leaves the loading racks and *will not create additional standing time* for the vehicle."¹⁷ PHMSA therefore includes no cost associated with additional waiting time at the loading rack. These assumptions are inconsistent with our understanding of the operation of the manual system. We understand that a manual purge requires at least 3.5 minutes of driver attention/delay subsequent to loading the tanker compartment.¹⁸ Assuming that the *only* cost associated with a delay at the rack is the cost of the driver's time (i.e., ignoring additional costs due to reduced availability of the truck and increased congestion at the rack), we calculate that the additional cost to the industry would be at least \$61.6 million per year once purging systems were in operation across the entire fleet, based on the conservative estimate of a single 3.5-minute delay per load.¹⁹ This cost alone represents more than *ten times* the annual benefits of the proposed rule, as we describe below. Clearly, the proposed rule would fail any reasonable cost-benefit test if manual purging systems represented the best means of compliance.

CTC also offers an "automatic" purging system, which may reduce the potential for delays at the loading rack relative to its manual system. In its assessment of the feasibility of the proposed rule, PHMSA cites the installation and use

¹² Regulatory Assessment, p. 17.

¹³ *Ibid*, pp. 12 and 24.

¹⁴ Testimony of Ron Andenmatten, Cargo Tank Concepts, Ltd., before U.S. House of Representatives, Committee on Transportation and Infrastructure, Subcommittee on Railroads, Pipelines, and Hazardous Materials, November 16, 2009 ("CTC Testimony"); and CTC website at www.cargotankconcepts.com/wetlinepurgingsystem.htm, accessed April 8, 2011.

¹⁵ Note, at present CTC is the only supplier of the purging system described by PHMSA and the company has not manufactured its systems at the scale necessary to comply with the proposed rule. PHMSA has not analyzed whether CTC (or any other supplier) could deliver the thousands of systems that would be required within the time frame of the proposed rule. If there are supply bottlenecks, compliance costs could increase further (or simply become infeasible).

¹⁶ Regulatory Assessment, p. 13 (emphasis added).

¹⁷ 2011 NPRM, p. 4851 (emphasis added).

¹⁸ CTC produced a video showing operation of its manual system for a single line with a duration of 3.5 minutes. [www.youtube.com/watch?v=5QOoK2GDo0A, accessed April 13, 2011] If purging of a line cannot be accomplished during the loading of subsequent lines, then the total delay could be multiples of this time. Based on discussions with NTTC personnel, we understand that some truckers have experienced total delays of 8 or 9 minutes (or more) for purging of all lines at the loading rack, based on limited experience with these systems to date.

¹⁹ Based on PHMSA's estimate of 36.5 million trips per year [Regulatory Assessment, p. 19] and a labor cost of \$28.90 per hour for truck drivers [U.S. Bureau of Labor Statistics at data.bls.gov/cgi-bin/print.pl/oes/2009/may/oes533032.htm and www.bls.gov/news.release/ecec.t10.htm, accessed April 13, 2011].

of approximately 120 automatic purging systems by Sunoco, a petroleum products distributor.²⁰ However, as noted above, PHMSA bases its cost estimate on CTC's pricing for the manual system. In fact, CTC charges \$1,500-\$1,650 more for the automatic system and notes that installation requires an additional 2 person-hours.²¹ Therefore, if delay costs are to be ignored, as PHMSA has done in the Regulatory Assessment, then actual costs to the industry should be based, at a minimum, on the higher cost of the automatic purging systems. Note, however, that even an automatic system will cause delays at the rack if the driver must be in attendance during the purge or if regulatory requirements dictate that the truck must remain in the loading rack during the purge.²² Below, we also consider a scenario in which compliance through installation of the automatic purging systems causes a short delay at the loading rack. Finally, we understand that installation of a CTC system requires additional parts, such as hoses and gaskets, which are not included in CTC's list price. These additional parts cost approximately \$600 per unit, based on actual installation experience by Baltimore Cargo Tank Services, Inc. ("BCTS"), the service company that installed the Sunoco units.²³

In addition to the problems with PHMSA's assumptions regarding equipment cost, the agency's estimate of labor costs appears to be far too low. The most recent figures from the Bureau of Labor Statistics indicate an hourly cost of \$33.23 for production workers in the Motor Vehicle and Parts Manufacturing industry,²⁴ which may be an appropriate measure for the cost of installing purging systems on new trucks at the factory. We understand that retrofitting a purging system requires skilled repair technicians whose labor costs are approximately \$70 per hour, based on actual charges by repair centers that serve the tanker industry.²⁵ In addition, PHMSA's estimate of the amount of time required to install a purging system is understated. As noted above, CTC estimates that installing an automatic system requires approximately 2 additional person-hours, relative to its manual system. We therefore assume that new systems require 14 person-hours for installation. Actual experience by BCTS indicates much greater labor requirements for retrofitting—approximately 32-36 person-hours.²⁶ We adopt a conservative estimate of 25 person-hours for retrofitted units, reflecting a potential reduction in per-unit installation time associated with the large number of installations across the industry required to meet the proposed rule.

In addition to the costs associated with equipment and labor, a retrofit requirement would necessitate withdrawing tankers from operation, resulting in additional costs. PHMSA assumes that no such costs would be incurred, claiming that "the system may be installed when the CTMV is out of service for mandated inspection and testing."²⁷ This assertion makes no sense. Carriers would not leave tankers out of service for any longer than necessary for the required services under current regulations and business conditions. If the proposed rule requires retrofits, the out-of-service time for tankers will necessarily increase. We calculate costs associated with installation downtime for retrofitted units based on the assumption that the industry would increase the size of the tanker fleet sufficiently to allow each existing unit to be withdrawn for two days without reducing the total availability of in-service vehicles. For example, in the scenario in which compliance is required in five years, PHMSA assumes that 4,050 vehicles will be

²⁰ 2011 NPRM, p. 4849 and CTC Testimony, pp. 3-5.

²¹ CTC charges \$3,800 for a four-compartment automatic system and \$3,950 for a five-compartment automatic system. [CTC website at www.cargotankconcepts.com/wetlinepurgingsystem.htm, accessed April 8, 2011] We assume an average cost of \$3,875 per unit.

²² See, for example, 49 C.F.R. § 177.834(i)(1).

²³ Based on correspondence with Roy Clark of BCTS and review of invoices for BCTS's work on the Sunoco trucks.

²⁴ U.S. Bureau of Labor Statistics at ftp.bls.gov/pub/special.requests/ForeignLabor/pwind3361naics.txt, accessed April 13, 2011.

²⁵ In a recent survey performed by NTTC, carriers reported labor costs for repair and maintenance in the range of approximately \$60 to \$110 per hour. [Survey results for approximately 40 carriers provided to Edgeworth Economics by NTTC ("NTTC Survey")] BCTS currently charges \$80 per hour. [Correspondence with Roy Clark of BCTS] We adopt a figure at the lower end of this range for the purpose of our calculations here.

²⁶ Based on correspondence with Roy Clark of BCTS and a review of invoices for BCTS's work on the Sunoco trucks.

²⁷ Regulatory Assessment, p. 24.

retrofitted during each of the first five years of the rule. Based on the assumption that each retrofit requires two days of downtime, we calculate that the industry will require 25 additional trucks in order to compensate for the lost trips.²⁸ We assess “fleet expansion” costs in the first year of the rule based on a \$90,000 cost for each new tanker required.²⁹

In summary, we calculate total costs associated with equipment and installation of automatic purging systems ranging from a minimum of \$6.7 million per year, if only new trucks are covered by the rule, to a maximum of \$166.3 million in the first year, if the entire fleet is required to retrofit immediately.

B. Maintenance

PHMSA assumes that the purging systems require maintenance costs of \$3 per year per unit, citing only “information from industry and the relative simplicity of the system’s components.”³⁰ The agency further assumes that the operational life of a purging system will be at least as long as the average lifetime of a tanker—assumed to be 20 years. PHMSA’s assumed annual maintenance cost represents less than one-tenth of 1 percent of the capital costs associated with CTC’s automatic system. PHMSA provides no references regarding the “information from industry” nor does the agency indicate why it believes CTC’s purging system to be “relatively simple.” In fact, the system includes pneumatic pumps, valves, optical sensors (for the automatic system), connections to the tanker’s overfill prevention system, and electrical transmission wires, among many other components.³¹ PHMSA presents no data on the reliability of the system, its expected operational life, the availability/feasibility of repair and replacement (particularly since there is, at present, a single supplier of the systems), or the impact, if any, on tanker operations. Since the CTC system is the only known technology for wetlines purging and the sole basis for PHMSA’s cost-benefit and feasibility analyses, these issues should have been more carefully addressed. However, at this time, we do not have any information regarding the actual cost to maintain a purging system. Therefore, for the purposes of this report, we adopt PHMSA’s assumption of \$3 per unit per year.

C. Weight Penalty

Fuel tankers must comply with maximum weight limits. Consequently, the added weight of a purging system will reduce the amount of product that a fully-loaded tanker can carry, thereby requiring additional trucks and deliveries. PHMSA calculates a “weight penalty” cost based on the assumption that carriers reach the maximum load weight in 25 percent of trips. PHMSA then applies a series of assumptions to derive a total annual cost of \$449,938 when applied across the entire fleet of 27,000 trucks.

PHMSA’s assumption that 25 percent of trips involve a fully loaded tanker appears to be a substantial underestimate. For obvious business reasons, carriers have an incentive to fully load every tanker if their customers can take delivery of at least the amount of product in a single tank compartment, which we understand is generally the case. For example, the storage capacity of a typical gas station (in the range of 30,000 to 40,000 gallons³²) is more than an order of magnitude larger than the capacity of a tanker compartment (about 2,000 gallons) and substantially larger even than the capacity of a fully loaded four/five-compartment tanker (8,000 to 12,000 gallons). Consistent with these market circumstances, a recent survey of carriers by NTTC found that most companies load their tankers to the

²⁸ Based on PHMSA’s assumptions of 4.2 trips per day and 1,352 trips per year for each truck: $4,050 \times 2 \times 4.2 \div 1,352 = 25.2$. [Regulatory Assessment, p. 19]

²⁹ The \$90,000 figure represents the low end of the range of current prices for a new DOT 406 tanker. [NTTC Survey and correspondence with John Cannon of Walker Group Holdings and Tom Anderson of LBT, Inc.]

³⁰ Regulatory Assessment, p. 17.

³¹ See the Owner’s Manual at CTC’s website, cargotankconcepts.webs.com/Wet%20Line%20Purging%20System%20Owners%20Manual.pdf, accessed April 8, 2013.

³² www.oilspillinfo.org/prevention/gas-station.html, accessed April 13, 2011.

maximum allowable weight in at least 80 percent of all trips and many reach the limit in essentially every trip. To be conservative, we assess the “weight penalty” associated with installation of a purging system based on the assumption that tankers are loaded to the maximum allowable weight in 75 percent of trips. Using PHMSA’s other assumptions, we calculate a “weight penalty” cost of \$1.35 million per year when applied across the entire fleet of 27,000 trucks.

D. Delay at the Loading Rack

As described above, PHMSA does not include any cost associated with delay at the loading rack. Clearly, a manual system, such as the one currently offered by CTC, would impose such costs. However, we understand that even an automatic purging system may result in increased loading time. For example, we understand that regulatory requirements may dictate that purging must occur at the loading rack.³³ Additionally, driver attendance may be necessary to verify proper operation of the system before departing the loading facility. We estimate that the proposed rule would impose additional costs of \$17.6 million per year for each minute of delay, based only on drivers’ labor cost.³⁴ If driver attendance is required until the purge is complete, then the proposed rule could result in additional costs of \$53 million to \$106 million per year, based on CTC’s estimate for a 3 to 6 minute purge time for the automatic system.³⁵ Those amounts represent costs that are at least an order of magnitude higher than the potential benefits of the proposed rule. Below, we present two cost-benefit calculations assuming 1) no delay at the loading rack and 2) a two-minute delay per load.

E. Total Costs

In summary, we estimate that the costs of complying with the proposed rule will include:

- Equipment costs of \$3,875 per unit, based on the average of CTC’s prices for four-compartment and five-compartment automatic purging systems, plus \$600 for additional parts.
- Labor costs of \$465 per unit for installing new systems (14 person-hours at \$33.23 per hour) and \$1,750 for retrofitted systems (25 hours at \$70 per hour).
- Operating costs of \$52.99 per truck per year, which includes a “weight penalty” of \$49.99 and maintenance of \$3.00.
- “Fleet expansion” costs based on a two-day retrofit time for existing vehicles and a cost of \$90,000 per new tanker.
- Delay costs based on both a two-minute delay per load and no delay.

We adopt the following additional PHMSA assumptions:

- 27,000 trucks in the fleet.
- 20-year horizon.
- Retrofitting the existing fleet will occur over a 10-year period.

³³ See, for example, 49 C.F.R. § 177.834(i)(1) and 40 C.F.R. § 112.7(h)(1).

³⁴ See footnote 19.

³⁵ See the Owner’s Manual at CTC’s website, cargotankconcepts.webs.com/Wet%20Line%20Purging%20System%20Owners%20Manual.pdf, accessed April 8, 2013.

- Discount rates of 3 and 7 percent.

Table 1 shows our calculations of the present value (“PV”) of total compliance costs based on these assumptions, with no delay cost included. We find that the PV of total costs will be in the range of \$122.7 million (7 percent discount rate) to \$176.4 million (3 percent). These figures are approximately two times the values estimated by PHMSA for its “Alternative 3” (10-year compliance) scenario.

Table 1
Total Costs of the Proposed Rule
10-Year Compliance for Existing Trucks, Assuming No Delay at the Loading Rack
(\$ million)

Year	% New	# New	% Retrofit	# Retrofit	Units in Service	Installation Cost	Operating Cost	Fleet	Total Cost	Discounted	Discounted
								Expansion Cost		Cost (3%)	Cost (7%)
2013	5%	1,350	5%	1,350	2,700	\$15.07	\$0.14	\$0.75	\$15.97	\$14.62	\$13.04
2014	5%	1,350	5%	1,350	5,400	\$15.07	\$0.29		\$15.36	\$13.65	\$11.72
2015	5%	1,350	5%	1,350	8,100	\$15.07	\$0.43		\$15.50	\$13.37	\$11.05
2016	5%	1,350	5%	1,350	10,800	\$15.07	\$0.57		\$15.65	\$13.10	\$10.43
2017	5%	1,350	5%	1,350	13,500	\$15.07	\$0.72		\$15.79	\$12.84	\$9.83
2018	5%	1,350	5%	1,350	16,200	\$15.07	\$0.86		\$15.93	\$12.58	\$9.27
2019	5%	1,350	5%	1,350	18,900	\$15.07	\$1.00		\$16.07	\$12.32	\$8.74
2020	5%	1,350	5%	1,350	21,600	\$15.07	\$1.14		\$16.22	\$12.07	\$8.24
2021	5%	1,350	5%	1,350	24,300	\$15.07	\$1.29		\$16.36	\$11.82	\$7.77
2022	5%	1,350	5%	1,350	27,000	\$15.07	\$1.43		\$16.50	\$11.58	\$7.33
2023	5%	1,350	0%	-	27,000	\$6.67	\$1.43		\$8.10	\$5.52	\$3.36
2024	5%	1,350	0%	-	27,000	\$6.67	\$1.43		\$8.10	\$5.36	\$3.14
2025	5%	1,350	0%	-	27,000	\$6.67	\$1.43		\$8.10	\$5.20	\$2.94
2026	5%	1,350	0%	-	27,000	\$6.67	\$1.43		\$8.10	\$5.05	\$2.74
2027	5%	1,350	0%	-	27,000	\$6.67	\$1.43		\$8.10	\$4.90	\$2.56
2028	5%	1,350	0%	-	27,000	\$6.67	\$1.43		\$8.10	\$4.76	\$2.40
2029	5%	1,350	0%	-	27,000	\$6.67	\$1.43		\$8.10	\$4.62	\$2.24
2030	5%	1,350	0%	-	27,000	\$6.67	\$1.43		\$8.10	\$4.48	\$2.09
2031	5%	1,350	0%	-	27,000	\$6.67	\$1.43		\$8.10	\$4.35	\$1.96
2032	5%	1,350	0%	-	27,000	\$6.67	\$1.43		\$8.10	\$4.23	\$1.83
Total										\$176.40	\$122.69

Sources: Edgeworth Economics calculations as described in text

When a delay of two minutes per load is added to the analysis, we calculate that the PV of total costs would rise to \$339.1 million (7 percent discount rate) to \$535.5 million (3 percent). These figures are approximately six times the values estimated by PHMSA.

F. Additional Costs

In addition to the costs described above, the proposed rule would impose other burdens on industry, government agencies, and the public which we have not included in our overall cost estimates.

First, PHMSA assumes no risk associated with “hot work” on retrofitted tankers.³⁶ From 1998 through 2009, at least 20 technicians were killed by explosions or fires while working on fuel tankers.³⁷ We understand that any repair work

³⁶ Regulatory Assessment, p. 13.

³⁷ “NTTC Cargo Tank Welding Incident Data,” docket ID # PHMSA-2009-0303-0004.

involving incursions into wetlines or the tank compartments raises some risk of explosion due to the potential presence of vapors. PHMSA claims that since a “non-welded” purging system is available from CTC,³⁸ this would “eliminat[e] any potential risks of injury to welders.”³⁹ However, the proposed rule does not require that every carrier choose a “non-welded” system. Furthermore, we understand that even a “non-welded” system may require drilling or cutting that potentially can increase the risk of a fire or explosion. A purging system that uses air pressure to load the tank compartments, such as CTC’s system, may also increase safety risks at the loading rack.⁴⁰ Such risks represent additional costs associated with the proposed rule. At this time, we do not have sufficient information to assess these costs, but we note that PHMSA’s assumption of zero additional risk is clearly inadequate for the purpose of determining an accurate cost-benefit ratio for the proposed rule.

Second, PHMSA has ignored the cost of training the drivers who will operate the purging systems. Due to the limited use of purging systems to date, we do not have accurate estimates of the cost of such training. However, if training requires just one hour per driver, the additional cost would be well over \$1 million in the first year.

Third, PHMSA assumes no monitoring or enforcement costs associated with the proposed rule. We have no basis to estimate such costs at this time; however, it is clear that PHMSA’s estimate of zero is clearly an understatement of the true costs.

Finally, PHMSA has not considered the implications of the proposed rule with regard to air pollution. In response to earlier proposals by PHMSA, a number of parties have noted that CTC’s purging technology is likely to cause increased emissions of volatile organic compounds (“VOCs”) by raising the pressure inside the cargo tank.⁴¹ For example, in a letter to the U.S. Department of Transportation, the California Air Resources Board stated that “available information indicates that [a purging system] will cause an increase in pressure-driven transit emissions from cargo tanks” and that such emissions “will hamper [CARB’s] ability to meet federally prescribed air quality standards and harm public health.”⁴²

III. Benefits of the Proposed Rule

A. PHMSA’s Methodology

PHMSA estimates the benefits of the proposed rule by calculating the avoidable costs associated with past incidents in which the agency deemed that a purging system could have reduced the loss of product and risk of a fire. PHMSA states:

The incidents that can be attributed to wetlines are of two types: those that involve damage to a wetline and a loss of product of no more than 50 gallons (the maximum carried by wetlines) without a fire and those that involve an initial release of product from a damaged wetline that results in a fire. (In other words, the fire would not result if the wetline did not contain flammable product, as

³⁸ Note, CTC’s website lists a “non-welded” system for sale, however the “Wet Line Purging System Owners Manual” on the site describes only a welded system.

³⁹ Regulatory Assessment, p. 13.

⁴⁰ Note that Federal regulations state: “Air pressure in excess of ambient atmospheric pressure may not be used to load or unload any lading which may create an air-enriched mixture within the flammability range of the lading in the vapor space of the tank.” [49 C.F.R § 173.33(b)(3)] PHMSA does not address this issue with regard to the CTC purging technology.

⁴¹ See, for example, Letter from Simon Hill of Civacon to NTTC, docket ID # PHMSA-2009-0303-0001; and letter from Catherine Witherspoon of California Air Resources Board to U.S. Department of Transportation, docket ID # PHMSA-RSPA-1999-6223-0041.

⁴² Letter from Catherine Witherspoon of California Air Resources Board to U.S. Department of Transportation, docket ID # PHMSA-RSPA-1999-6223-0041.

no other part of the tanker truck containing liquid had been damaged in the incident.) Therefore, incidents identified as wetlines incidents in this analysis indicate a breach of the external product piping resulting in a spill of 50 gallons or less or a spill of more than 50 gallons caused by a fire resulting from the initial release of product from a wetline.

Incidents identified in the NPRM which resulted in spills of more than 50 gallons but no fire were excluded from this analysis as such incidents imply that there was further damage to the tank causing the release of more product than the maximum amount that can be held by a wetline.⁴³

PHMSA calculates costs associated with 172 incidents identified during the 10-year period from 1999 through 2008. The agency then adds some additional costs associated with a less-frequently occurring “catastrophic” event, based on its analysis of the Yonkers incident in 1997 and an assumption that such an event would occur once every 20 years in the absence of the proposed rule. Table 2 summarizes PHMSA’s calculations of the annual costs potentially avoidable by the proposed rule.

Table 2
Summary of PHMSA’s Calculations of Annual Benefits (Avoidable Costs) of the Proposed Rule
(\$ thousand)

<i>Category of Avoidable Costs</i>	<i>Annual Benefits Associated with the Presence of a Purging System</i>
Non-Fatal Injuries	\$5
Fatalities	\$3,912
Product Loss	\$34
Cleanup	\$1,100
Carrier Damage	\$223
Property Damage	
Associated with 1999-2008 Incidents	\$75
Associated with “20-Year” Incident	\$350
Evacuation	\$116
Traffic Delay	
Associated with 1999-2008 Incidents	\$283
Associated with “20-Year” Incident	\$1,364
Additional Mileage	
Associated with 1999-2008 Incidents	\$5
Associated with “20-Year” Incident	\$24
Lost Business (Associated with “20-Year” Incident)	\$125
Environmental Damage	\$10
Emergency Response	\$108
Total - Associated with 1999-2008 Incidents	\$5,872
Total - Associated with “20-Year” Incident	\$1,863
Grand Total	\$7,735

Source: Regulatory Assessment, pp. 31-49.

The annual benefit figure of \$7.7 million, as calculated by PHMSA, would apply when purging systems have been installed on the entire tanker fleet. In the regulatory scenarios that allow retrofitting the existing fleet over time, the annual benefits would be smaller in proportion to the share of the fleet with a purging system in operation at that time.

⁴³ Regulatory Assessment, p. 31.

PHMSA's approach, summarized in the statement above, omits a number of important considerations. The agency's method would be appropriate if only costs that would have been avoided by the presence of a purging system were included in the analysis. However, the agency does not follow this requirement. For example, PHMSA includes incidents in which impingement of the wetlines caused a release of less than one gallon of product, which would be unaffected by the presence of a purging system, since such systems, according to the proposed rule, may leave up to one gallon of product in the external lines.⁴⁴ Second, PHMSA includes costs of injury and carrier damage in some cases where no fire occurred. A purging system would have no effect on such costs. Additionally, PHMSA includes costs associated with incidents involving straight trucks as well as those involving trucks carrying combustible (rather than flammable) products, which are exempt from the proposed rule.⁴⁵ Finally, PHMSA does not even follow its stated standard in its analysis of the 172 incidents. In particular, the agency includes some costs associated with incidents involving a release of greater than 50 gallons of product—i.e., involving a breach of the tank or other equipment failure—without a subsequent fire. The proposed rule would not affect the costs associated with such incidents. As a consequence of these errors, PHMSA substantially overestimates the potential benefits of the proposed rule.

B. Incident Analysis

Based on data from the incident reports included in the public docket and analysis provided to us by NTTC, we categorized the 172 incidents from the 1999-2008 period identified by PHMSA. As shown in Appendix 1, we identified 90 incidents which would not have been affected by the presence of a purging system, based on the following qualifications:

- Incidents in which less than one gallon of product was released.
- Incidents in which greater than 50 gallons of product was released, with no associated fire.
- Incidents in which the product spill was caused by a breach of the tank or other equipment failure.
- Incidents which involved combustible (rather than flammable) product or a straight truck.

The costs associated with these incidents should not be included in an analysis of the proposed rule, since the presence of a purging system would not have affected them. In the following section, we estimate costs potentially avoidable by the proposed rule using the characteristics of the remaining 82 incidents during the 1999-2008 period.

As noted above, PHMSA also includes some costs associated with the incident in Yonkers in 1997, primarily related to damage to public property, traffic delay, and losses to affected businesses. The agency assumes, without any supporting analysis, that such costs are representative of a "20-year" incident; i.e., that in the absence of the proposed rule, such an event will occur once every 20 years. Based on discussions with NTTC, we understand that there remains some doubt as to whether the presence of a purging system would have changed the outcome of that incident. At this time, however, we adopt PHMSA's approach with respect to additional costs associated with a "20-year" incident.

⁴⁴ The proposed rule would allow one liter of residual product in each external line. [NPRM, p. 4850]

⁴⁵ 2011 NPRM, p. 4850.

C. Avoidable Costs

i. Injuries and Fatalities

PHMSA identifies four non-fatal injuries (four separate incidents) and five fatalities (four separate incidents) during the 1999-2008 period which it claims could have been avoided if purging systems were present.⁴⁶ Based on a cost of \$12,000 per non-fatal injury and \$6 million per fatality, PHMSA calculates that the proposed rule would generate benefits of \$3.92 million annually.⁴⁷ However, as shown in Appendix 1, none of the identified non-fatal injuries would have been affected by the proposed rule. Furthermore, of the four fatal incidents, one involved an accident in which the tank was breached by the collision and another involved a fatality caused by “blunt force trauma”—i.e., the force of the accident rather than the resulting fire.⁴⁸ Neither of these fatalities could have been avoided by the presence of a purging system. We therefore calculate potential benefits of the proposed rule based on a total of zero non-fatal injuries and two fatal incidents over a 10-year period. Adopting PHMSA’s other assumptions regarding the costs of these types of incidents, we calculate potential benefits of the proposed rule of \$1.96 million annually.

ii. Product Loss

PHMSA calculates that the 172 identified incidents during the 1999-2008 period resulted in a product loss of about 94,000 gallons.⁴⁹ The agency calculates benefits associated with avoiding these losses equal to \$33,666 per year. However, as shown in Appendix 1, only 82 incidents with losses of 31,149 gallons of product could have been affected by the presence of purging systems as described in the proposed rule. Based on these incidents, we calculate an annual benefit of \$11,151 related to avoided product loss.

iii. Cleanup

PHMSA calculates avoidable cleanup costs of \$1.1 million per year by applying a per-gallon charge of \$117 to each gallon of lost product.⁵⁰ Using the reduced loss figure of 31,149 gallons over a 10-year period, described above, we calculate that the proposed rule could result in reduced cleanup costs of \$364,443 per year.

iv. Carrier Damage

PHMSA calculates benefits from reduced carrier damage averaging \$222,983 annually based on the 172 incidents identified during the 1999-2008 period.⁵¹ These benefits are overstated for two reasons. First, as described above, many of these incidents would not have been affected by the proposed rule. The losses to the carriers would have occurred even if the proposed rule had been in place at the time. Second, even in cases where a purging system

⁴⁶ Regulatory Assessment, pp. 33-34.

⁴⁷ Based on the historical data, PHMSA assumes that four fatal incidents could be avoided over a 10-year period. The four fatal incidents during the 1999-2008 period actually resulted in five total fatalities, for an average of 1.25 per incident. However, PHMSA assumes that future fatal incidents would result in the death of 1.63 passengers per vehicle, based on the average number of passengers per vehicle in all automotive trips and an assumption that all passengers would be killed in such an incident. [Regulatory Assessment, p. 33] The agency provides no analysis to support its assumption that the historic fatality rate in wetlines incidents would not be representative of future incidents. Furthermore, PHMSA does not explain why it chose to adjust only this particular variable to account for purported differences between past incidents and expected future incidents. Notwithstanding these questions, for the purposes of our calculations here, we adopt PHMSA’s assumption that each fatal incident caused by a wetline leak would result in an average of 1.63 fatalities.

⁴⁸ Based on analysis by NTTC and a review of the certificate of death from the Altoona incident issued by the Commonwealth of Pennsylvania Department of Health on August 7, 2000.

⁴⁹ Regulatory Assessment, pp. 34-35.

⁵⁰ *Ibid*, p. 35.

⁵¹ *Ibid*.

may have reduced the amount of product loss, the damage to the carrier would have been unaffected unless a fire could have been avoided.⁵² Thus, we calculate avoidable carrier damage only for incidents where a purging system would have reduced the amount of product loss *and* where a fire occurred. Losses associated with carrier damage in such incidents totaled \$957,885 during the 1999-2008 period, for an average of \$95,789 per year.

v. Property Damage

PHMSA calculates (non-carrier) property damage of approximately \$75,000 per year across the 172 incidents identified during the 1999-2008 period.⁵³ The agency then adds \$350,000 to this figure, based on the assumption that the proposed rule would result in the avoidance of an additional “Yonkers-type” incident every 20 years with property damage costs of \$7 million. As described above, PHMSA provides no analysis of the likely frequency of such incidents going forward. Nevertheless, we adopt the agency’s assumption with respect to the Yonkers incident. We calculate avoidable property damage of \$375,882 per year, based on the costs associated with the 82 relevant incidents during the 1999-2008 period and PHMSA’s other assumptions.

vi. Evacuations

PHMSA calculates costs associated with evacuations of \$116,200 per year by assuming a per-person cost of \$1,000 for each of the persons evacuated during the 172 identified incidents.⁵⁴ By applying PHMSA’s methodology to the smaller set of relevant incidents, we calculate avoidable evacuation costs of \$70,000 per year.

vii. Traffic Delays

PHMSA calculates avoidable costs associated with traffic delays of \$282,600 per year based on the 172 incidents identified during the 1999-2008 period.⁵⁵ We calculate a figure of \$144,000 per year associated with the 82 relevant incidents. PHMSA adds \$1.36 million per year by assuming further avoidance of a “Yonkers-type” incident every 20 years. As above, we adopt the agency’s assumption with respect to the Yonkers incident, and therefore estimate avoidable costs associated with traffic delays of \$1.51 million per year.

viii. Additional Mileage

PHMSA calculates avoidable costs associated with additional mileage travelled by automobiles to detour around wetlines-caused incidents. The agency estimates costs of \$5,074 per year based on the 172 incidents identified during the 1999-2008 period plus \$24,480 per year related to a “Yonkers-type” incident every 20 years.⁵⁶ We calculate figures of \$1,963 and \$18,593 per year for the two cost categories.⁵⁷

⁵² For example, the presence of a purging system would not reduce the cost associated with damage to the loading lines caused by a collision. In fact, it is reasonable to expect that carrier damage will *increase* with the presence of a purging system, since the system itself represents an additional piece of equipment that could be damaged in a collision. However, we have not calculated any increased costs associated with this aspect of the proposed rule.

⁵³ Regulatory Assessment, pp. 35-37.

⁵⁴ *Ibid*, p. 38.

⁵⁵ *Ibid*, pp. 40-43.

⁵⁶ *Ibid*, pp. 43-44.

⁵⁷ PHMSA errs in its calculation of the mileage costs associated with a “20-year” incident. The agency uses current estimates of per-mile vehicle operating expenses, but then scales the resulting figure upward to account for inflation. The inflation-adjustment is unnecessary, since the operating expense figures are already expressed in current dollars.

ix. Lost Business

PHMSA calculates lost business costs of \$124,849 per year, based on an allocation of costs associated with the Yonkers incident across a 20-year period.⁵⁸ We adopt the agency's assumptions here.

x. Environmental Damage

PHMSA estimates environmental damages associated with wetlines incidents in proportion to the amount of spilled product. The agency calculates avoidable costs of \$10,244 per year based on the 172 incidents identified during the 1999-2008 period.⁵⁹ We estimate a figure of \$3,393 per year associated with the 82 relevant incidents.

xi. Emergency Response

PHMSA estimates avoidable costs of \$108,365 per year associated with emergency response personnel, using the number and characteristics of the identified wetlines incidents during the 1999-2008 period.⁶⁰ We calculate a smaller figure of \$71,389 associated with the 82 relevant incidents, using PHMSA's methods and other assumptions.

xii. Total Avoidable Costs

In summary, we calculate total avoidable costs associated with historic wetlines incidents of approximately \$4.6 million annually, based on implementation across the entire tanker fleet. This figure should be compared to PHMSA's estimate of approximately \$7.7 million per year. Table 3 summarizes the various categories of avoidable costs.

⁵⁸ Regulatory Assessment, p. 45.

⁵⁹ *Ibid*, pp. 45-46.

⁶⁰ *Ibid*, pp. 46-49.

Table 3
Summary of Annual Benefits (Avoidable Costs) of the Proposed Rule, PHMSA and Edgeworth Calculations
(\$ thousand)

Category of Avoidable Costs	Annual Benefits	
	PHMSA	Edgeworth
Non-Fatal Injuries	\$5	-
Fatalities	\$3,912	\$1,956
Product Loss	\$34	\$11
Cleanup	\$1,100	\$364
Carrier Damage	\$223	\$96
Property Damage		
Associated with 1999-2008 Incidents	\$75	\$26
Associated with "20-Year" Incident	\$350	\$350
Evacuation	\$116	\$70
Traffic Delay		
Associated with 1999-2008 Incidents	\$283	\$144
Associated with "20-Year" Incident	\$1,364	\$1,364
Additional Mileage		
Associated with 1999-2008 Incidents	\$5	\$2
Associated with "20-Year" Incident	\$24	\$19
Lost Business (Associated with "20-Year" Incident)	\$125	\$125
Environmental Damage	\$10	\$3
Emergency Response	\$108	\$71
Total - Associated with 1999-2008 Incidents	\$5,872	\$2,744
Total - Associated with "20-Year" Incident	\$1,863	\$1,857
Grand Total	\$7,735	\$4,602

Sources: Regulatory Assessment, pp. 31-49 and Edgeworth Economics calculations as described in text.

IV. Cost-Benefit Summary

Table 4 summarizes the PV of costs and benefits of the proposed rule for each of the scenarios analyzed by PHMSA. As shown here, we find that the PVs of costs in the various scenarios are approximately twice the values calculated by PHMSA when no delay at the loading rack is considered and approximately six times greater if a two-minute delay per load is included. The PVs of benefits are approximately half of PHMSA's values. Overall, we calculate benefit-cost ratios in the range of 0.20 to 0.30 when no delay is considered—i.e., the costs of the proposed rule exceed the benefits by a factor of at least three. When a two-minute delay is included, the benefit-cost ratios fall to 0.08-0.09—i.e., the costs of the proposed rule exceed the benefits by a factor of more than ten. Since our calculations omit consideration of many other potential costs, such as the risk to repair personnel and increased VOC emissions, it is clear that the proposed rule will impose substantial net costs on society.

Table 4
Summary of Costs and Benefits of the Proposed Rule, PHMSA and Edgeworth Calculations
(\$ million)

<i>Compliance Period for Existing Fleet</i>	<i>3% Discount Rate</i>			<i>7% Discount Rate</i>		
	<i>PV of Costs</i>	<i>PV of Benefits</i>	<i>Benefit-Cost Ratio</i>	<i>PV of Costs</i>	<i>PV of Benefits</i>	<i>Benefit-Cost Ratio</i>
<u>1 Year (All Trucks Compliant by 2013)</u>						
PHMSA	\$117.1	\$108.5	0.93	\$91.3	\$71.6	0.78
Edgeworth – No Delay	\$272.8	\$64.5	0.24	\$217.0	\$42.6	0.20
Edgeworth – Two-Minute Delay per Load	\$766.1	\$64.5	0.08	\$542.5	\$42.6	0.08
<u>5 Years</u>						
PHMSA	\$100.6	\$94.7	0.94	\$73.9	\$59.7	0.81
Edgeworth – No Delay	\$222.0	\$56.3	0.25	\$164.9	\$35.5	0.22
Edgeworth – Two-Minute Delay per Load	\$652.7	\$56.3	0.09	\$436.6	\$35.5	0.08
<u>10 Years</u>						
PHMSA	\$82.4	\$79.0	0.96	\$57.0	\$47.6	0.84
Edgeworth – No Delay	\$176.4	\$47.0	0.27	\$122.7	\$28.3	0.23
Edgeworth – Two-Minute Delay per Load	\$535.5	\$47.0	0.09	\$339.1	\$28.3	0.08
<u>15 Years</u>						
PHMSA	\$66.5	\$64.7	0.97	\$44.1	\$37.8	0.86
Edgeworth – No Delay	\$137.2	\$38.5	0.28	\$91.2	\$22.5	0.25
Edgeworth – Two-Minute Delay per Load	\$431.3	\$38.5	0.09	\$262.9	\$22.5	0.09
<u>20 Years (New Trucks Only)</u>						
PHMSA	\$52.5	\$51.6	0.98	\$34.3	\$29.8	0.87
Edgeworth – No Delay	\$103.1	\$30.7	0.30	\$67.2	\$17.7	0.26
Edgeworth – Two-Minute Delay per Load	\$337.9	\$30.7	0.09	\$202.6	\$17.7	0.09

Sources: Regulatory Assessment, pp. 5, 59, and 60; and Edgeworth Economics calculations as described in text.

V. PHMSA’s “Sensitivity Analysis”

PHMSA presents additional cost-benefit calculations which it describes as a “sensitivity analysis.” The agency tests the implications of increasing the fleet size by 10 percent, reducing installation costs by 10 percent, eliminating the “weight penalty,” increasing non-fatality-related benefits by 10 percent, and increasing the expected fatalities per incident from 1.63 to 3.⁶¹ With the exception of the final one, these assumptions represent relatively small adjustments to the overall cost-benefit calculation, i.e., each with less than 10 percent impact on the benefit-cost ratio. The assumption about fatalities is more significant—increasing total benefits by about 50 percent and increasing the benefit-cost ratio from 0.96 to 1.37 in the 10-year compliance scenario with a discount rate of 3 percent. When combined together, PHMSA’s alternative assumptions raise the benefit-cost ratio to as high as 1.66 in this scenario.

PHMSA characterizes these alternative assumptions as “likely variations in real-world conditions” and further claims that “the reverse condition (e.g., higher installation costs or lower associated damages) was considered much less likely to obtain.”⁶² PHMSA concludes that “adjustment of data points for the sensitivity analyses dramatically shifts

⁶¹ Regulatory Assessment, pp. 61-62.

⁶² *Ibid*, p. 61.

the [benefit-cost ratios] above 1.0 in all cases, reflecting the relative confidence between benefits and costs.”⁶³ These calculations appear to be the basis of the agency’s “confidence” that the benefits of the proposed rule ultimately would exceed the costs, despite its finding a benefit-cost ratio less than one in its primary analysis.

PHMSA’s “sensitivity analysis” is problematic for a number of important reasons. First, the agency cites no data to support any of its alternative assumptions or its claims that such assumptions are “likely variations in real-world conditions.” There appears to be no basis for the 10 percent adjustments; 1 percent, 5 percent, or, for that matter, 50 percent, could all be more reasonable variations.

Second, in most cases the available data supports assumptions that deviate from PHMSA’s central-case analysis in the opposite direction from the assumptions proposed in the agency’s “sensitivity analysis.” For example, as described above, in its primary analysis PHMSA assumes that the “weight penalty” would apply to 25 percent of tanker trips. However, it is much more likely that such a penalty would apply in 50 percent, or more, of all trips than in no trips at all (which is the assumption PHMSA applies in its “sensitivity analysis”). Similarly, PHMSA assumes an annual maintenance cost of \$3 per unit—less than one-tenth of one percent of the up-front cost of the equipment—with no possibility of device failure necessitating replacement over a 20-year period of use. It is much more likely that annual maintenance costs could reach \$10 annually per unit or more, rather than potentially being lower than PHMSA’s central-case assumption of \$3.

PHMSA’s alternative assumption regarding avoidable fatalities is particularly problematic. As shown in Appendix 1, the average number of fatalities per wetlines incident actually has been smaller than PHMSA’s central-case assumption (1.5 compared to 1.63) and, since at least 1999, no incident has had more than two associated fatalities. In contrast, in its “sensitivity analysis” PHMSA tests only the assumption that future incidents could have an average of three such fatalities. In apparent support for this assumption, the agency cites a “possibility” that vehicle occupancy rates will increase in the future due to rising gasoline prices.⁶⁴ However, since 1990, the average occupancy rate has never been higher than 1.64.⁶⁵ From 2001 to 2009 the rate was essentially unchanged. Furthermore, while rising gasoline prices could have a slight impact on average vehicle occupancy rates, they also would likely cause a reduction the number of vehicles on the roadway, which would reduce the likelihood of wetlines incidents.⁶⁶ PHMSA ignores this factor.

In summary, PHMSA’s “sensitivity analysis” provides no relevant information for a cost-benefit analysis. The agency’s alternative assumptions are arbitrary, unsupported by analysis or real-world data, and biased to result in higher estimates of benefits and lower estimates of costs.

⁶³ 2011 NPRM, p. 4852.

⁶⁴ *Ibid*, p. 4848.

⁶⁵ U.S. Department of Energy at www1.eere.energy.gov/vehiclesandfuels/facts/2010_fotw613.html, accessed April 16, 2011.

⁶⁶ U.S. Department of Energy at www1.eere.energy.gov/vehiclesandfuels/facts/2004/m/fcvt_fotw345.html, accessed April 16, 2011.

Appendix 1
Wetlines Incidents - 1999-2008

Report #	Quantity Released	Injuries	Fatalities	Fire	Carrier Damage	Property Damage	Remediation Cost	Evacuees	Less Than One Gallon Released	Greater Than 50 Gallons Released and No Fire	Tank Breached by Impact or Other Equipment Failure
1999030756	4				\$ -	\$ -	\$ -	-	-	-	-
1999040713	10				\$ -	\$ -	\$ 1,500	-	-	-	-
1999051250	5				\$ -	\$ -	\$ -	-	-	-	-
1999051321	20				\$ 3,287	\$ -	\$ -	-	-	-	-
1999100243	10				\$ 9,500	\$ 1,000	\$ -	-	-	-	-
1999120007	2				\$ 6,000	\$ -	\$ 3	-	-	-	-
2000031001	2				\$ -	\$ -	\$ 20	-	-	-	-
2000040556	10				\$ -	\$ -	\$ 50	-	-	-	-
2000050780	20			X	\$ 70,000	\$ -	\$ -	-	-	-	-
2000051681	25				\$ -	\$ -	\$ -	-	-	-	-
2000090155	5				\$ -	\$ -	\$ -	-	-	-	-
2000090189**	50			X	\$ 76,900	\$ -	\$ -	-	-	-	-
2000090703	15				\$ 500	\$ -	\$ 1,200	-	-	-	-
2000100742	25				\$ -	\$ -	\$ -	-	-	-	-
2001041058	7,800			X	\$ 70,000	\$ 5,000	\$ 15,000	-	-	-	-
2001060208	20				\$ -	\$ -	\$ -	-	-	-	-
2001060605	45				\$ 5,000	\$ -	\$ -	-	-	-	-
2001061735	6,800			X	\$ 100,000	\$ 50,000	\$ -	-	-	-	-
2001080074	4,850			X	\$ 65,000	\$ -	\$ 100,000	-	-	-	-
2001080082	5				\$ 700	\$ -	\$ -	-	-	-	-
2001080698	25			X	\$ 250,000	\$ 20,000	\$ -	-	-	-	-
2001121065	10			X	\$ 3,500	\$ -	\$ -	-	-	-	-
2002010453	3				\$ 6,550	\$ -	\$ 25	-	-	-	-
2002021158	5				\$ -	\$ -	\$ 1,000	-	-	-	-
2002030910	15				\$ 10,611	\$ -	\$ -	-	-	-	-
2002050014	15				\$ 1,010	\$ -	\$ -	-	-	-	-
2002061818	50				\$ -	\$ -	\$ 15,000	-	-	-	-
2002070547	25				\$ -	\$ -	\$ -	-	-	-	-
2002080461	25				\$ -	\$ -	\$ -	-	-	-	-
2002090613	5				\$ 7,000	\$ -	\$ -	-	-	-	-
2002091077	15				\$ -	\$ -	\$ -	-	-	-	-
2002110643	20				\$ -	\$ -	\$ 1,500	-	-	-	-
2002120582	15				\$ -	\$ -	\$ 100	-	-	-	-
2003010475	10				\$ 3,692	\$ -	\$ 3,000	-	-	-	-
2003011089	2				\$ -	\$ -	\$ 50	-	-	-	-
2003011118	2				\$ 140	\$ -	\$ -	-	-	-	-
2003020750	10,000			X	\$ 100,000	\$ 70,000	\$ 5,000	-	-	-	-
2003030282	5				\$ 4,000	\$ -	\$ 6,382	-	-	-	-
2003040379	4				\$ 100	\$ -	\$ -	-	-	-	-
2003041183	3			X	\$ 1,000	\$ 2,000	\$ 2,500	-	-	-	-
2003050244	25				\$ 200	\$ -	\$ 1,000	-	-	-	-
2003070945	33				\$ 2,000	\$ 1,500	\$ 6,500	-	-	-	-
2003080490	5				\$ -	\$ -	\$ 250	-	-	-	-
2003101011	20			X	\$ 40,000	\$ -	\$ 40,000	-	-	-	-
2003101616	40				\$ 500	\$ 2,000	\$ 5,000	-	-	-	-
2003120142	5				\$ 20,000	\$ -	\$ 500	-	-	-	-
2003120921	40				\$ 17,221	\$ -	\$ 3,000	-	-	-	-
2004010028	40				\$ -	\$ -	\$ 100	-	-	-	-
2004010551	8				\$ 47,000	\$ -	\$ -	-	-	-	-

Incidents Which Could Have Been Affected by the Proposed Rule

Appendix 1
Wetlines Incidents - 1999-2008

Report #	Quantity Released	Injuries	Fatalities	Fire	Carrier Damage	Property Damage	Remediation Cost	Evacuees	Less Than One Gallon Released	Greater Than 50 Gallons Released and No Fire	Tank Breached by Impact or Other Equipment Failure	Combustible	Straight Truck
2004010557	25				\$ -	\$ -	\$ 500	-					
2004061273	15				\$ -	\$ -	\$ 75	-					
2004070747	11				\$ 43,997	\$ 250	\$ 2,856	-					
2004080711	20				\$ -	\$ -	\$ 1,500	-					
2004100006	1				\$ 8,500	\$ -	\$ 3,000	-					
2004100740	30				\$ 750	\$ -	\$ 1,500	-					
2005020168	3				\$ -	\$ -	\$ -	-					
2005020936	7				\$ 1,600	\$ -	\$ 25	-					
2005050500	15				\$ 7,100	\$ -	\$ 4,000	-					
2005050502	10				\$ -	\$ -	\$ -	-					
2005090174	30				\$ 2,000	\$ -	\$ 8,000	-					
2006030021	6				\$ 72,000	\$ 2,000	\$ -	700					
2006070009	3				\$ -	\$ -	\$ -	-					
2006110023	10				\$ -	\$ -	\$ -	-					
2006111147	500				\$ 120,435	\$ -	\$ 134,381	-					
2006111203	15			X	\$ 1,941	\$ -	\$ -	-					
2007020128	30				\$ 45,000	\$ -	\$ 1,500	-					
2007050465	15				\$ 3,000	\$ -	\$ 2,500	-					
2007050910	10				\$ -	\$ -	\$ -	-					
2007070435	10				\$ 1,600	\$ -	\$ -	-					
2007070725	10				\$ -	\$ -	\$ 1,500	-					
2007100036	40				\$ -	\$ -	\$ 1,500	-					
2007110599	10				\$ 2,500	\$ 3,000	\$ -	-					
2007120280	10				\$ 20,000	\$ -	\$ 5,000	-					
2008010571	4				\$ 4,650	\$ -	\$ -	-					
2008030151	10				\$ 4,000	\$ -	\$ 1,500	-					
2008060252	1				\$ -	\$ -	\$ -	-					
2008080316	10				\$ -	\$ -	\$ -	-					
2008090320	15				\$ -	\$ -	\$ -	-					
2008090474	40				\$ -	\$ -	\$ -	-					
2008090864	20			X	\$ 61,050	\$ -	\$ 100	-					
2008110269	1				\$ -	\$ -	\$ 2,394	-					
2009040537	20				\$ 45,524	\$ -	\$ 1,833	-					
Total	31,149	0	3		\$ 1,367,058	\$ 156,750	\$ 382,344	700					
No. of Incidents	82	0	2										
Incidents Which Could Not Have Been Affected by the Proposed Rule													
1999011030	10				\$ 3,000	\$ 10,000	\$ 1,000	-				X	
1999031045	30				\$ 1,434	\$ -	\$ 3,184	-				X	
1999050983	2,500				\$ 4,000	\$ 20,000	\$ 40,000	-		X			
1999070202	1,560	2			\$ 4,000	\$ 5,000	\$ 50,000	-		X			
1999080507	1,180				\$ 15,000	\$ 10,000	\$ 50,000	-		X			
1999080809	202				\$ 2,000	\$ 2,500	\$ 28,000	-		X			
1999120641	2				\$ -	\$ -	\$ 25	-				X	
1999121153	1				\$ -	\$ -	\$ -	-					X
2000020067	0.01				\$ 2,000	\$ -	\$ -	-	X				
2000051604	2,000				\$ 7,800	\$ -	\$ 20,000	-		X			
2000051689	0			X	\$ 35,000	\$ 5,000	\$ 5,000	-	X				
2000080283	3,375				\$ 10,000	\$ -	\$ -	2		X			
2000101151	20				\$ 2,000	\$ -	\$ 3,500	-					X

Appendix 1
Wetlines Incidents - 1999-2008

Report #	Quantity Released	Injuries	Fatalities	Fire	Carrier Damage	Property Damage	Remediation Cost	Evacuees	Less Than One Gallon Released	Greater Than 50 Gallons Released and No Fire	Tank Breached By Impact or Other Equipment Failure	Combustible	Straight Truck
2001010547	1,105				\$ 1,808	\$ -	\$ 696	-		X			
2001020337	5,000				-	\$ 20,000	\$ 20,000	-		X			
2001030655	0.13				-	-	-	-	X				
2001040178	4	1		X	-	-	\$ 1,000	-					X
2001060606	1,500				\$ 65,000	\$ 20,000	\$ 60,000	-		X			
2001060929	800				\$ 15,000	-	\$ 10,250	-		X			
2001070767	10				\$ 3,000	\$ 5,000	\$ 100	-				X	
2001120827	750				-	-	-	-		X			
2002010021	2,463				\$ 40,015	-	\$ 35,000	-		X			
2002011561	100				-	\$ 3,000	\$ 13,000	-		X			
2002030876	20				\$ 7,000	-	\$ 4,500	-		X			
2002031220	100				\$ 1,000	-	-	-		X		X	
2002050007	15				-	\$ 1,000	\$ 3,500	-		X		X	
2002060003	0.50				\$ 2,500	-	\$ 150	-	X				
2002060804	3				-	-	\$ 7	-			X		
2002061569	5				\$ 80,000	-	\$ 6,485	-			X		
2002090574	3,500				\$ 20,000	\$ 5,000	\$ 60,000	400		X			
2002100001	10				\$ 50	-	\$ 150	-		X			
2002100462	1,840				\$ 18,000	\$ 2,490	\$ 32,460	-		X		X	
2003010563	146				\$ 2,000	-	\$ 9,000	-		X			
2003081099	2				-	-	\$ 100	-			X		
2003110652	500	1			\$ 2,500	\$ 500	\$ 10,000	-		X			
2003120427	100				\$ 8,000	\$ 4,000	\$ 10,000	-		X			
2004031004	1,400				\$ 500	-	\$ 100,000	-		X			
2004031082	25				\$ 500	-	\$ 2,000	-		X			
2004031084	1,200				\$ 17,000	\$ 500	\$ 8,500	-		X			X
2004031109	1,393				-	-	\$ 50,000	-		X			X
2004031308	3				\$ 270	-	\$ 218	-					X
2004040541	3				\$ 4,600	-	-	-			X		
2004040622	1,218			X	\$ 96,516	-	-	-		X			
2004050005	650				\$ 5,000	-	-	-		X			
2004050306	2,000				\$ 7,481	-	\$ 33,159	-		X			
2004071246	10				\$ 3,500	-	-	-		X			
2004090377	1,200				-	-	-	-		X			
2004100230	0.50				\$ 5,000	-	\$ 100	-	X				
2004100738	8,005			X	\$ 75,000	\$ 20,000	\$ 7,500	-			X		X
2005011202	30				-	-	-	-					
2005030069	0.004				-	-	-	-	X				
2005070006	0.002				-	-	-	-	X				
2005070322	20				-	-	-	-					
2005091256	2,900				-	-	-	20		X			
2005100228	1,765				\$ 11,916	\$ 15,000	\$ 8,461	-		X			
2006030178	0				\$ 13,000	\$ 40,000	-	-	X				
2006030219	0.09				-	-	-	-	X				
2006030440	2,100				-	-	-	-		X			
2006060093	20				\$ 2,500	-	\$ 500	-				X	
2006061197	200				\$ 1,000	-	\$ 12,000	40		X			
2006070212	0.06				-	-	-	-	X				
2006081333	15				\$ 9,960	\$ 5,000	-	-				X	
2006090796	800				\$ 8,500	\$ 5,000	\$ 75,000	-	X				
2006100048	0.75				-	-	-	-					

Appendix 1
Wetlines Incidents - 1999-2008

Report #	Quantity Released	Injuries	Fatalities	Fire	Carrier Damage	Property Damage	Remediation Cost	Evacuees	Less Than One Gallon Released	Greater Than 50 Gallons Released and No Fire	Tank Breached by Impact or Other Equipment Failure	Combustible	Straight Truck
2006110703	165				915		\$ 5,354	-		X		X	
2006120163	0.02								X				
2007010612	150						\$ 1,972			X		X	
2007040031	0.02								X			X	
2007040219	0.26								X			X	
2007040220	1				2,600				X			X	
2007040229	0.13				3,000	750			X	X		X	
2007040408	4,600								X			X	
2007050210	0.26								X			X	
2007050835	117					3,000	\$ 15,000		X	X		X	
2007070471	15			X	30,000	500	\$ 10,000					X	
2007100005	0.26								X				
2007100095	0.13								X				
2007110306	130						\$ 3,300		X	X		X	
2008010265	0.50								X				
2008020298	0.50								X				
2008040279	150				5,000		\$ 5,000		X	X			
2008040389	0				4,300								
2008060272	1											X	
2008060480	25				4,000	1,000	\$ 2,500			X		X	
2008080309	3,700				125,000	500	\$ 12,000			X		X	
2008080526	0.25								X			X	
2008080550	17											X	
2008090076	0.01								X			X	
2008110361	0.02								X			X	
2009020017	3				54,623	16,750	\$ 3,402					X	
Total	62,888	4	1		842,788	221,490	\$ 833,073	462					
No. of Incidents	90	3	1										
Total	94,037	4	4		2,209,846	378,240	\$ 1,215,417	1,162					
No. of Incidents	172	3	3										

ALL PHMSA Incidents

Sources and Notes: "Quantity Released": Column BS in PHMSA spreadsheet obtained from the Federal docket, titled "PHMSA-2009-0303-0014.1.xls".
 Note: There appear to be a number of errors in the PHMSA database. For example, Report # 2008080550 lists "Quantity Released" of 16.9 gallons; however, the "Narrative" describes a loss of "100-150 gallons".
 We have not attempted to reconcile PHMSA's database with regard to these issues.
 "Injuries"/"Fatalities": Column J in "PHMSA-2009-0303-0014.1.xls". We list only cases where PHMSA determined the injuries/fatalities to be due to a preventable wetlines incident, with the exception of Report # 2000090189, in which the fatality was caused by "blunt force trauma" (according to death certificate).
 "Fire": Column K in "PHMSA-2009-0303-0014.1.xls".
 "Carrier Damage": Column F plus Column FN in "PHMSA-2009-0303-0014.1.xls".
 "Property Damage": Column FK in "PHMSA-2009-0303-0014.1.xls".
 "Remediation Cost": Column FM in "PHMSA-2009-0303-0014.1.xls".
 "Evacuees": Column GE in "PHMSA-2009-0303-0014.1.xls".
 Analysis of incident characteristics by Edgeworth Economics and NTTC.