Keeping America's Pipelines Safe and Secure: Key Issues for Congress

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Summary

Nearly half a million miles of pipeline transporting natural gas, oil, and other hazardous liquids crisscross the United States. While an efficient and fundamentally safe means of transport, many pipelines carry materials with the potential to cause public injury and environmental damage. The nation's pipeline networks are also widespread and vulnerable to accidents and terrorist attack. The 2006 partial shutdown of the Prudhoe Bay, AK, oil field, and the 2010 pipeline accidents in San Bruno, CA, and Marshall, MI, have heightened congressional concern about pipeline risks. Both government and industry have taken numerous steps to improve pipeline safety and security over the last 10 years. While many stakeholders agree that federal pipeline safety programs have been on the right track, recent pipeline incidents suggest there continues to be room for improvement. Likewise the threat of terrorist attack on U.S. pipelines remains a concern.

The federal pipeline safety program was authorized through the fiscal year ending September 30, 2010, and is currently operating under a continuing resolution. S. 3856 would reauthorize the program through FY2014. Both the House and Senate versions of the Transportation, Housing and Urban Development, and Related Agencies Appropriations Act, 2011 (H.R. 5850 and S. 3644) would provide appropriations for the federal pipeline safety program for FY2011.

The 111th Congress is considering new legislation to improve the safety and security of the U.S. pipeline network. H.R. 6008 would require pipeline operators to provide immediate telephonic notice of a pipeline release to federal emergency response officials and would increase civil penalties for pipeline safety violations. S. 3824 would increase the number of federal pipeline safety inspectors, would require automatic shutoff valves for natural gas pipelines, and would mandate internal inspections of transmission pipelines, among other provisions. S. 3856 would increase federal pipeline safety inspectors, would require automatic or remote controlled shutoff valves on new gas pipelines, would require public access to pipeline emergency response plans, and would increase civil penalties for pipeline safety violations, among other provisions. H.R. 6295 would require automatic or remote shut-off valves for many pipelines and public disclosure of pipeline locations, among other provisions. S. 1333 would change natural gas pipeline integrity assessment intervals. H.R. 2220 would mandate a new federal pipeline security study.

As Congress debates reauthorization of the federal pipeline safety program and oversees the federal role in pipeline security, key questions may be raised concerning pipeline agency staff resources, automatic pipeline shutoff valves, penalties for pipeline safety violations, and the possible need for pipeline safety legislation. In addition to these issues, Congress may wish to assess how the various elements of the pipeline safety and security activity fit together in the nation's overall strategy to protect transportation infrastructure. Pipeline safety and security necessarily involve many groups, including federal agencies, oil and gas pipeline associations, large and small pipeline operators, and local communities. Reviewing how these groups work together to achieve common goals could be an oversight challenge for Congress.

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Introduction

Nearly half a million miles of high-volume pipeline transport natural gas, oil, and other hazardous liquids across the United States.[1] These transmission pipelines are integral to U.S. energy supply and have vital links to other critical infrastructure, such as power plants, airports, and military bases. While an efficient and fundamentally safe means of transport, many pipelines carry volatile, flammable, or toxic materials with the potential to cause public injury and environmental damage. The nation's pipeline networks are also widespread, running alternately through remote and densely populated areas, sometimes above ground, some below; consequently, these systems are vulnerable to accidents and terrorist attacks. The 2006 partial shutdown of the Prudhoe Bay, AK, oil field due to pipeline leaks and the 2010 pipeline accidents in San Bruno, CA, and Marshall, MI, have demonstrated this vulnerability and have heightened congressional concern about pipeline risks.

The federal program for pipeline safety resides primarily within the Department of Transportation (DOT), although its inspection and enforcement activities rely heavily upon partnerships with state pipeline safety agencies. The federal pipeline security program began with the DOT as well, immediately after the terrorist attacks of September 11, 2001, but pipeline security authority was subsequently transferred to the Department of Homeland Security (DHS) when the latter department was created. The DOT and DHS have distinct missions, but they cooperate to protect the nation's pipelines. The Federal Energy Regulatory Commission is not operationally involved in pipeline safety or security, but it can examine safety issues under its siting authority for interstate natural gas pipelines, and can allow pipeline companies under its rate jurisdiction to recover pipeline security costs. Collectively, these agencies administer a comprehensive and complex set of regulatory authorities which has been changing significantly over the last decade and continues to do so.

The federal pipeline safety program was authorized through the fiscal year ending September 30, 2010, and is currently operating under a continuing resolution. S. 3856 would reauthorize the program through FY2014. Both the House and Senate versions of the Transportation, Housing and Urban Development, and Related Agencies Appropriations Act, 2011 (H.R. 5850 and S. 3644) would provide appropriations for the federal pipeline safety program for FY2011.

Safety and Security in the Pipeline Industry

Of the nation's approximately half million miles of transmission pipeline, roughly 170,000 miles carry hazardous liquids—over 75% of the nation's crude oil and about 60% of refined petroleum products, along with other products.[2] Within this network, there are nearly 200

[1] Hazardous liquids primarily include crude oil, gasoline, jet fuel, diesel fuel, home heating oil, propane, and butane. Other hazardous liquids transported by pipeline include anhydrous ammonia, carbon dioxide, kerosene, liquefied ethylene, and some petrochemical feedstocks.

[2] Pipeline and Hazardous Materials Safety Administration, "Natural Gas Transmission, Gas Distribution, and Hazardous Liquid Pipeline Annual Mileage," online table, September 21, 2010, http://www.phmsa.dot.gov/pipeline/library/data-stats.

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*inter*state crude oil and liquid fuel pipelines, which account for roughly 80% of total pipeline mileage and transported volume.[3]

The U.S. natural gas pipeline network consists of around 217,000 miles of *inter*state transmission, and 89,000 miles of *intra*state transmission.[4] It also contains some 20,000 miles of field and gathering pipeline, which connect gas extraction wells to processing facilities.[5] Around 120 systems make up the *inter*state gas transmission network; another 90 or so systems operate strictly within individual states.[6] These *inter*state and *intra*state gas transmission pipelines feed around 1.2 million miles of regional pipelines in some 1,400 local distribution networks.[7] Natural gas pipelines also connect 13 liquefied natural gas (LNG) storage sites, which augment pipeline gas supplies during peak demand periods.[8]

Pipeline Safety Record

Taken as a whole, relatively few pipelines cause few annual fatalities compared to other products transportation modes. According to the Department of Transportation (DOT), hazardous liquid pipelines reported an average of 2.4 deaths per year from 2005 through 2009. During the same period, natural gas transmission and distribution pipelines reported an average of 1.0 and 10.4 deaths per year, respectively.[9] Accidental pipeline releases result from a variety of causes, including third-party excavation, corrosion, mechanical failure, control system failure, and operator error. Natural forces, such as floods and earthquakes, can also damage pipelines. There were 102 hazardous liquid pipeline accidents, 84 natural gas transmission (including gathering) pipeline accidents, and 1,608 natural gas distribution accidents in 2009.[10]

Although pipeline releases have caused relatively few fatalities in absolute numbers, a single pipeline accident can be catastrophic in terms of deaths and environmental damage. Notable pipeline accidents in recent years include:

- **1999**—A gasoline pipeline explosion in Bellingham, WA, killed two children and an 18-year-old man, and caused $45 million in damage to a city water plant and other property.

[3] Richard A Rabinow, "The Liquid Pipeline Industry in the United States: Where It's Been, Where It's Going," Prepared for the Association of Oil Pipe Lines, April 2004, p. 4.

[4] Energy Information Administration, "Estimated Natural Gas Pipeline Mileage in the Lower 48 States, Compressor Stations," online table, 2010, http://www.eia.doe.gov/pub/oil_gas/natural_gas/analysis_publications/ngpipeline/mileage.html.

[5] Pipeline and Hazardous Materials Safety Admin., "Natural Gas Transmission, Gas Distribution, and Hazardous Liquid Pipeline Annual Mileage," web page, September 21, 2010, http://www.phmsa.dot.gov/pipeline/library/data-stats.

[6] Energy Information Administration, "About U.S. Natural Gas Pipelines," June 2007, pp. 1, 29, http://www.eia.doe.gov/pub/oil_gas/natural_gas/analysis_publications/ngpipeline/fullversion.pdf.

[7] Pipeline and Hazardous Materials Safety Admin., September 21, 2010, http://www.phmsa.dot.gov/pipeline/library/data-stats.

[8] There are also approximately 6,300 miles of offshore gathering pipelines. Gathering pipelines in on the Outer Continental Shelf regulated by the Department of the Interior are outside the scope of this report.

[9] Pipeline and Hazardous Materials Safety Administration, "Significant Pipeline Incidents," web page, September 21, 2010, http://primis.phmsa.dot.gov/comm/reports/safety/SigPSI.html.

[10] Ibid.

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- **2000**—A natural gas pipeline explosion near Carlsbad, NM, killed 12 campers, including 4 children.
- **2006**—Corroded pipelines on the North Slope of Alaska leaked over 200,000 gallons of crude oil in an environmentally sensitive area and temporarily shut down Prudhoe Bay oil production.
- **2007**—An accidental release from a propane pipeline and subsequent fire near Carmichael, Mississippi killed 2 people, injured several others, destroyed 4 homes, and burned over 70 acres of grassland and woodland.
- **2010**—A pipeline spill in Marshall, Michigan released 819,000 gallons of crude oil into a tributary of the Kalamazoo River.
- **2010**—A natural gas pipeline explosion in San Bruno, California, killed 8 people (including 1 child), injured 60 others, and destroyed 37 homes.

Such accidents have generated persistent scrutiny of pipeline regulation and have increased state and community activity related to pipeline safety.[11]

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Pipeline Security Risks

In addition to their vulnerability to accidents, pipelines may also be intentionally damaged by vandals and terrorists. Some pipelines may also be vulnerable to "cyber-attacks" on computer control systems or attacks on electricity grids and telecommunications networks.[12] Oil and gas pipelines, globally, have been a favored target of terrorists, militant groups, and organized crime. In Colombia, for example, rebels have bombed the Caño Limón oil pipeline and other pipelines over 950 times since 1993.[13] In 1996, London police foiled a plot by the Irish Republican Army to bomb gas pipelines and other utilities across the city.[14] Militants in Nigeria have repeatedly attacked pipelines and related facilities, including the simultaneous bombing of three oil pipelines in May 2007.[15] A Mexican rebel group similarly detonated bombs along Mexican oil and natural gas pipelines in July and September 2007.[16] In June 2007, the U.S. Department of Justice arrested members of a terrorist group planning to attack jet fuel pipelines and storage tanks at the John F. Kennedy (JFK) International Airport in New York.[17] Natural gas pipelines in British Columbia,

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[11] See, for example: Boston Globe Editorial Board, "Older Pipes Carry Deadly Risks," *Boston Globe*, September 18, 2010; Bellingham Herald Editorial Board, "Citizens Need Panel To Monitor Pipeline Safety," *Bellingham Herald* (WA), January 24, 2010; Janet Zink, [illegible] Times, [illegible], 2007; [illegible] Mayor Questions Leak Detection," *Anchorage Daily News*, March [illegible], 2006; J. Nesmith and R.M. Haurwitz, "Pipelines: The Invisible Danger," *Austin American-Statesman*, July 2[illegible], 20[illegible].

[12] J.L. Shreeve, "Science & Technology: The Enemy Within," *The Independent*. London, UK, May [illegible]1, 2006, p. 8.

[13] Government Accountability Office (GAO), *Security Assistance: Efforts to Secure Colombia's Caño Limón-Coveñas Oil Pipeline Have Reduced Attacks, but Challenges Remain*, GAO-05-971, September 2005, p. 15; Stratfor Forecasting, Inc.," Colombia: The FARC's Low-Level Pipeline Campaign," *Stratfor Today*, June 23, 2008. http://www.stratfor.com/analysis/colombia_farcs_low_level_pipeline_campaign?ip_auth_redirect=1

[14] President's Commission on Critical Infrastructure Protection, *Critical Foundations: Protecting America's Infrastructures*, Washington, DC, October 1997.

[15] Katehrine Houreld, "Militants Say 3 Nigeria Pipelines Bombed," *Associated Press*, May 8, 2007.

[16] Reed Johnson, "Six Pipelines Blown Up in Mexico," *Los Angeles Times,* September 11, 2007. p A-3.

[17] U.S. Dept. of Justice, "Four Individuals Charged in Plot to bomb John F. Kennedy International Airport," Press release, June 2, 2007.

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Canada, were bombed six times between October 2008 and July 2009 by unknown perpetrators.[18] In 2009, the *Washington Post* reported that over $1 billion of crude oil had been stolen directly from Mexican pipelines by organized criminals and drug cartels.[19]

Since September 11, 2001, federal warnings about Al Qaeda have mentioned pipelines specifically as potential terror targets in the United States.[20] One U.S. pipeline of particular concern, and with a history of terrorist and vandal activity, is the Trans Alaska Pipeline System (TAPS), which transports crude oil from Alaska's North Slope oil fields to the marine terminal in Valdez. TAPS runs some 800 miles and delivers nearly 17% of United States domestic oil production.[21] In 1999, Vancouver police arrested a man planning to blow up TAPS for personal profit in oil futures.[22] In 2001, a vandal's attack on TAPS with a high-powered rifle forced a two-day shutdown and caused extensive economic and ecological damage.[23] In January 2006, federal authorities acknowledged the discovery of a detailed posting on a website purportedly linked to Al Qaeda that reportedly encouraged attacks on U.S. pipelines, especially TAPS, using weapons or hidden explosives.[24] In November 2007, a U.S. citizen was convicted of trying to conspire with Al Qaeda to attack TAPS or a major natural gas pipeline in the eastern United States.[25] To date, there have been no known Al Qaeda attacks on TAPS or other U.S. pipelines, but such attacks remain a possibility.

Pipelines and Hazardous Materials Safety Administration

The Natural Gas Pipeline Safety Act of 1968 (P.L. 90-481) and the Hazardous Liquid Pipeline Act of 1979 (P.L. 96-129) are two of the principal early acts establishing the federal role in pipeline safety. Under both statutes, the Transportation Secretary is given primary authority to regulate key aspects of interstate pipeline safety: design, construction, operation and maintenance, and spill response planning. Pipeline safety regulations are covered in Title 49 of the *Code of Federal Regulations*.[26] The DOT administers pipeline regulations through the Office of Pipeline Safety (OPS) within the Pipelines and Hazardous Materials Safety Administration (PHMSA). The OPS is funded for 206 full-time equivalent staff in 2010, based in Washington, DC; Atlanta; Kansas City; Houston; and Denver.[27] This includes funding for 137 inspectors, although the agency

[18] Ben Gelinas, "New Letter Threatens Resumption of 'Action' against B.C. Pipelines," *Calgary Herald*, April 15, 2010.

[19] Steve Fainaru and William Booth, "Mexico's Drug Cartels Siphon Liquid Gold," *Washington Post*, December 13, 2009.

[20] "Already Hard at Work on Security Issues, Pipelines Told of Terrorist Threat," *Inside FERC*, McGraw-Hill Companies, January 3, 2002.

[21] Alyeska Pipeline Service Co., Internet page, Anchorage, AK, [accessed] July 8, 2009, http://www.alyeska-pipe.com/about.html.

[22] David S. Cloud, "A Former Green Beret's Plot to Make Millions Through Terrorism," *Ottawa Citizen*, December 24, 1999, p. E15.

[23] Y. Rosen, "Alaska Critics Take Potshots at Line Security," *Houston Chronicle*, February 17, 2002.

[24] Wesley Loy, "Web Post Urges Jihadists to Attack Alaska Pipeline," *Anchorage Daily News*, January 19, 2006.

[25] U.S. Attorney's Office, Middle District of Pennsylvania, "Man Convicted of Attempting to Provide Material Support to Al-Qaeda Sentenced to 30 Years' Imprisonment," Press release, November 6, 2007; A. Lubrano and J. Shiffman, "Pa. Man Accused of Terrorist Plot," *Philadelphia Inquirer*, February 12, 2006, p. A1.

[26] Safety and security of liquefied natural gas (LNG) facilities used in gas pipeline transportation is regulated under CFR Title 49, Part 193.

[27] U.S. Office of Management and Budget, *Budget of the United States Government, Fiscal Year 2011: Appendix*, February 2010, p. 989.

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actually employed 110 inspectors as of September 15, 2010.[28] In addition to its own staff, PHMSA's enabling legislation allows the agency to delegate authority to *intra*state pipeline safety offices, and allows state offices to act as "agents" administering *inter*state pipeline safety programs (excluding enforcement) for those sections of *inter*state pipelines within their boundaries.[29] Over 400 state pipeline safety inspectors are available in 2010.

PHMSA's pipeline safety program is funded primarily by user fees assessed on a per-mile basis on each regulated pipeline operator (49 U.S.C. § 60107). P.L. 109-468 authorized annual pipeline safety program expenditures of $79.0 million in FY2007, $86.2 million in FY2008, $91.5 million in FY2009, and $96.5 million in FY2010. The President's FY2010 budget request included $105.2 million for pipeline safety.[30] The FY2011 budget requested $111.1 million.[31] H.R. 5850 and S. 3644 would appropriate $111.1 million to fund the PHMSA pipeline safety program for FY2011. S. 3856 would authorize annual pipeline safety program expenditures of $111 million in FY2011, $115.8 million in FY2012, $119 million in FY2013, and $122.8 million in FY2014. The bill would also authorize $5 million annually through FY2014 for grants to state pipeline damage prevention programs.

PHMSA uses a variety of strategies to promote compliance with its safety standards. The agency conducts programmatic inspections of management systems, procedures, and processes; conducts physical inspections of facilities and construction projects; investigates safety incidents, and maintains a dialogue with pipeline operators. The agency clarifies its regulatory expectations through published protocols and regulatory orders, guidance manuals, and public meetings. PHMSA relies upon a range of enforcement actions, including administrative actions such as corrective action orders (CAOs) and civil penalties, to ensure that operators correct safety violations and take measures to preclude future safety problems. From 2005 through 2009, PHMSA initiated approximately 1,300 enforcement actions against pipeline operators.[32] Civil penalties assessed by PHMSA for safety violations during this period totaled approximately $27.2 million.[33] PHMSA also conducts accident investigations and system-wide reviews focusing on high-risk operational or procedural problems and areas of the pipeline near sensitive environmental areas, high-density populations, or navigable waters.

Since 1997, PHMSA has increasingly required industry's implementation of "integrity management" programs on pipeline segments near "high consequence areas." Integrity management provides for continual evaluation of pipeline condition; assessment of risks to the pipeline; inspection or testing; data analysis; and followup repair, as well as preventive or mitigative actions. High consequence areas include population centers, commercially navigable waters, and environmentally sensitive areas.

[28] John D. Porcari, Dep. Secretary, U.S. Dept. of Transportation, Testimony before the House Committee on Transportation and Infrastructure, Hearing on the Enbridge Pipeline Oil Spill in Marshall, MI, September 2, 2010.

[29] 49 U.S.C. 601. States may recover up to 50% of their costs for these programs from the federal government.

[30] U.S. Office of Management and Budget, *Budget of the United States Government, Fiscal Year 2010: Appendix*, February 2009, p. 952.

[31] U.S. Office of Management and Budget, February 2010, p. 988.

[32] Pipeline and Hazardous Material Safety Administration (PHMSA), "PHMSA Pipeline Safety Program: Summary of Enforcement Actions," Web page, September 22, 2010. http://primis.phmsa.dot.gov/comm/reports/enforce/Actions_opid_0.html.

[33] Pipeline and Hazardous Material Safety Administration (PHMSA), "PHMSA Pipeline Safety Program: Summary of Cases Involving Civil Penalties," Web page, September 22, 2010. http://primis.phmsa.dot.gov/comm/reports/enforce/CivilPenalty_opid_0.html?nocache=9288#_TP_1_tab_1.

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reserves. The integrity management approach directs priority resources to locations of highest consequence rather than applying uniform treatment to the entire pipeline network. PHMSA made integrity management programs mandatory for most oil pipeline operators with 500 or more miles of regulated pipeline as of March 31, 2001 (49 C.F.R. § 195).

Pipeline Safety Improvement Act of 2002

On December 12, 2002, President Bush signed into law the Pipeline Safety Improvement Act of 2002 (P.L. 107-355). The act strengthened federal pipeline safety programs, state oversight of pipeline operators, and public education regarding pipeline safety.[34] Among other provisions, P.L. 107-355 required operators of regulated natural gas pipelines in high-consequence areas to conduct risk analysis and implement integrity management programs similar to those required for oil pipelines.[35] The act authorized the DOT to order safety actions for pipelines with potential safety problems and increased violation penalties. The act streamlined the permitting process for emergency pipeline repairs by establishing an interagency committee, including the DOT, the Environmental Protection Agency, the Bureau of Land Management, the Federal Energy Regulatory Commission, and other agencies, to ensure coordinated review and permitting of pipeline repairs. The act required DOT to study ways to limit pipeline safety risks from population encroachment and ways to preserve environmental resources in pipeline rights-of-way. P.L. 107-355 also included provisions for public education, grants for community pipeline safety studies, "whistle blower" and other employee protection, employee qualification programs, and mapping data submission.

Pipeline Inspection, Protection, Enforcement, and Safety Act of 2006

On December 29, 2006, President Bush signed into law the Pipeline Inspection, Protection, Enforcement and Safety Act of 2006 (PIPES Act, P.L. 109-468). The main provisions of the act address pipeline damage prevention, integrity management, corrosion control, and enforcement transparency. The PIPES act created a national focus on pipeline damage prevention through grants to states for improving damage prevention programs, establishing 811 as national "call before you dig" one-call telephone number, and giving PHMSA limited "backstop" authority to conduct civil enforcement against one-call violators in states that have failed to conduct such enforcement. The act mandated the promulgation by PHMSA of minimum standards for integrity management programs for natural gas distribution pipelines.[36] It also mandated a review of the adequacy of federal pipeline safety regulations related to internal corrosion control, and required PHMSA to increase the transparency of enforcement actions by establishing a publicly accessible database including violation and penalty information and the mechanism for pipeline operators to make response information available to the public.

[34] P.L. 107-355 encourages the implementation of state "one-call" excavation notification programs (§ 2) and allows states to enforce "one-call" program requirements. The act expands criminal responsibility for pipeline damage to cases where damage was not caused "knowingly and willfully" (§ 3). The act adds provisions for ending federal-state pipeline oversight partnerships if states do not comply with federal requirements (§ 4).

[35] A 2006 Government Accountability Office (GAO) report found that PHMSA's gas integrity management program benefitted public safety, although the report recommended revisions to PHMSA's performance measures. See GAO, "Natural Gas Pipeline Safety: Integrity Management Benefits Public Safety, but Consistency of Performance Measures Should Be Improved," GAO-06-946, September 8, 2006, pp. 2-3.

[36] PHMSA issued final regulations requiring operators of natural gas distribution pipelines to adopt integrity management programs similar to existing requirements for gas transmission pipelines on December 4, 2009.

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DOT Pipeline Security Activities

Presidential Decision Directive 63 (PDD-63), issued during the Clinton administration, assigned lead responsibility for pipeline security to the DOT.[37] These responsibilities fell to the OPS, at that time a part of the DOT's Research and Special Programs Administration (RSPA), since the agency was already addressing some elements of pipeline security in its role as safety regulator.[38] In 2002, the OPS conducted a vulnerability assessment to identify critical pipeline facilities and worked with industry groups and state pipeline safety organizations "to assess the industry's readiness to prepare for, withstand and respond to a terrorist attack...."[39] Together with the Department of Energy, state pipeline agencies, the OPS promoted the development of consensus standards for security measures tiered to correspond with the five levels of threat warnings issued by the Office of Homeland Security.[40] The OPS also developed protocols for inspections of critical facilities to ensure that operators implemented appropriate security practices. To convey emergency information and warnings, the OPS established a variety of communication links with key state officials, the most critical pipeline facilities throughout the country. The OPS also began identifying near-term technology to enhance deterrence, detection, response, and recovery, and began seeking to advance public and private sector planning for response and recovery.[41]

On September 5, 2002, the OPS circulated formal guidance developed in cooperation with the pipeline industry associations defining the agency's security program recommendations and implementation expectations. This guidance recommended that operators identify critical facilities, develop security plans consistent with prior trade association security guidance, implement these plans, and review them annually.[42] Although the guidance was voluntary, the OPS expected compliance and informed operators of its intent to begin reviewing security programs within 12 months, potentially as part of more comprehensive safety inspections.[43] Federal pipeline security authority was subsequently transferred outside of DOT, however, as discussed below, so the OPS did not follow through on a national program of pipeline security program reviews.

Transportation Security Administration

In November 2001, President Bush signed the Aviation and Transportation Security Act (P.L. 107-71) establishing the Transportation Security Administration (TSA) within the DOT. According to TSA, the act placed the DOT's pipeline security authority (under PDD-63) within TSA. The act specified for TSA a range of [illegible] powers related to general transportation security, [illegible] and

[37] Presidential Decision Directive 63, *Protecting the Nation's Critical Infrastructures*, May 22, 1998.

[38] In November 2004, the President signed the Norman Y. Mineta Research and Special Programs Improvement Act (P.L. 108-426), which eliminated RSPA and placed the Office of Pipeline Safety under the new Pipeline and Hazardous Material Safety Administration. This restructuring did not significantly alter the authorities or activities of the OPS.

[39] Research and Special Programs Administration (RSPA), *RSPA Pipeline Security Preparedness*, December 2001.

[40] Ellen Engleman, Administrator, Research and Special Programs Administration (RSPA), statement before the Subcommittee on Energy and Air Quality, House Energy and Commerce Committee, March 19, 2002.

[41] Ellen Engleman, Administrator, Research and Special Programs Administration (RSPA), statement before the Subcommittee on Highways and Transit, House Transportation and Infrastructure Committee, February 13, 2002.

[42] James K. O'Steen, Research and Special Programs Administration (RSPA), *Implementation of RSPA Security Guidance*, presentation to the National Association of Regulatory Utility Commissioners, February 25, 2003.

[43] Office of Pipeline Safety (OPS), personal communication, June 10, 2003.

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intelligence management, threat assessment, mitigation, security measure oversight and enforcement, among others. On November 25, 2002, President Bush signed the Homeland Security Act of 2002 (P.L. 107-296) creating the Department of Homeland Security (DHS). Among other provisions, the act transferred to DHS the Transportation Security Administration from the DOT (§ 403). On December 17, 2003, President Bush issued Homeland Security Presidential Directive 7 (HSPD-7), clarifying executive agency responsibilities for identifying, prioritizing, and protecting critical infrastructure.[44] HSPD-7 maintains DHS as the lead agency for pipeline security (par. 15), and instructs the DOT to "collaborate in regulating the transportation of hazardous materials by all modes (including pipelines)" (par. 22h). The order requires that DHS and federal agencies collaborate with "appropriate private sector entities" in sharing information and protecting critical infrastructure (par. 25). TSA joined both the Energy Government Coordinating Council and the Transportation Government Coordinating Council under provisions in HSPD-7. The missions of the councils are to work with their industry counterparts to coordinate critical infrastructure protection programs in the energy and transportation sectors, respectively, and to facilitate the sharing of security information.

HSPD-7 also required DHS to develop a national plan for critical infrastructure and key resources protection (par. 27), which the agency issued in 2006 as the *National Infrastructure Protection Plan* (NIPP). The NIPP, in turn, required each critical infrastructure sector to develop a Sector Specific Plan (SSP) that describes strategies to protect its critical infrastructure, outlines a coordinated approach to strengthen its security efforts, and determines appropriate funding for these activities. Executive Order 13416 further required the transportation sector SSP to prepare annexes for each mode of surface transportation.[45] In accordance with the above requirements the TSA issued its *Transportation Systems Sector Specific Plan* and *Pipeline Modal Annex* in 2007.

TSA Pipeline Security Activities

Pipeline security activities at TSA are led by the Pipeline Security Division (PSD) within the agency's Office of Transportation Sector Network Management.[46] According to the agency's *Pipeline Modal Annex* (PMA), TSA has been engaged in a number of specific pipeline security initiatives since 2003 as summarized in **Table 1**.

Table 1. TSA Pipeline Security Initiatives

Initiative	Description	Participants[a]
Pipeline Policy and Planning	Coordination, development, implementation, and monitoring of pipeline security plans	TSA, DHS, DOT, DOE
Sector Coordinating Councils and Joint Sector Committee	Government and private sector coordination and cross-jurisdictional implementation of critical infrastructure security	TSA, DOT, DOE, and industry
Corporate Security Reviews (CSR)	On-site reviews of pipeline operator security	TSA, Industry

[44] HSPD-7 supersedes PDD-63 (par. 37).

[45] Executive Order 13416, "Strengthening Surface Transportation Security," December 5, 2006.

[46] These offices were formerly known as the Pipeline Security Program Office and the Intermodal Security Program Office, respectively.

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Initiative	Description	Participants[a]
Pipeline System Risk Tool	Statistical tool used for relative risk ranking and prioritizing CSR findings	TSA, Industry
Pipeline Cross-Border Vulnerability Assessment	U.S. and Canadian security assessment and planning for critical cross-border pipeline	TSA, Canada
Regional Gas Pipeline Studies	Regional supply studies for key natural gas markets	TSA, DOE, INGAA, GTI, NETL, Industry
Cyber Attack Awareness	[illegible]/presentation on Supervisory Control and Data Acquisition (SCADA) system vulnerabilities	TSA, GTI
Landscape Depiction and Analysis Tool	Incorporates depiction of the pipeline domain with risk analysis components	TSA
International Pipeline Security Forums	International forums for U.S. and Canadian governments and pipeline security officials convened annually	TSA, Canada, Other agencies, Industry
"G8" Multinational Security Assessment and Planning	Multinational-sharing of pipeline threat assessment methods, advisory levels, effective practices, and vulnerability information; also develops a G8-based contingency planning guidance document	TSA, DHS, State Dept., G8 Nations
Pipeline Security Drills	Facilitation of pipeline security drills and exercises	TSA, Industry
Security Awareness Training	Informational compact discs about pipeline security issues and improvised explosive devices	TSA
Stakeholder Conference Calls	Periodic information-sharing conference calls between key pipeline security stakeholders	TSA, Other agencies, Industry
Pipeline Blast Mitigation Studies	Explosives tests on various pipe configurations to determine resiliency characteristics	TSA, DOD, Other agencies
Virtual Library Pipeline Site	Development of TSA information-sharing Web portal	TSA

Sources: Transportation Security Administration, Pipeline Modal Annex, June 2007, pp. 10-11, http://www.dhs.gov/xlibrary/assets/Transportation_Pipeline_Modal_Annex_5_21_07.pdf; Jack Fox, Transportation Security Administration, Testimony before the House Committee on Homeland Security, Subcommittee on Management, Investigations, and Oversight, April 19, 2010

a. **Key:** DHS = Dept. Of Homeland Security, DOE = Dept. of Energy, G8 = Group of Eight (U.S., U.K., Canada, France, Germany, Italy, Japan, and Russia), GTI = Gas Technology Institute, INGAA = Interstate Natural Gas Association of America, NETL = National Energy Technology Laboratory, TSA = Transportation Security Administration

In 2003, TSA initiated its Corporate Security Review (CSR) program, [illegible] the largest pipeline and natural gas distribution operators to review their security plans and inspect their facilities. During the reviews, TSA evaluates whether each company is following the intent of the OPS security guidance, and seeks to collect the list of assets each company had identified meeting the criteria established for critical facilities. In 2004, the DOT reported that the plans reviewed to date (approximately 25) had been "judged responsive to the OPS guidance."[47] As of August 2010, TSA had completed CSR's covering the largest 100 pipeline systems (84% of total U.S. energy pipeline throughput) and was in the process of conducting second CSR's of

[47] Department of Transportation (DOT), "Action Taken and Actions Needed to Improve Pipeline Safety," CC-2004-061, June 16, 2004, p. 21.

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these systems.[48] According to TSA, CSR results indicate that the majority of U.S. pipeline systems "continue to do a good job in regards to pipeline security" although there are areas in which pipeline security can be improved.[49] Past CSR reviews have identified inadequacies in some company security programs such as not updating security plans, lack of management support, poor employee involvement, inadequate threat intelligence, and employee apathy or error.[50] In 2008, the TSA initiated its Critical Facility Inspection Program (CFI), under which the agency conducts in-depth inspections of all the critical facilities of the 100 largest pipeline systems in the United States. By the end of 2011, TSA expects to complete CFIs for all 373 critical facilities identified by pipeline operators.[51]

In addition to the initiatives in **Table 1**, TSA has worked to establish qualifications for personnel applying for positions with unrestricted access to critical pipeline assets and has developed its own inventory of critical pipeline infrastructure.[52] The agency has also addressed legal issues regarding recovery from terrorist attacks, such as FBI control of crime scenes and eminent domain in pipeline restoration. In October 2005, TSA issued an overview of recommended security practices for pipeline operators "for informational purposes only ... not intended to replace security measures already implemented by individual companies."[53] The agency released revised guidance on security best practices at the end of 2006, and is currently reviewing an updated version for possible release in 2011. The guidelines include a section on cybersecurity developed with the assistance of the Applied Physics Laboratory of John Hopkins University as well as other government and industry stakeholders.[54]

The mission of TSA's Pipeline Security Division (PSD) currently includes developing security standards; implementing measures to mitigate security risk; building and maintaining stakeholder relations, coordination, education and outreach; and monitoring compliance with security standards, requirements, and regulations. The President's FY2011 budget request for DHS does not include a separate line item for TSA's pipeline security activities. The budget request does include a $137.6 million line item for "Surface Transportation Security," which encompasses security activities in non-aviation transportation modes, including pipelines.[55] The PSD has traditionally received from the agency's general operational budget an allocation for routine operations such as regulation development, travel, and outreach. According to the PSD, the budget funds 13 full-time equivalent staff within the office.[56]

In 2007 the TSA Administrator testified before Congress that the agency intended to conduct a pipeline infrastructure study to identify the "highest risk" pipeline assets, building upon such a

[48] Government Accountability Office (GAO), *Pipeline Security: TSA Has Taken Actions to Help Strengthen Its Program but Could Improve Priority-Setting and Assessment Processes*, GAO-10-867, August 2010. Executive summary.

[49] Transportation Security Administration, personal communication, November 5, 2010.

[50] Mike Gillenwater, TSA, "Pipeline Security Overview," presented to the Alabama Public Service Commission Gas Pipeline Safety Seminar, Montgomery, AL, December 11, 2007.

[51] GAO, August 2010, p. 32.

[52] TSA, *TSA Multi-Modal Criticality Evaluation Tool*, TSA Threat Assessment and Risk Management Program, slide presentation, April 15, 2003.

[53] TSA, Intermodal Security Program Office, *Pipeline Security Best Practices*, October 19, 2005, p. 1.

[54] Transportation Security Administration, Personal communication, February 2, 2010.

[55] U.S. Office of Management and Budget, *Budget of the United States Government, Fiscal Year 2011: Appendix*, February 2010, p. 526.

[56] Transportation Security Administration, Pipeline Security Division, personal communication, November 5, 2010.

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list developed through the CSR program. He also stated that the agency would use its ongoing security review process to determine the future implementation of baseline risk standards against which to set measurable pipeline risk reduction targets.[57] Provisions in the Implementing Recommendations of the 9/11 Commission Act of 2007 (P.L. 110-53) require TSA, in consultation with PHMSA, to develop a plan for the federal government to provide increased security support to the "most critical" pipelines at high or severe security alert levels and when there is specific security threat information relating to such pipeline infrastructure (§ 1558(a)(1)). The act also requires a recovery protocol plan in the event of an incident affecting the interstate and intrastate pipeline system (§ 1558(a)(2)). According to TSA, a draft plan has been completed and is currently under review in the DHS clearance process.[58]

Security Incident Investigations

In addition to the above pipeline security initiatives, the TSA Pipeline Security Division has performed a limited number of security assessments and has supported investigations for specific companies and assets where intelligence information has suggested potential terrorist activity. The PSD, along with PHMSA, was involved in the investigation of an August 2006 security breach at an LNG peak-shaving plant in Lynn, MA.[59] Although not a terrorist incident, the security breach involved the penetration of intruders through several security barriers and alert systems, permitting them to access the main LNG storage tank at the facility. The PSD also became aware of the JFK airport terrorist plot in its early stages and supported the Federal Bureau of Investigation's associated investigation. The PSD engaged the private sector in helping to assess potential targets and determine potential consequences. The PSD worked with the pipeline company to keep it informed about the plot, discuss its security practices, and review its emergency response plans.[60]

GAO Study of TSA's Pipeline Security Activities

In December 2008, the Senate Committee on Commerce, Science, and Transportation requested a study by the Government Accountability Office (GAO) examining TSA's efforts to ensure pipeline security. GAO's report, released in August 2010, focused on TSA's use of risk assessment and risk information in securing pipelines, actions the agency has taken to improve pipeline security under guidance in the 9/11 Commission Act of 2007 (P.L. 110-53), and the agency's efforts to measure such security improvement efforts.[61] Among other findings, GAO concluded that, although TSA had begun to implement a risk management approach to prioritize its pipeline security efforts, it had not established [illegible] to ensure that the highest-risk pipeline systems throughout the nation get the necessary scrutiny. GAO also concluded that TSA was missing opportunities to [illegible] CSR and CFI programs to ensure that pipeline operators understand how they can improve

[57] Kip Hawley, Asst. Secretary, Dept. of Homeland Security, Testimony before the Senate Committee on Commerce, Science, and Transportation hearing on Federal Efforts for Rail and Surface Transportation Security, January 18, 2007.

[58] Transportation Security Administration, personal communication, November 5, 2010.

[59] Pipeline and Hazardous Materials Safety Administration (PHMSA), "Pipeline Safety: Lessons Learned From a Security Breach at a Liquefied Natural Gas Facility," Docket No. PHMSA-04-19856, *Federal Register*, Vol. 71, No. 249, December 28, 2006, p. 78269; TSA, Intermodal Security Program Office, personal communication, August 30, 2006.

[60] Transportation Security Administration, personal communication, July 6, 2007.

[61] Government Accountability Office, *GAO Watchdog*, "Transportation Security's Efforts To Ensure Pipeline Security," Assignment No. 440768, Internet database, February 4, 2010.

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the security of their pipeline systems. TSA could also make better use of CSR and CFI recommendations for analyzing pipeline vulnerabilities and was not following up on these recommendations. GAO found that linking TSA's pipeline security performance measures and milestones to the goals and objectives in its national security strategy for pipeline systems could aid in achieving results within specific time frames and could facilitate more effective oversight and accountability.[62] TSA concurred with all of GAO's recommendations for addressing the issues and is in the process of implementing them.[63]

Federal Energy Regulatory Commission

One area related to pipeline safety and security not under either PHMSA's or TSA's primary jurisdiction is the siting approval of new gas pipelines, which is the responsibility of the Federal Energy Regulatory Commission (FERC). Companies building interstate natural gas pipelines must first obtain from FERC certificates of public convenience and necessity. (FERC does not oversee oil pipeline construction.) FERC must also approve the abandonment of gas facility use and services. These approvals may include safety and security provisions with respect to pipeline routing, safety standards and other factors.[64] As a practical matter, however, FERC has traditionally left these considerations to the other agencies.[65]

On September 14, 2001, FERC notified jurisdictional companies that it would "approve applications proposing the recovery of prudently incurred costs necessary to further safeguard the nation's energy systems and infrastructure" in response to the terror attacks of 9/11. FERC also committed to "expedite the processing on a priority basis of any application that would specifically recover such costs from wholesale customers." Companies could propose a surcharge over currently existing rates or some other cost recovery method.[66] In FY2005, the commission processed security cost recovery requests from 14 oil pipelines and 3 natural gas pipelines.[67] FERC's FY2006 annual report stated that "the Commission continues to give the highest priority to deciding any requests made for the recovery of extraordinary expenditures to safeguard the reliability and security of the Nation's energy transportation systems and energy supply infrastructure."[68] FERC's subsequent annual reports do not mention pipeline security.

In February 2003, FERC promulgated a new rule (RM02-4-000) to protect critical energy infrastructure information (CEII). The rule defines CEII as information that "must relate to critical infrastructure, be potentially useful to terrorists, and be exempt from disclosure under the Freedom of Information Act." According to the rule, critical infrastructure is "existing and proposed systems and assets, whether physical or virtual, the incapacity or destruction of which

[62] U.S. Government Accountability Office (GAO), *Pipeline Security: TSA Has Taken Actions to Help Strengthen Security, but Could Improve Priority-Setting and Assessment Processes*, GAO-10-867, August 2010, pp. 43-45.

[63] Jerald E. Levine, Director, Departmental GAO/OIG Liaison Office, U.S. Dept. of Homeland Security, Letter to GAO, July 23, 2010; Transportation Security Administration, Pipeline Security Division, personal communication, November 5, 2010.

[64] U.S. Code of Federal Regulations. 18 C.F.R. 157.

[65] Federal Energy Regulatory Commission (FERC), personal communication, May 22, 2003.

[66] Federal Energy Regulatory Commission (FERC), News release, R-01-38, Washington, DC, September 14, 2001.

[67] Federal Energy Regulatory Commission (FERC), *Federal Energy Regulatory Commission Annual Report FY2005*, 2006, p. 19. These are the most recent specific figures reported.

[68] Federal Energy Regulatory Commission (FERC), *Federal Energy Regulatory Commission* Annual Report FY2006, 2007, p. 23.

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would negatively affect security, economic security, public health or safety, or any combination of those matters." CEII excludes "information that identifies the location of infrastructure." The rule also establishes procedures for the public to request and obtain such critical information, and applies both to proposed and existing infrastructure.[69]

On May 14, 2003, FERC handed down new rules (RM03-4) facilitating the restoration of pipelines after a terrorist attack. The rules allow owners of a damaged pipeline to use blanket certificate authority to immediately start rebuilding, regardless of project cost, even outside existing rights-of-way. Pipeline owners would still need to notify landowners and comply with environmental laws. Pa[illegible]s lim[illegible]nket authority to $17.5 million projects and 45-day advance notice.[70]

Key Policy Issues

The 111th Congress is overseeing the implementation of the Pipeline Inspection, Protection, Enforcement, and Safety Act of 2006 (P.L. 109-468) and pipeline security provisions in the Implementing Recommendations of the 9/11 Commission Act of 2007 (P.L. 110-53). It is also considering numerous new legislative proposals as the federal pipeline safety program requires reauthorization in the wake of major pipelines accidents in 2010. In the context of its broader oversight of federal pipeline safety and security activities, Congress may examine a subset of key issues which have drawn particular attention in recent policy deliberations.

Staffing Resources for Pipeline Safety and Security

The U.S. pipeline safety program is based upon on a combination of federal and state staff to implement and enforce federal pipeline safety regulations. To date, PHMSA has relied heavily on state agencies for pipeline inspections, with only 20% of inspectors in 2010 being federal employees. Some in Congress have criticized this level of inspector staffing at PHMSA as being insufficient to adequately cover pipelines under the agency's jurisdiction, notwithstanding state agency cooperation. S. 3824 would increase the number of full-time equivalent employees at PHMSA by at least 100 in increments of 25 annually between FY2011 and FY2014 (§ 3(a)). S. 3856 would increase PHMSA pipeline safety staffing by 40 through FY2014. In considering such PHMSA staff increases, three distinct issues that may warrant further consideration are the overall number of federal inspectors, the agency's historical use of staff funding, and the staffing of pipeline safety inspectors [illegible]t[illegible]s.

PHMSA Inspectors

The President's FY2011 budget request listed PHMSA's estimated staffing in 2010 as 206 full-time equivalent employees (FTEs).[71] As **Figure 1** shows, the addition of 100 staff under S. 3824 would increase the DOT's overall pipeline safety staff by approximately 50% over current levels, and would represent a nearly 300% increase in funded staff since 2001. Thus, staff increases

[69] Federal Energy Regulatory Commission (FERC), News release, R-03-08, Washington, DC. February 20, 2003.

[70] Christian Schmollinger, "FERC OKs Emergency Reconstruction," *Natural Gas Week,* May 13, 2003.

[71] U.S. Office of Management and Budget, February 2010, p. 989.

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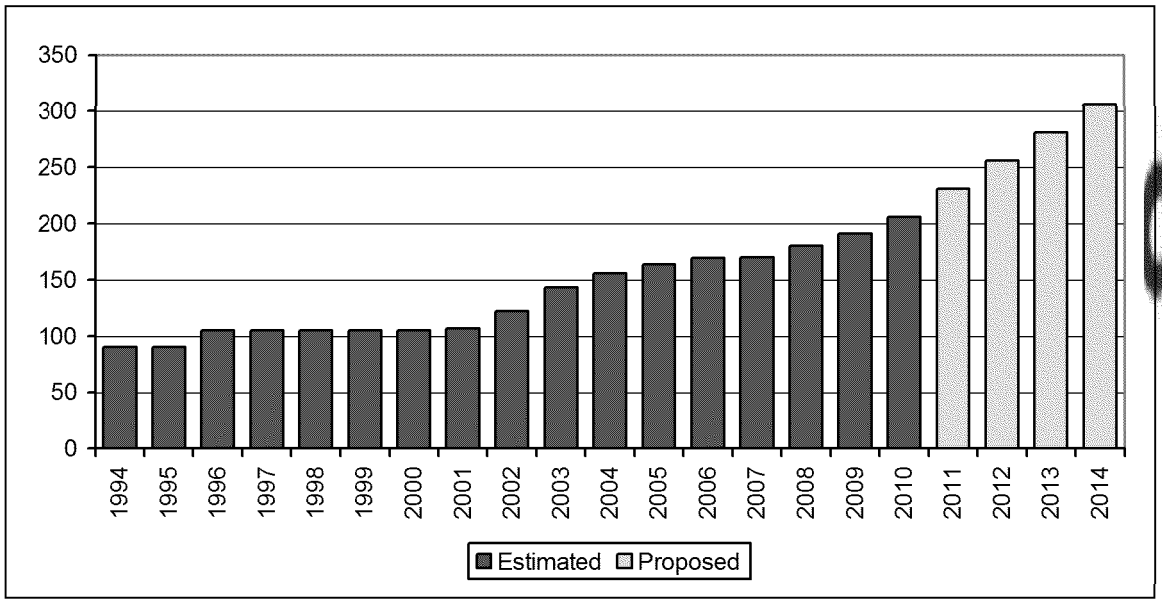
under S. 3824 would be a continuation of staff growth (of mostly inspectors) begun 10 years ago in response to the 1999 Bellingham accident, the terrorist attacks of 9/11, implementation of PHMSA's integrity management regulations, and the continued growth of U.S. pipelines.

Figure 1. PHMSA Pipeline Safety Staffing, Historical and Proposed under S. 3824

Full-Time Equivalent Staff



Sources: U.S. Office of Management and Budget, *Budget of the United States Government: Appendix*, Fiscal Years1996-2011; S. 3824.

Notes: Estimated staff are staff anticipated by the agency as reported in annual budget requests. They may differ from actual staff employed (for the same fiscal year) as reported in subsequent budget requests.

Whether 300 PHMSA pipeline safety staff in 2014 would be the optimal number is open to debate. However, the additional employees available under S. 3824 (§ 3(b)) and S. 3856 (§ 24(b)) would not necessarily all be field inspectors, as inspectors are only one of several categories of hiring "focus" for the agency listed under these bills.

PHMSA Staffing Shortfalls

One issue that complicates the PHMSA staffing debate is long-term [illegible] the agency's pipeline safety program. At least since FY2001, PHMSA's (or RSPA's) actual staffing for pipeline safety has been [illegible] in each of its annual budget requests [illegible] the level of staffing anticipated in the prior year's budget request. For example, the FY2011 budget request for pipeline safety reports 162 actual employees in 2009. However, the FY2010 budget request states an expectation of 191 employees ("estimated") for 2009. On this basis, between 2001 and 2009, the agency reported a staffing shortfall averaging approximately 25 employees every year. (Note that, due to this annual shortfall, the FTE's reported in **Figure 1** are higher that the number actually employed by PHMSA). In testimony before Congress in September 2010, DOT officials reported that PHMSA employed only 110 of 137 inspectors for

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which it was funded—a shortfall of 27 inspectors.[72] Furthermore, as of November 12, 2010, there appeared to be no postings for PHMSA pipeline safety inspector positions at the USAJobs website.

Table 2. Actual vs. Anticipated Pipeline Safety Staff in DOT Budget Requests

Full-Time Equivalent Staff

Year	Actual	Anticipated	Difference
1994	62	90	-28
1995	71	90	-19
1996	84	105	-21
1997	92	105	-13
1998	97	105	-8
1999	93	105	-12
2000	97	105	-8
2001	96	107	-11
2002	100	122	-22
2003	111	143	-32
2004	125	156	-31
2005	154	164	-10
2006	139	169	-30
2007	146	170	-24
2008	147	180	-33
2009	162	191	-29

Sources: U.S. Office of Management and Budget, *Budget of the United States Government: Appendix*, Fiscal Years1996-2011; CRS analysis.

PHMSA officials offer a number of reasons for the persistent shortfall in inspector staffing. These reasons include a scarcity of qualified inspector job applicants, delays in the federal hiring process during which applicants accept other job offers, and PHMSA inspector turnover—especially to pipeline companies which often hire away PHMSA inspectors for their corporate safety programs. Because PHMSA pipeline inspectors are highly trained by the agency (typically for two years before being allowed to operate independently) they are highly valued by pipeline operators seeking to comply with federal safety regulations. PHMSA officials also cite budget issues associated with the agency's appropriations which can require the use of FTE salary funding to meet other obligations. The pipeline safety staffing shortfall calls into question of how the DOT will achieve and maintain a sharply increased inspection workforce under S. 3824 or S. 3856 when it has not been able to staff the number of inspectors for which it is already budgeted.

[72] John D. Porcari, Dep. Secretary, U.S. Dept. of Transportation, Testimony before the House Committee on Transportation and Infrastructure, Hearing on the Enbridge Pipeline Oil Spill in Marshall, MI, September 15, 2010.

[73] Pipeline and Hazardous Materials Safety Administration, Personal communication, November 4, 2010.

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State Pipeline Inspector Funding

Because state agencies would continue to account for the majority of U.S. pipeline safety inspectors, even if S. 3824 or S. 3856 were enacted, another important consideration is how the number of state inspectors might be affected by budget shortfalls and possible agency funding cuts faced by many states due to the recent U.S. economic recession. Under P.L. 109-468 (§ 2(c)), PHMSA is authorized to award grants reimbursing state governments for up to 80% of the cost of the staff, personnel, and activities required to support the federal pipeline safety program (although reimbursement has not reached the 80% level since the passage of the act). According to DOT these grant are[illegible]al to [illegible] the states to continue their current programs and hire additional inspectors, [and] [illegible]ssure that st[illegible]es do not turn over responsibility for distribution pipeline systems to t[illegible] Federal inspectors,[74] among other reasons.[74] Notwithstanding these federal grants, inspector staffing at state pipeline safety agencies has been negatively affected by state budget deficits. According to the National Association of Pipeline Safety Representatives, as of October 2010, pipeline safety employees in 17 states had been furloughed without pay for up to 3 weeks.[75] PHMSA officials have also reportedly cited unfilled positions among state pipeline safety agencies as eroding the state pipeline safety workforce.[76] Senior DOT officials consider financial problems among state pipeline safety agencies a matter of "great concern" and have granted to states waivers from certain regulatory financial requirements to increase their access to federal grant money.[77] Nonetheless, the future availability of state pipeline safety inspectors remains uncertain. In particular, the possibility that some states may choose to end their roles as agents for the federal pipeline safety program, and thereby shift a greater burden for pipeline inspections back to the federal government, may require continued attention from Congress.

TSA Pipelines Security Resources

Similar to its concerns about the adequacy of federal pipeline safety staffing, Congress has long been concerned about staff resources available to implement the nation's pipeline security program. For example, as one Member remarked in 2005, "aviation security has received 90% of TSA's funds and virtually all of its attention. There is simply not enough being done to address ... pipeline security."[78] At a congressional field hearing in April 2010, another Member expressed concern that TSA's pipeline division did not have sufficient staff to carry out a federal pipeline security program on a national scale.[79]

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[74] U.S. Department Of Transp[illegible]ation, *Pipeline And Hazardous Materials Safety Administration, FY 2011 Budget Request*, February 1, 2010, p. [illegible]

[75] National Association of Pipe[illegible]afety Representatives, [illegible] for Waiver [illegible] Prior Three Year Average S Expense Component of the Pipe[illegible]Safet[illegible] Grant Program, Letter to [illegible] Pipeline Safety, Pipeline And [illegible]ardous Materials Safety Administration, October [illegible], 2010, http://www.[illegible].gov/webimage.nsf/web+objects/CCOPS_DOCs_by_Year/$file/NAPSR%20letter%20to%20PHMSA%20dated%2010-15-09-Waiver%20Request.pdf.

[76] Stephanie Seay, "Budget Woes May Impede Local Pipe Safety Efforts," *Gas Daily*, November 8, 2010.

[77] The Honorable Cynthia Quarterman, Administrator, Pipeline and Hazardous Materials Safety Administration, Remarks at the Different Pathways to a Common Goal: PIPA, Damage Prevention, & Greater Public Awareness and Involvement Conference, Pipeline Safety Trust, New Orleans, LA, November 5, 2010.

[78] Sen. Daniel K. Inouye, opening statement before the Senate Committee on Commerce, Science and Transportation, hearing on the President's FY2006 Budget Request for the Transportation Security Administration (TSA), February 15, 2005.

[79] The Honorable Gus M. Billirakis, Remarks before the House Committee on Homeland Security, Subcommittee on Management, Investigations, and Oversight hearing on "Unclogging Pipeline Security: Are the Lines of Responsibility (continued...)

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At its current staffing level of 13 FTEs, TSA's Pipelines Security Division has limited field presence. In conducting a pipeline corporate security review, for example, TSA typically sends one to three staff to hold a three- to four-hour interview with the operator's security representatives followed by a visit to only one or two of the operator's pipeline assets.[80] TSA's plan to focus security inspections on the largest pipeline and distribution system operators tries to make the best use of its limited resources. However, there are questions as to whether the agency's CSRs as currently structured allow for rigorous security plan verification and a credible threat of enforcement. The limited number of CSRs the agency can complete in a year is a particular concern. According to a 2009 GAO report, "TSA's pipeline division stated that they would like more staff [illegible] to conduct its corporate security reviews more frequently," and "analyzing secondary or indirect consequences of a terrorist attack and developing strategic risk objectives required much time and effort."[81] P.L. 110-53 specifically authorized funding of $2 million annually through FY2010 for TSA's pipeline security inspections and enforcement program (§ 1557(e)). It is an open question whether $2 million annually is sufficient to enable TSA to meet congressional expectations for federal pipeline security activities.

Given that both PHMSA and TSA have played important roles in the federal pipeline security program, with TSA the designated lead agency since 2002, Congress has raised questions about the appropriate responsibilities and division of pipeline security authority between them.[82] According to TSA, the two agencies "continue to enjoy a 24/7 communication and coordination relationship in regards to all pipeline security and safety incidents."[83] Nonetheless, given the limited staff in TSA's pipeline security division, and the comparatively large pipeline safety staff (especially inspectors) in PHMSA, legislators have considered whether the TSA-PHMSA pipeline security relationship optimally aligns staff resources across both agencies to fulfill the nation's overall pipeline safety and security mission.[84] H.R. 2200 would require a study reexamining the roles and responsibilities of DHS and DOT with respect to pipeline security (§ 406).

Automatic Shutoff Valves for Transmission Pipelines

In the 2010 San Bruno pipeline accident, natural gas continued to flow from the pipeline for nearly two hours after the initial explosion—fueling the intense fire, hindering emergency response, and increasing damage caused by the fire. The long duration of flowing gas reportedly was due to delays in the closing of manually operated valves by the pipeline operator, and may have been exacerbated by inadequate employee training in valve closure procedures.[85] Consequently, some advocates have called for [illegible]

(...continued)

Clear?," Plant City, FL, April [illegible]

[80] Department of Homeland Security, "Intent to Request Approval from OMB of One New Public Collection of Information: Pipeline Corporate Security Review," 74 *Federal Register* 42086, August 20, 2009.

[81] U.S. Government Accountability Office, Transportation Security: Comprehensive Risk Assessments and Stronger Internal Controls Needed to Help Infrom TSA Resource Allocation, GAO-09-492, March 2009, p. 30, http://www.gao.gov/new.items/ d09492.pdf.

[82] For example, see Hon. William J. Pascrell, Jr., statement at the House Committee on Transportation and Infrastructure, Subcommittee on Highways, Transit and Pipelines, hearing on Pipeline Safety, March 16, 2006.

[83] TSA, Pipeline Security Division, personal communication, November 5, 2010.

[84] The Honorable Gus M. Billirakis, April 19, 2010.

[85] John Upton, "Gas Fueled Blaze for Almost Two Hours," *San Francisco Examiner*, Sept. 15, 2010.

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automatically controlled valves in natural gas and hazardous liquids transmission pipelines. S. 3824 would require the installation of remotely or automatically controlled valves capable of "shutting off the flow of gas" in natural gas pipelines "wherever technically and economically feasible" (§ 6). H.R. 6295 would require the installation of "automatic or remote shut off valves" for all new transmission pipelines and for existing transmission pipelines near significant earthquake faults or in relatively populated areas (§6). S. 3856 would require automatic or remotely controlled shut off valves "where economically and technically feasible" for all new transmission pipelines (§ 5).

Previous Consideration

The possibility of requiring remotely controlled or automatic shut off valves for natural gas pipelines is not new. Congress previously considered such requirements in reaction to a 1994 natural gas pipeline fire in Edison, NJ, similar to the San Bruno accident in which it took the pipeline operator 2½ hours to locate and manually operated valves.[86] In 1995, during the 104th Congress, H.R. 432 and S. 1962 would have required the installation of remotely or automatically controlled valves in natural gas pipelines "wherever technically and economically feasible" (§ 11). Under the Accountable Pipeline Safety and Partnership Act of 1996 (P.L. 104-304), Congress mandated a DOT assessment of remotely controlled valves (RCVs) on interstate natural gas pipelines, and empowered the agency to require such valves if appropriate based upon its findings (§4(h)).

The DOT's assessment, released in 1999, reported that installation of RCVs would provide only "a small benefit from reduced casualties because virtually all casualties from a rupture occur before an RVC could be activated."[87] Moreover, the DOT reported that it lacked data to compare pipeline fire property damage with and without RCVs. Nonetheless, the DOT study advocated the deployment of RCVs, at least in some gas pipeline locations.

> We have found that RCVs are effective and technically feasible, and can reduce risk, but are not economically feasible. We have also found that there may be a public perception that RCVs will improve safety and reduce the risk from a ruptured gas pipeline. We believe there is a role for RCVs in reducing the risk from certain ruptured pipelines and thereby minimizing the consequences of certain gas pipeline ruptures.... Any fire would be of greater intensity and would have greater potential for damaging surrounding infrastructure if it is constantly replenished with gas. The degree of disruption in heavily populated and commercial areas would be in direct proportion to the duration of the fire. Although we lack data enabling us to [illegible] potential consequences, we believe that [illegible] nonetheless, and we believe RCVs may provide the most [illegible][88]

Notwithstanding this conclusion, the DOT has not mandated the use of RCVs on natural gas transmission pipelines.

The natural gas pipeline industry historically has objected to federal mandates to install remotely controlled or automated valves. Although pipeline operators already employ such valves under

[86] National Transportation Safety Board, *Texas Eastern Transmission Corporation Natural Gas Pipeline Explosion and Fire, Edison, New Jersey, March 23, 1994*, NTSB/PAR-95/01, January 18, 1995.

[87] U.S. Department of Transportation, *Remotely Controlled Valves on Interstate Natural Gas Pipelines*, September 1999, p.22.

[88] U.S. Department of Transportation, September 1999, pp. 23-24.

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specific circumstances, such as in hard-to-access locations or at compressor stations, they have opposed the installation of such valves more widely throughout their pipeline systems on the grounds that they are usually not cost-effective. They also argue that such valves do not always function properly, would not prevent natural gas pipeline explosions (which cause most fatalities), and are susceptible to false alarms, needlessly shutting down pipelines and disrupting critical fuel supplies.[89] Automatic valves, in particular, may be susceptible to unnecessary closure, potentially disrupting critical flows of natural gas to distribution utilities and—as a result—increasing safety risks associated with residential furnace relighting, among other concerns.[90] Some operators also claim higher maintenance costs for valves that are not manually operated.

Remotely Controlled Valves for Liquids Pipelines

The use of remotely controlled or automatic valves has also been a long-standing consideration for hazardous liquid pipeline systems. The National Transportation Safety Board (NTSB) began to address the need for [illegible] failed hazardous liquid pipelines using remotely controlled or automatic valves in the 1970s.[91] In 1987, the NTSB recommended that the DOT "require the installation of remote-operated valves on pipelines that transport hazardous liquids, and base the spacing of remote-operated valves on the population at risk."[92] The Pipeline Safety Act of 1992 (P.L. 102-508) required the DOT to assess the effectiveness of "emergency flow restricting devices (including remotely controlled valves and check valves)" on hazardous liquid pipelines, and required the DOT to "issue regulations prescribing the circumstances under which operators of hazardous liquid pipeline facilities must use emergency flow restricting devices" (§ 212). Notwithstanding this Congressional mandate, the NTSB found the DOT's efforts to promote the use of such devices inadequate. In 1996, the NTSB stated that the DOT "has performed studies, conducted research, and sought industry input, but has failed to carry through and develop requirements for leak detection and rapid shutdown of failed pipelines."[93] In its integrity management regulations, issued in December 2000, the DOT opted to leave the decision whether to install emergency flow restricting devices up to pipeline operators.[94]

Valve Replacement Costs

Cost would be a major factor in a broad national program to retrofit manual valves with remotely-controlled or automatic valves. For example, in the interstate natural gas pipeline network, valves are typically installed every 5 to 20 miles. Assuming a 10-mile separation between valves, the nation's 306,000 mile gas transmission system contains over 30,000 valves. The spacing of valves can be much closer together in [illegible]

GalleryWatch.com
http://www.crsdocuments.co

[89] Rich Connell, John Hoeffel and Marc Lifsher, "Lawmakers Move to Impose New Requirements for Pipeline Shutoff Valves," *Los Angeles Times*, September [illegible], 2010.

[90] Christina Sames, Vice President, American Gas Association, Remarks at the Different Pathways to a Common Goal: PIPA, Damage Prevention, & Greater Public Awareness and Involvement Conference, Pipeline Safety Trust, New Orleans, LA, November 4, 2010

[91] National Transportation Safety Board (NTSB), *Pipeline Special Investigation Report: Evaluation of Accident Data and Federal Oversight of Petroleum Product Pipelines,* NTSB/SIR-96/02, 1996, p. 37.

[92] Ibid.

[93] Ibid. p. 39.

[94] 49 CFR 195.452(i)(4)

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more populated areas. In October 2010 PG&E reported 300 valves that could be candidates for automation in approximately 565 miles of high consequence area pipelines.[95]

The potential costs of retrofitting manual valves vary greatly by pipeline and specific location. A 1998 Southwest Research Institute report estimated a cost of $32,000 (approximately $40,000 in 2010 dollars) per valve for retrofitting 30-inch pipeline valves to make them remotely controlled.[96] The DOT's 1999 study reported an average cost of $83,000 (approximately $100,000 in 2010 dollars) for Texas Eastern Transmission Corporation (TETCO) to retrofit 90 existing valves in a large part of its pipeline system.[97] PG&E estimates the average cost of retrofitting an automatic or remotely controlled valve on an existing large diameter pipeline at approximately $750,000, but ranging as low as $100,000 and as high as $1.5 million.[98]

Applying, for illustration, a $1,000,000 cost to some 30,000 valves yields $30 billion in capital investment required, not counting any higher future maintenance expenses. Even if such valve retrofits were required only in densely populated areas, industry costs could still be hundreds of millions of dollars—a significant cost to the pipeline industry and therefore likely to increase rates for pipeline transportation of natural gas. To the extent that some pipeline systems, like PG&E's, contain more valves than others per mile of pipe, they could be disproportionately affected. Gas pipeline service interruptions would also be an issue as specific lines could be repeatedly taken out of service during the valve retrofit process. The hazardous liquids pipeline industry could face capital costs and service interruptions of the same magnitude if required to do a widespread valve retrofit on existing lines. Additional right-of-way costs, environmental impacts, and construction accidents associated with the valve replacements could also be a consideration. For new pipelines, the incremental costs of installing remotely controlled or automatic valves instead of manual valves would be lower than in the retrofit case, but could still increase future pipeline costs.

SCADA and Leak Detection System Requirements

To effectively reduce the impact of pipeline accidents, installing remotely controlled or automatic valves may require associated investments in supervisory control and data acquisition (SCADA) systems along with other operational changes to improve leak detection. As one pipeline expert has stated,

> The pipeline operator's focus on keeping the pipeline system operating and the lack of remotely-operable valves are the primary factors that control the quantity of product released after a rupture or [illegible] remote control valves that are [illegible] unless the pipeline is equipped with a reliable leak detection subsystem that works with the SCADA system and [illegible]

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[95] Pacific Gas and Electric Company, "Re: Updates on Natural Gas Transmission System," Letter to the California Public Utilities Commission, October 25, 2010, p. 2-2, http://www.pge.com/includes/docs/pdfs/about/newsroom/puc_updates_oct252010.pdf.

[96] Cecil R. Sparks, Thomas R. Morrow, and John P. Harrell, "Cost Benefit Study of Remote Controlled Main Line Valves, Final Report to Gas Research Institute," Southwest Research Institute, San Antonio, TX, Report No. GRI-GRI-98/0076, May 1998.

[97] U.S. Department of Transportation, September 1999, p. 11.

[98] Pacific Gas and Electric Company, October 25, 2010, p. 2-3.

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> dedicated to minimizing product release (safety and environmental mindset) rather than trained for and dedicated to keeping the system operating (economic mindset).[99]

In its report about a 1996 pipeline accident in Tiger Pass, LA, the NTSB similarly concluded that the operator's "delay in recognition ... that it had experienced a pipeline rupture at Tiger Pass was due to the piping system's dynamics during the rupture and to the design of the company's SCADA system."[100] Consistent with these concerns, S. 3824 would mandate standards for natural gas leak detection with the goal of identifying substantial leaks in high consequence areas as expeditiously as technologically possible (§ 7). S. 3856 includes leak detection requirements for hazardous liquid pipelines (§ 10). H.R. 5295 mandates leak detection standards for both types of pipeline. Estimates of converting manual valves may, therefore, need to account for the costs of SCADA changes, leak detection systems, and associated training. These costs may also include significant reliability and security components, since increasing reliance upon new or expanded SCADA systems may also expose pipeline systems to greater risk from operating software failure or cyberterrorism.[101]

Public Perceptions

Some stakeholders have argued that public perceptions of improved pipeline safety and control are the highest perceived benefit of remotely controlled or automatic valves.[102] Although the value of these perceptions is hard to quantify (and, therefore, not typically reflected in cost-effectiveness studies), the importance of public perception and community acceptance of pipeline infrastructure can be a significant consideration in pipeline design, expansion, and regulation. In 2001, a representative of the National Association of Regulatory Utility Commissioners testified before Congress that "the main impediment to siting energy infrastructure is the great difficulty getting public acceptance for needed facilities."[103] Likewise, the National Commission on Energy Policy stated in its 2006 report that energy-facility siting is "a major cross-cutting challenge for U.S. energy policy," largely because of public opposition to new energy projects and other major infrastructure.[104]

One result of public concern about pipeline safety has been to prevent new pipeline siting in certain localities, and to increase pipeline development time and costs in others. In a 2006 report, for example, the EIA stated that "several major projects in the Northeast, although approved by FERC, have been held up because of public opposition or non-FERC regulatory interventions."[105]

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[99] Charles H. Batten, Engineer [illegible] Application No. 96-1 Cross Ca[illegible] p. 19, http://www.efsec.wa.gov/[illegible]

[100] National Transportation Safety Board, *Pipeline Accident Summary Report [illegible] During Dredging of Tiger Pass, Louisiana, October 25, 1996*, PR98-916501,NTSB/PAR-98/01/SUM, September 28, 1998, p. 15.

[101] See, for example: Tyler Williams, "Cyber Security Threats to Pipelines and Refineries," *Pipeline & Gas Journal*, November 1, 2007.

[102] U.S. Department of Transportation, September 1999, pp. 19-20.

[103] William M. Nugent, First Vice President, National Association of Regulatory Utility Commissioners, Testimony before the Senate Energy and Natural Resources Committee hearing on Federal, State, and Local Impediments to Siting Energy Infrastructure (May 15, 2001).

[104] National Commission on Energy Policy, *Siting Critical Energy Infrastructure: An Overview of Needs and Challenges*. (Washington, DC: June 2006): 1. (Hereafter referred to as NCEP 2006.)

[105] Energy Information Administration, *Additions to Capacity on the U.S. Natural Gas Pipeline Network: 2005* (August (continued...)

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In the specific case of the Millennium Pipeline, proposed in 1997 to transport Canadian natural gas to metropolitan New York, developers did not receive final construction approval for nine years, largely because of community resistance to the pipeline route.[106] Numerous other proposed pipelines, especially in populated areas, have faced similar public acceptance barriers.[107] Even where there is federal siting authority, as is the case for interstate natural gas pipelines, community stakeholders retain many statutory and regulatory avenues to affect energy infrastructure decisions. Consequently, the public perception value of remotely controlled or automatic pipeline valves may need to be accounted for, especially with respect to its implications for general pipeline development and operations.

Natural Gas Distribution Excess Flow Valves

While the San Bruno, CA, and Edison, NJ, gas pipeline accidents have focused attention on automatic valves in large diameter transmission pipelines, this technology also applies to smaller gas distribution lines serving residential buildings. In natural gas distribution systems, "excess flow" valves are safety devices which can automatically shut off pipeline flow in the event of a leak. In this way, the valves can minimize the release of natural gas during a pipeline accident, thereby reducing the likelihood or severity of a fire or explosion. P.L. 109-468 required PHMSA to promulgate minimum standards for natural gas distribution systems requiring the installation of excess flow valves on new gas distribution lines in single-family homes (§ 9). The agency issued final regulations for excess flow valves as part of its final rule for natural gas distribution integrity management programs on December 3, 2009.[108] S. 3856 would mandate excess flow valves for new or entirely replaced distribution branch pipelines, as well as service lines to multi-family residential buildings and small commercial facilities. Although smaller in scale, automatic valves in distribution lines raise the same cost and safety tradeoffs as automatic valves in large diameter pipelines.

PHMSA Penalties and Pipeline Safety Enforcement

The adequacy of the PHMSA's enforcement strategy has been an ongoing focus of congressional oversight.[109] Provisions in the Pipeline Safety Improvement Act of 2002 (P.L. 107-355) put added scrutiny on the effectiveness of the agency's enforcement strategy and assessment of civil penalties (§ 8). In April 2006, PHMSA officials testified before Congress that the agency had institutionalized a "tough but fair" approach to enforcement, "imposing and collecting larger penalties, while guiding pipeline operators to enhance higher performance."[110] According to the

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2006): 11.

[106] Federal Energy Regulatory Commission (FERC), "Commission Approves Revised $1 Billion Millennium Pipeline Project to Bring New Gas Service to the Northeast," Press release (December 21, 2006). See, for example: Randal C. Archibold, "Fighting Plans for a Gas Pipeline: Not Under My Backyard," *New York Times* (August 7, 2001).

[107] Samantha Santa Maria, "Energy Projects: Rockies Express Add-on Pipe Projects Face Several Obstacles to Building in US Northeast," *Inside F.E.R.C.* (October 22, 2007).

[108] U.S. Department of Transportation, "DOT Issues Much-Anticipated Rules to Enhance Pipeline Safety," Office of Public Affairs, press release, December 3, 2009.

[109] See, for example: Representative James L. Oberstar, Statement before the House Committee on Transportation and Infrastructure, Hearing on the Enbridge Pipeline Oil Spill in Marshall, MI, September 15, 2010.

[110] S.L. Gerard, Pipeline and Hazardous Materials Admin.(PHMSA), Testimony before the House Energy and Commerce Committee, Energy and Air Quality Subcommittee hearing on Pipeline Safety, Serial No. 109-84, April 27, (continued...)

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agency, $4.6 million in proposed civil penalties in 2005 was three times greater than penalties proposed in 2003, the first year higher penalties could be imposed under P.L. 107-355 (§ 8(a)).[111] Proposed penalties totaled $6.5 million in 2009.[112] Proposed penalties through September 2010 totaled $3.6 million, with an average penalty of approximately $140,000.[113] S. 3856 would increase the maximum civil penalty from $1.0 million to $2.5 million for a related series of major consequence violations, such as those causing serious injuries, deaths, or environmental harm (§ 2(a)). H.R. 6008 would also increase the maximum civil penalty to $2.5 million (§ 4(2)).

Although PHMSA's imposition of pipeline safety penalties appears to have risen under P.L. 107-355, the role of federal fines in encouraging greater operator compliance with pipeline safety regulations is not always clear. To understand the potential influence of penalties on operators, it can be helpful to put PHMSA fines in the context of the overall costs to operators of a pipeline release. Pipeline companies, seeking to generate financial returns for their owners, are motivated to operate their pipelines safely (and securely) for a range of financial reasons. While these financial considerations certainly include possible PHMSA penalties, the costs of a pipeline accident may also include fines for violations of environmental laws (federal and state), the costs of spill response and remediation, penalties from civil litigation, the value of lost product, costs for pipeline repairs and modifications (e.g., to resolve federal regulatory interventions), and other costs. Depending upon the severity of a pipeline release, these other costs may far exceed pipeline safety fines, as illustrated by the following examples.

- **Kinder-Morgan.** In April 2006 Kinder Morgan Energy Partners entered into a consent agreement with PHMSA to resolve a corrective action order stemming from three hazardous liquid spills in 2004 and 2005 from the company's Pacific Operations pipeline unit.[114] According to the company, the agreement would require Kinder Morgan to spend approximately $26 million on additional integrity management activities, among other requirements.[115] Under a 2007 settlement agreement with the United States Justice Department and the State of California, Kinder Morgan also agreed to pay approximately $3.8 million in civil penalties for violations of environmental laws and approximately $1.5 million related to response and remediation associated with these spills. The spills collectively released approximately 200,000 gallons of diesel fuel, jet fuel, and gasoline.[116] This volume of fuel would have a product value on the order of $0.5 million based on typical wholesale market prices at the time of the spills.

http://www.crsdocuments.com

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2006, p. 14.

[111] Ibid.

[112] Pipelines and Hazardous Materials Safety Admin. (PHMSA), "Civil Penalty Cases: Nationwide," Web page, October 15, 2010. http://primis.phmsa.dot.gov/comm/reports/enforce/CivilPenalty_opid_0.html?nocache=4013; "Colorado Pipeline Company Fined 2.3 Million After Explosion," *Clean Skies News*, December 1, 2009.

[113] PHMSA, "Civil Penalty Cases: Nationwide," October 15, 2010.

[114] Pipeline and Hazardous Materials Safety Administration, *Consent Agreement: In the Matter of Kinder Morgan Energy Partners, L.P., Respondent*, CPF No. 5-2005-5025H, April 4, 2006.

[115] Kinder Morgan Energy Partners, L.P., "Kinder Morgan Energy Partners Enters into Consent Agreement with PHMSA," press release, Houston, TX, April 10, 2006.

[116] U.S. Environmental Protection Agency, "Kinder Morgan, SFPP Agree To Pay Nearly $5.3 Million To Resolve Federal And State Environmental Violations," press release, May 21, 2007.

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- **Plains All American.** In 2010, Plains All American Pipeline agreed to spend approximately $41 million to upgrade 10,420 miles of U.S. oil pipeline to resolve Clean Water Act (CWA) violations for 10 crude oil spills in Texas, Louisiana, Oklahoma, and Kansas from 2004 through 2007. Among these upgrades, the company agreed to spend at least $6 million on equipment and materials for internal corrosion control and surveys on at least 2,400 miles of pipeline. The company was required to pay $3.25 million civil penalty associated with the CWA violations.[117]
- **Enbridge.** Enbridge Energy Partners estimated expenses of $475 million to clean up two oil spills on its Lakehead pipeline system in 2010, including the spill in Marshall, MI. This estimate did not include fines or penalties which might also be imposed in connection with the spills. The pipeline operator also reported $16 million in lost revenue from pipeline shipments it could not redirect to other lines while the Lakehead system was out of service.[118] The full impact of these expenditures on the company's business is unclear, however as Enbridge stated in a subsequent quarterly report that "substantially all of the costs" related to its 2010 oil pipeline spills "will ultimately be recoverable under our existing insurance policies."[119]
- **Olympic Pipe Line.** After the 1999 Bellingham pipeline accident, Olympic Pipe Line Company and associated defendants reportedly agreed to pay a $75 million settlement to the families of two children killed in the accident.[120]
- **El Paso.** In 2002, El Paso Corporation settled wrongful death and personal injury lawsuits stemming from the 2000 natural gas pipeline explosion near Carlsbad, NM, which killed 12 campers.[121] Although the terms of those settlements were not disclosed, two additional lawsuits sought a total of $171 million in damages.[122] However, El Paso's June 2003 quarterly financial report stated that "our costs and legal exposure ... will be fully covered by insurance."[123]

PHMSA Penalties in Perspective

The threat of safety enforcement penalties is often considered one of the primary tools available to pipeline safety regulators to ensure operator compliance with their safety requirements. However, as the examples above suggest, pipeline safety fines, even if they were raised to $2.5 million for major violations, would still account for only a limited share of the financial impact of future pipeline releases. [illegible]

[117] U.S. Environmental Protection Agency, "Plains Pipeline Will Spend $41 Million to Prevent Oil Spills Across 10,000 Miles of Pipeline," Press release, August 27, 2010.

[118] Enbridge Energy Partners, L.P., *Enbridge Energy Partners, L.P. Third Quarter 2010 Earnings*, Slide presentation, October 28, 2010, p. 8, http://phx.corporate-ir.net/External.File?item=UGFyZW50SUQ9MjY2NzE3N3xDaGlsZElEPTQwMTI5MXxUeXBlPTI=&t=1.

[119] Enbridge Energy Partners, L.P., October 28, 2010, p. 8.

[120] "Olympic Pipe Line, Others Pay Out Record $75 Million in Pipeline Explosion Wrongful Death Settlement," *Business Wire,* April 10, 2002.

[121] National Transportation Safety Board, *Pipeline Accident Report*, PAR-03-01, February 11, 2003.

[122] El Paso Corp., Quarterly Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934, Form 10-Q, for the period ending June 30, 2002, Houston, TX, 2002.

[123] El Paso Corp., 2002.

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fines, alone, might have on operator compliance. On the other hand, the authority of PHMSA to influence pipeline operations directly—for example, through corrective action orders or shutdown orders in the event of a pipeline failure—can have a large financial impact on a pipeline operator in terms of capital expenditures or lost revenues. Indeed, some have suggested that this operational authority is the most influential component of PHMSA's pipeline safety enforcement strategy. Therefore, as Congress continues its oversight of PHMSA's enforcement activities, and considers new proposals to increase compliance with federal pipeline safety regulations, it may evaluate how PHMSA's authorities to set standards, assess penalties, and directly affect pipeline operations may reinforce one another to improve U.S. pipeline safety.

Pipeline Security Regulations

As noted earlier in this report, federal pipeline security activities to date have relied upon voluntary industry compliance with PHMSA security guidance and TSA security best practices. By initiating this voluntary approach, PHMSA sought to speed adoption of security measures by industry and avoid the publication of sensitive security information (e.g., critical asset lists) that would normally be required in public rulemaking.[124] Provisions in P.L. 109-468 require the DOT Inspector General to "address the adequacy of security standards for gas and oil pipelines" (§ 23(b)(4)). P.L. 110-53 similarly directs TSA to promulgate pipeline security regulations and carry out necessary inspection and enforcement—if the agency determines that regulations are appropriate (§ 1557(d)). Addressing this issue the 2008 IG report states that

> TSA's current security guidance is not mandatory and remains unenforceable unless a regulation is issued to require industry compliance.... PHMSA and TSA will need to conduct covert tests of pipeline systems' vulnerabilities to assess the current guidance as well as the operators' compliance.[125]

Although TSA's FY2005 budget justification stated that the agency would "issue regulations where appropriate to improve the security of the [non-aviation transportation] modes," the agency has not done so for pipelines, and is not currently working on such regulations.[126] The pipelines industry has expressed concern that new security regulations and related requirements may be "redundant" and "may not be necessary to increase pipeline security."[127] The PHMSA Administrator in 2007 testified that enhancing security "does not necessarily mean that we must impose regulatory requirements."[128] TSA officials have questioned the IG assertions regarding pipeline security regulations, particularly the IG's call for covert testing of pipeline operator security measures. They have argued that the agency is complying with the letter of P.L. 110-53 and that its pipeline operator security reviews are more than paper reviews.[129]

[124] GAO, *Pipeline Security and Safety: Improved Workforce Planning and Communication Needed*, GAO-02-785, August 2002, p. 22.

[125] U.S. Dept. of Transportation, Office of Inspector General, May 21, 2008, p. 6.

[126] Department of Homeland Security (DHS), *Transportation Security Administration Fiscal Year 2005 Congressional Budget Justification*, Washington, DC, February 2, 2004, p. 20; TSA, Pipeline Security Division, personal communication, February 17, 2009.

[127] American Gas Association (AGA), American Petroleum Institute (API), Association of Oil Pipelines (AOPL), and American Public Gas Association (APGA), joint letter to members of the Senate Commerce Committee providing views on S. 1052, August 22, 2005.

[128] Barrett, T.J. January 18, 2007.

[129] Sammon, John, Transportation Security Administration, Testimony before the House Transportation and Infrastructure Committee, Railroad, Pipelines, and Hazardous Materials Subcommittee hearing on Implementation of (continued...)

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P.L. 110-53 (§ 1557 (b)), the TSA has been implementing a multi-year program of pipeline system inspections, including documentation of findings and follow up reviews.[130] In its oversight of potential pipeline security regulations, Congress may evaluate the effectiveness of the current voluntary pipeline security standards based on findings from the TSA's CSR reviews, pipeline inspections, and future DOT Inspector General reports.

Additional Issues

In addition to the issues mentioned above, Congress may consider several issues related to proposed legislation or otherwise raised by pipeline stakeholders.

Mandatory Internal Inspection Requirements

Some legislative proposals, such as provisions in S. 3824, would increase requirements for pipeline operators to conduct internal inspections of transmission pipelines using "smart pigs," robotic devices sent through pipelines taking physical measurements continuously along the way.[131] However, experts note that there are different pipeline inspection techniques with overlapping capabilities and different strengths.[132] While an effective technology for detecting corrosion in many applications, smart pigs have limitations as a general tool for assessing the integrity of pipelines. For example, although smart pigs may be good corrosion detectors, they are still a developing technology and may be somewhat less effective in detecting other types of pipeline anomalies (e.g., cracks). Operators also maintain that smart pigging may be less useful for predicting future problems with pipeline integrity than other federally approved maintenance techniques like "direct assessment" (49 C.F.R. 192.903) wherein pipelines are examined externally based on risk data and other factors.[133] Furthermore, because many older pipelines contain sharp turns and other obstructions due to historical construction techniques, they cannot accommodate smart pig devices without significant and costly pipeline modifications to make them more "piggable." Consequently, some industry stakeholders caution against unrealistic expectations for the capabilities of smart pigs as a stand-alone pipeline inspection tool.[134] As Congress debates new federal requirements for pipeline inspection with smart pigs, it may consider these devices as only one in a portfolio of maintenance practices operators may need to employ to ensure their pipelines are physically sound.

Emergency Response Plan Disclosure

Federal regulations require pipeline operators to prepare emergency response plans for pipeline spills and to make those plans available for review by PHMSA and local emergency response agencies (49 C.F.R. 192.615). Some stakeholders have proposed that these plans should be made

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the Pipeline Inspection, Protection, Enforcement, and Safety Act of 2006, June 24, 2008.

[130] TSA, Pipeline Security Division, personal communication, February 17, 2009.

[131] "Pig" is the common acronym for "pipeline inspection gauge."

[132] Pete Carey, "Pipeline Inspection Not an Exact Science," *San Jose Mercury News*, October 11, 2010.

[133] The Pipeline Safety Improvement Act of 2002 (P.L. 107-355) directed the DOT to issue regulations on using internal inspection, pressure testing, and direct assessment to natural gas pipelines in high consequence areas.

[134] Christina Sames, Vice President, American Gas Association, November 4, 2010.

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available to the public to allow for additional review of their adequacy and to provide better risk and response information to people living near pipelines.[135] Operators reportedly have resisted such disclosures on the grounds that their emergency response plans contain confidential customer and employee information.[136] They also raise concerns that the plans contain security-sensitive information about pipeline vulnerabilities and spill scenarios which could be useful to terrorists.[137] S. 3856 would require PHMSA to collect and maintain copies of pipeline emergency plans for public availability "excluding any proprietary or security-sensitive information" (§ 8(a)). As debate on this issue continues, Congress may consider the tradeoffs between public awareness and pipeline security in a general operating environment where both safety and security hazards may be significant.

Mandatory Pipeline Assessment Intervals

The Pipeline Safety Improvement Act of 2002 requires that natural gas pipeline operators subject to the act perform integrity management assessments at least every seven years after an initial baseline assessment (§ 14a). Some pipeline operators believe that this reassessment interval may be too prescriptive and may not be appropriate for all pipelines. Operators argue that assessing pipelines too frequently is costly and inefficient, diverting limited safety resources from other uses with greater pipeline safety benefits.[138] Based on assessments conducted through 2005, "and the generally safe condition of gas transmission pipelines," GAO concluded in 2006 that the seven year reassessment interval "appears to be conservative."[139] GAO recommended that Congress permit pipeline operators to reassess gas transmission pipelines at intervals based on risk factors, technical data, and engineering analyses. The agency believed such a revision would allow PHMSA more flexibility to establish longer or shorter reassessment intervals as warranted by pipeline conditions.[140] According to PHMSA testimony in June 2008, the Secretary of Transportation corresponded with the House Energy and Commerce committee regarding the agency's plans for exempting pipeline operators from the seven year interval requirement, but this correspondence has not been released publicly.[141] PHMSA has since concurred with GAO's recommendation for extending reassessment intervals and is reviewing its authority to do so through the grant of special permits to individual operators.[142] S. 1333 would allow pipeline

[135] For an example of such a review, see The Northern Great Plains at Risk: Oil Spill Planning in Keystone Pipeline System, Plains Justice, Billings, MT, November 23, 2010.

[136] Sharon Theimer, "Government Lacks Copies of Emergency Response Plans Developed by Gas Pipeline Operators," Associated Press, October 6, 2010.

[137] Andrew Black, President, Association of Oil Pipelines, Remarks at the Different Pathways to Commonality: PIPA, Damage Prevention, & Emergency Public Awareness Round Table Joint Conference, Pipeline Safety Trust, New Orleans, LA, November 5, 2010.

[138] J. L. Mohn, Panhandle Energy, testimony before the House Committee on Transportation and Infrastructure, Subcommittee on Highways, Transit and Pipelines, hearing on pipeline Safety, March 16, 2006, p. 9.

[139] Government Accountability Office (GAO), *Natural Gas Pipeline Safety: Risk-Based Standards Should Allow Operators to Better Tailor Reassessments to Pipeline Threats*, GAO-06-945, September 8, 2006. p. 3.

[140] Ibid. p. 6.

[141] Gerard, Stacy, Asst. Administrator, Pipeline and Hazardous Materials Safety Administration (PHMSA), Testimony before the House Transportation and Infrastructure Committee, Railroad, Pipelines, and Hazardous Materials Subcommittee hearing on Implementation of the Pipeline Inspection, Protection, Enforcement, and Safety Act of 2006, June 24, 2008.

[142] E. Komiskey, Office of Pipeline Safety, "High Consequence Areas and Pipeline Assessment Intervals," *Pipeline Safety—What More Needs To Be Done?*, Pipeline Safety Trust Conference, New Orleans, November 20, 2008.

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integrity reassessment intervals to be changed from seven years to intervals based on "technical data, risk factors, and engineering analysis" (§ 401).

Telephonic Notice of Pipeline Spills

Some stakeholders have questioned the speediness with which pipeline operators report spills to federal emergency response authorities.[143] H.R. 6008 would require pipeline operators to provide telephonic notice to the Secretary of Transportation and the National Response Center at the earliest practicable moment but no later than one hour after discovering a release of natural gas or a hazardous liquids. According to PHMSA officials, the agency currently holds operators to a one hour reporting standard, although this time limit is not stated explicitly under current statutes.[144]

Conclusion

Both government and industry have taken numerous steps to improve pipeline safety and security over the last 10 years. While government, industry, and other stakeholders agree that federal pipeline safety programs have been on the right track, major pipeline incidents in 2010 suggest there continues to be room for improvement. Likewise the threat of terrorist attack on U.S. pipeline infrastructure remains a significant concern.

As Congress debates reauthorization of the federal pipeline safety program and oversees the federal role in pipeline security, key questions may be raised concerning pipeline agency staff resources, automatic pipeline shutoff valves, penalties for pipeline safety violations, and the possible need for pipeline security regulations, among other concerns. In addition to these specific issues, Congress may assess how the various elements of U.S. pipeline safety and security activity fit together in the nation's overall strategy to protect transportation infrastructure. For example, diverting pipeline resources away from safety to enhance security might further reduce terror risk, but not overall pipeline risk, if safety programs become less effective as a result. Pipeline safety and security necessarily involve many groups: federal agencies, oil and gas pipeline associations, large and small pipeline operators, and local communities. Reviewing how these groups work together to achieve common goals could be an oversight challenge for Congress.

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[143] Todd A. Heywood, "Schauer: Enbridge Violated Federal Reporting Regulations," *The Michigan Messenger*, August 5, 2010.

[144] The Honorable Cynthia Quarterman, Administrator, Pipeline and Hazardous Materials Safety Administration, Testimony before the House Energy and Commerce Committee, Energy and the Environment Subcommittee hearing on Pipeline Safety Oversight and Legislation, September 23, 2010.

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