



U.S. DEPARTMENT OF TRANSPORTATION
OFFICE OF INSPECTOR GENERAL

PHMSA's Safety Culture Efforts

PHMSA

Report No. ST2021012

January 13, 2021





PHMSA's Safety Culture Efforts

Self-initiated

Pipeline and Hazardous Materials Safety Administration | ST2021012 | January 13, 2021

What We Looked At

The Pipeline and Hazardous Materials Safety Administration (PHMSA) aims to protect people and the environment by advancing the safe transportation of energy and other hazardous materials. An essential element of PHMSA's safety mission is its underlying safety culture—the organization's safety-related values and behaviors. A positive safety culture is essential to any organization that directly or indirectly addresses high-hazard risks, such as the regulatory agencies of DOT. We initiated this audit to help Agency leaders make informed decisions about their organizational safety culture and focused on PHMSA because it had publicly identified fostering a positive safety culture as a strategic goal. The first part of this report is an assessment of PHMSA's safety culture. The second part evaluates PHMSA's efforts to foster a positive safety culture as it carries out its mission and other responsibilities.

What We Found

While PHMSA exhibits several indicators of a positive safety culture, we also found opportunities to further enhance its efforts. For example, many employees have positive perceptions of their immediate supervisors and the Agency's impact on industry safety. However, some non-supervisors indicated that they do not trust management to share information and perceive that industry and PHMSA are not sufficiently separate, which may impact the way employees share concerns with management. PHMSA also developed a number of safety culture-related initiatives but did not always complete or document its actions. For example, in 2015, PHMSA allocated \$1.5 million for safety culture planning and, over the next 4 years, expended one-third of that amount. Additionally, no one individual is focused wholly on fostering a positive safety culture at all times, including during changes of administrations. While most employees believe PHMSA's leadership is committed to safety, some express doubt about the leadership's commitment to fostering a positive safety culture.

Our Recommendations

PHMSA concurred with our two recommendations to enhance its efforts to foster a positive safety culture. Accordingly, we consider them resolved but open pending completion of the planned actions.

Contents


Memorandum	1
Background	4
Results in Brief	5
PHMSA’s Safety Culture Activities Have a Number of Positive Characteristics, but There Are Opportunities To Enhance the Agency’s Efforts	6
Conclusion	16
Recommendations	17
Agency Comments and OIG Response	17
Actions Required	17
Exhibit A. Scope and Methodology	18
Exhibit B. Organizations Visited or Contacted	22
Exhibit C. List of Acronyms	23
Exhibit D. Major Contributors to This Report	24
Appendix. Agency Comments	25



Memorandum

Date: January 13, 2021

Subject: ACTION: PHMSA's Safety Culture Efforts | Report No. ST2021012

From: David Pouliott 
Assistant Inspector General for Surface Transportation Audits

To: Pipeline and Hazardous Materials Safety Administrator

In keeping with the Department of Transportation's (DOT) first priority—safety—the Pipeline and Hazardous Materials Safety Administration (PHMSA) aims to protect people and the environment by advancing the safe transportation of energy and other hazardous materials. PHMSA meets this mission through a range of activities, from setting and enforcing compliance with industry regulations to industry outreach and inspector training. Consistently, PHMSA staff show dedication and understanding of the safety mission. An essential element underlying this is PHMSA's safety culture¹—the organization's safety-related values and behaviors—which is the focus of this report.

A positive safety culture is essential to any organization that directly or indirectly deals with addressing high hazard risks—such as the regulatory agencies of DOT. Positive safety culture enables the agency “to do the right thing well and efficiently.”² According to DOT's strategic plan, safety culture is exemplified by shared values and behaviors that demonstrate a top-down commitment to safety over competing goals. The Department's current strategic plan recognizes the importance of safety culture at the regulator level, stating that “DOT will foster a safety culture by pursuing programs and initiatives that increase the valuation of

¹ The term *safety culture* was first used by the International Atomic Energy Agency (IAEA) in its *IAEA Safety Series INSAG-1. Summary Report on the Post-Accident Review Meeting on the Chernobyl Accident, 1986*. The report explained how a lack of knowledge about risk and safety, as well as a failure to act appropriately, contributed to the 1986 nuclear power station accident in Chernobyl, Ukraine. The subsequent IAEA investigation into the cause of the catastrophe, IAEA, *Safety Series: INSAG-7. The Chernobyl Accident: Updating of INSAG-1, 1992*, reported that human error and a “deficient safety culture, not only at the Chernobyl plant, but throughout the Soviet design, operating, and regulatory organizations,” were largely to blame.

² Organization for Economic Cooperation and Development, *The Safety Culture of an Effective Nuclear Regulatory Body*, Nuclear Energy Agency, 2016, p. 7.

safety and encourage proactive safety reporting and risk management to achieve safety goals.”³

The Office of Inspector General (OIG) initiated this audit to provide Agency leaders with independent insights into their Operating Administration’s safety culture and help inform future decisions regarding where to focus additional attention. We focused our review on PHMSA because our research determined that PHMSA had identified fostering a positive safety culture as a strategic goal and had stated publicly that efforts to achieve that strategic goal were underway. We are presenting this report in two parts.

The first part is an assessment of PHMSA’s safety culture. It was done to provide PHMSA’s leaders with a snapshot to inform their decisions about the Agency’s safety culture—not to determine whether PHMSA has a “good” or a “bad” safety culture. Such assessments are important because safety outcomes, such as number of accidents, are not good indicators of safety for highly hazardous activities. Instead, outcomes track the success of an activity after it occurs. A safety culture assessment, on the other hand, is a proactive approach to safety that looks at the systems supporting those activities.

We conducted our evaluation using a recognized framework established by the Nuclear Energy Agency (NEA) within the Organization for Economic Co-operation and Development. We chose the NEA framework because it is widely accepted and evidence-based. The NEA framework describes five principles that support the safety culture of an effective regulatory body: leadership, accountability and involvement, communication and cooperation, comprehensive and systematic approach, and continuous improvement.⁴

To make our evaluation under this framework, due to the topic’s complex nature, and to provide independent technical expertise, we contracted with Mark Fleming, Ph.D., a recognized expert in regulator safety culture who is not affiliated with DOT. Guided by Dr. Fleming, we administered a survey to nonsupervisory, managerial, and leadership employees; interviewed senior leaders and managers; and facilitated focus groups—separate gatherings of managers and non-supervisors—at PHMSA Headquarters and regional offices. We used these three methods—designed to gain insight from various perspectives—to collect a wide variety of perceptions from the Agency’s employees. In addition, we reviewed documents and observed inspections to create a comprehensive assessment of PHMSA’s safety culture. We systematically analyzed the data from these sources to identify overarching themes (see exhibit A for details). To be considered a theme, an idea had to appear in multiple

³ U.S. Department of Transportation Strategic Plan for FY 2018–2022, February 2018.

⁴ Organization for Economic Cooperation and Development, *The Safety Culture of an Effective Nuclear Regulatory Body*, Nuclear Energy Agency, 2016.

collection points. Because the results of many of the methods we used to collect perceptions cannot be generalized, we did not determine the extent to which an opinion was prevalent. Accordingly, we used the term "some employees" to present themes. In some cases, we paraphrased statements to protect the anonymity of employees or because we received information from multiple collection points.

The second part of the report evaluates PHMSA's efforts to foster a positive safety culture as it carries out its mission and other responsibilities. We conducted the audit in accordance with generally accepted Government auditing standards. Exhibit A details our scope and methodology. Exhibit B lists the entities we visited or contacted.

We appreciate the courtesies and cooperation of Department of Transportation representatives during this audit. If you have any questions concerning this report, please call me at (202) 366-1844 or Wendy Harris, Program Director, at (202) 366-2794.

cc: The Secretary
DOT Audit Liaison, M-1
PHMSA Audit Liaison, PHO-10

Background

Safety culture is a feature of regulated entities and regulators and has been described as “the way we typically do things around here.”⁵ The importance of safety culture at a regulatory agency was highlighted by an investigation into the 2011 nuclear disaster in Fukushima, Japan, which concluded that a poor regulator safety culture contributed to the incident.⁶ According to the Swiss Federal Nuclear Safety Inspectorate (ENSI), the safety culture at a regulatory agency includes its values, world views, behaviors, and products (such as regulatory frameworks and formal orders). While in a regulated entity, safety culture refers to industry’s focus on operating safely and includes employee occupational safety, in a regulatory agency it refers to the regulator’s mission of safety oversight. It is sometimes referred to as regulator oversight culture to emphasize how the regulator performs its oversight activities.

Safety culture is multidimensional, according to Dr. Fleming, consisting of a number of elements or principles. Several models seek to explain these principles, and there is significant overlap between them. Based on input from Dr. Fleming, we selected the NEA model because it is evidence based and widely accepted by recognized safety culture experts. The model contains five principles:

- Principle 1: Leadership for safety is to be demonstrated at all levels in the regulatory body.
- Principle 2: All staff of the regulatory body have individual responsibility and accountability for exhibiting behaviors that set the standard for safety.
- Principle 3: The culture of the regulatory body promotes safety, and facilitates cooperation and open communication.
- Principle 4: Implementing a holistic approach to safety is ensured by working in a systematic manner.
- Principle 5: Continuous improvement, learning, and self-assessment are encouraged at all levels in the organization.

⁵ R. L. Sumwalt, *The role of organisational culture, safety culture and safety climate in aviation and aerospace safety*, p. 37 (n.d.), quoted in Simon French and Tabitha Steel, “The Investigation of Safety Management Systems and Safety Culture,” p. 23, discussion paper for Roundtable on Safety Management Systems, International Transport Forum, Paris (March 23–24, 2017).

⁶ IAEA, *The Fukushima Daiichi Accident*, 2015.

According to the NEA, each principle in the model is a necessary feature of a healthy safety culture within a regulatory body, but one principle cannot stand alone.

A longstanding DOT strategic objective has been to foster a strong internal safety culture and implement Safety Management Systems (SMS)—formal, top-down, organization-wide approaches for managing safety risks and assuring the effectiveness of safety risk controls—across the Department. For example, in a 2012 memo, then Secretary of Transportation Ray LaHood asked each DOT Operating Administration to create an SMS implementation plan to “demonstrate our commitment to establishing a safety culture, hold us accountable, measure our performance, and enable us to talk convincingly to our partners on the advantages of using SMS concepts in improving transportation system safety.” In November 2014, Secretary LaHood’s successor, Anthony Foxx, directed the Operating Administrations to conduct a top-to-bottom review to ensure that their safety regimes were properly aligned with the greatest risks and foremost concerns facing the traveling public. This strategic objective is included in the current DOT strategic plan.

Results in Brief

PHMSA exhibits several indicators of a positive safety culture, as well as opportunities to further enhance its efforts.

Our evaluation of PHMSA’s safety culture—which we conducted using the NEA framework—revealed the Agency has several indicators of a positive safety culture. Based on our survey,⁷ for example, many employees have positive perceptions of their immediate supervisors and reported generally positive perceptions about accountability and employee involvement within the organization. We found strong positive perceptions about the Agency’s impact on industry safety and Agency leadership’s commitment to safety. Our evaluation also provided insights into key focus areas—including trust and communication—where PHMSA could enhance its safety culture. Nearly a third of the non-supervisors who responded to our survey indicated they do not trust management to share information with them.⁸ Also, some non-supervisors perceive that industry and PHMSA are not sufficiently separate, which may unduly influence safety-related decisions.

⁷ We administered our survey to all 561 non-supervisors, managers, and senior leaders at PHMSA who had valid email addresses on May 13, 2019, and we received a response rate of 64 percent. We asked survey respondents to react to 48 statements using a Likert scale (strongly disagree, disagree, neutral, agree, strongly agree, don’t know). We also invited them to provide open-ended comments.

⁸ Forty-one percent of non-supervisors agreed with the statement, and 26 percent answered neutral.

These two things may impact the way non-supervisors share their concerns with management. Additionally, survey respondents and focus group participants indicate that accountability for actions only applies to them and their immediate supervisors. Furthermore, while employees believe the Agency welcomes organizational assessments, they indicated that there are opportunities to improve how managers respond to feedback. Whether true or not, such perceptions may have an unintended impact on oversight and indirectly influence how employees take on their regulatory roles.

To its credit, over the years PHMSA developed a number of safety culture–related initiatives but in some instances did not complete or document its actions. For example, in 2010, PHMSA established a Safety Review Board to resolve internal complaints and differences of opinion relating to safety, but there is no record that the board ever met. This board may have provided the Agency with another avenue of communication. In another instance, in 2015 PHMSA allocated \$1.5 million for safety culture planning and, over the next 4 years, expended one-third of that amount. According to PHMSA officials, in some cases, initiatives were not completed due to successive changes in leadership at the Departmental and Agency levels. We found that when PHMSA established the position of Executive Director in 2016, it gave that official the responsibilities previously held by the Chief Safety Officer, which had been a separate position. Based on our analysis, the mixing of responsibilities reduces the emphasis on the Chief Safety Officer role. Additionally, no one individual is focused wholly on maintaining the continuity required to foster a positive safety culture at all times, including during changes of administrations. While most employees believe PHMSA’s leadership is committed to safety, some express doubt about the leadership’s commitment to fostering a positive safety culture.

We are making recommendations to enhance PHMSA’s efforts to foster a positive safety culture.

PHMSA’s Safety Culture Activities Have a Number of Positive Characteristics, but There Are Opportunities To Enhance the Agency’s Efforts

Our evaluation of PHMSA’s efforts to foster a positive safety culture (described starting on page 11) included an initial assessment of the Agency’s existing safety culture. We conducted the assessment to provide PHMSA’s leaders with useful information for making future decisions. During the audit phase of this project, we determined that PHMSA had developed a number of initiatives to build a positive safety culture. However, some of them were never completed, and others

were not documented; this lack of follow-through could result in staff not having a clear picture of leadership's commitment to PHMSA's safety culture.

PHMSA's Safety Culture Has Both Positive Characteristics and Areas for Further Improvement

Our assessment relied on the NEA safety culture framework, which is based on five principles, each of which is necessary but cannot stand alone. For each principle, we explore the themes that appeared in multiple assessment approaches (for example, in the survey and in focus groups).

Principle 1: Leadership

Leadership for safety is to be demonstrated at all levels in the regulatory body.

Leadership is the most important of the five principles that govern a regulatory agency's safety culture since it supports the other four principles. Our interactions with PHMSA staff identified a positive aspect of the Agency's safety culture: most supervisors and non-supervisors agreed the Agency's leadership is committed to the safety mission at PHMSA. However, there are differing opinions regarding whether leadership is commitment to improving the underlying safety culture.

PHMSA employees generally have positive opinions about their immediate supervisors, believing that they care about and listen to their staff. For example, 80 percent of our survey respondents either agree or strongly agree with the following statement: "my immediate supervisor helps me when I encounter a problem." Respondents also said that their current supervisors are doing a good job. "In my 9 years at PHMSA I have had great leadership in all levels," noted one employee, and another described a supervisor as "an amazing leader."

While employees provided positive responses about their immediate supervisors, a few survey respondents and focus group participants expressed concerns about accountability for senior leaders. For example, in one survey response, a manager said, "The executive leadership at PHMSA does not listen to employees and does not take action" on staff-related issues or concerns. In another area, PHMSA's regional employees expressed concerns about Headquarters staff. Staff in the regions believe that officials at Headquarters do not understand—and are not willing to learn about—their day-to-day experiences. Focus group participants and interviewees reported a "disconnect" between leadership and employees, adding that staff in regional offices can get frustrated when Headquarters does not fix issues they consider easy to resolve. Conversely, staff at Headquarters pointed out that the regional offices don't necessarily understand the dynamics in PHMSA operations elsewhere. These challenges are not unique to PHMSA and

Principle 4: Comprehensive and Systematic Approach

Implementing a holistic approach to safety is ensured by working in a systematic manner.

Generally, PHMSA employees have strongly positive perceptions about the Agency's impact on industry safety. Seventy-eight percent of the non-supervisors, managers, and senior leaders who responded to our survey agree that PHMSA works with industry to continuously improve safety; 73 percent believe that PHMSA has a positive impact on the industry's safety culture; and 61 percent agree that PHMSA's safety culture serves as a role model for the entities it regulates. This is further exemplified through PHMSA's actions—attending the American Petroleum Institute Safety Culture Summit, promoting positive safety culture for industry, and encouraging the industry to adopt SMS.

In the area of a systematic approach to safety, one broad theme illustrated in the survey responses and focus group discussions is the staff's perception that industry and PHMSA are not sufficiently separate, which may influence safety-related decisions. For example, 35 percent of the survey respondents—representing all job levels within the Agency—disagree with the following statement: "PHMSA makes decisions free of undue influence."¹⁴ In another example, some participants in our focus groups perceived a lack of transparency regarding meetings with regulated entities. Whether true or not, such perceptions may have an unintended impact on oversight and indirectly influence how an employee takes on their regulatory role. For example, our interactions with PHMSA staff revealed a perception among inspectors about the evidence they collect. Specifically, they perceive that Headquarters and the legal team sometimes do not consider their evidence to be legally sufficient to proceed with violation penalties, even when the inspectors believe it is. As a result, some inspectors question the purpose of documenting violations.

Principle 5: Continuous Learning

Continuous improvement, learning, and self-assessment are encouraged at all levels in the organization.

According to the IAEA,¹⁵ organizations can develop an attitude of continuous learning and assessment by regularly conducting internal and external assessments. PHMSA staff generally responded that they see the value in such activities, as evidenced by 60 percent of the employees who agree or strongly agree with the statement: "PHMSA welcomes assessments by outside

¹⁴ Thirty-six percent of respondents agreed with the statement, and 29 percent answered neutral.

¹⁵ IAEA, *Safety Series: INSAG-4. Safety Culture*, report from INSAG, 1991, quoted in Organization for Economic Cooperation and Development, *The Safety Culture of an Effective Nuclear Regulatory Body*, Nuclear Energy Agency, 2016, p. 20.

organizations.” However, for a number of reasons, some staff members are dissatisfied with the Agency’s efforts in this area. We found through observation and survey responses, for example, that fixes to problems are communicated to employees, but there is little opportunity for employees to provide feedback on the fix. This may limit the impact feedback could have and also decrease the buy-in from the staff.

Similarly, some employees believe that managers do not take action to address their concerns. Others said their opinions are welcomed by management but acknowledged that managers do not take action or provide any feedback. Focus group participants said this lack of action discourages employees from speaking up.

While PHMSA Has Developed Safety Culture Initiatives, Some Were Incomplete or Results Were Not Documented

PHMSA has emphasized safety culture in its strategic planning. For example, the Agency’s 2012–2016 Strategic Plan identified fostering a stronger safety culture as an organizational priority, stating, “By 2016 we aim to build a stronger safety culture in PHMSA by demonstrating a collective commitment to emphasize safety over competing goals and demands.” Since 2016, PHMSA’s Administrators and senior leaders have expressed their commitment to improving the Agency’s safety culture and implementing SMS principles in a variety of venues. For example, in testimony before the Senate in 2018,¹⁶ the Agency’s Chief Counsel noted that PHMSA’s “commitment to SMS goes beyond asking companies to make cultural changes; we are implementing SMS throughout PHMSA as well.” And in a January 2018 speech,¹⁷ Administrator Elliott said, “I am gratified by PHMSA’s dedication to cultivating organizational and operational excellence to grow a strong safety culture.” While PHMSA does not currently have its own strategic plan, it uses DOT’s 2018–2022 strategic plan, which also emphasizes the importance of an organizational safety culture: “DOT will foster a safety culture by pursuing programs and initiatives that increase the valuation of safety and encourage proactive safety reporting and risk management to achieve safety goals.”

¹⁶ Paul Roberti, PHMSA Chief Counsel, testimony before the Senate Committee on Commerce, Science, and Transportation (2018).

¹⁷ Howard R. “Skip” Elliott, speech to the Interstate Natural Gas Association of America Planning Meeting (2018).

PHMSA has developed a number of initiatives with the goal of building a positive safety culture. In some cases, initiatives were started but not completed; in others, the results were not documented. PHMSA's safety culture initiatives, ongoing or completed since 2012, are as follows:

2010 Safety Review Board. In 2010, PHMSA implemented a review board to help resolve differences of professional judgement amongst its staff. PHMSA Order 3770.1 established a Safety Review Board to resolve differences of opinion.¹⁸ However, PHMSA could not produce any records demonstrating that this board ever met, and the order was ultimately superseded by the safety manual PHMSA issued in June 2019, which no longer included the board.

2014 Safety Posture Review and 2015 Agency Safety Action Plan.

PHMSA stated that it completed a Safety Posture Review in response to a November 2014 Secretary Foxx directive. We requested the findings from this review, but PHMSA was unable to locate any documentation containing the results. However, PHMSA provided an Agency Safety Action Plan (ASAP), which PHMSA stated was developed in response to the Safety Posture Review. The ASAP included the following objective: to develop an Enforcement Effectiveness Study, which was subsequently divided into two phases. Phase 1, which was completed, analyzed PHMSA's inspection and enforcement outcomes over time, detailing the lessons learned. It also defined the phase 2 objectives—to identify how an inspection is defined, evaluate enforcement effectiveness metrics, and describe the relationship between risk rankings, inspection outcomes, and incident data.

We requested a copy of the phase 2 results, but an Agency official said it had evolved into objective 17.3.5 in PHMSA's 2017 Business Plan; that objective aimed to "evaluate the effectiveness of enforcement actions." The Agency accomplished the business plan objective by tracking four metrics: timely corrective and deterrent actions, repeat violations, collecting penalties, and incident causal factors. While this was in line with the planned phase 2 objectives, it did not approach the level of detail that the planned assessment would have accomplished. For example, the metrics did not compare risk rankings and inspection outcomes or incidents. As PHMSA finished phase 1, but not the full intent of phase 2, we consider this initiative to be incomplete.

2015 Volpe Center Contract to Expand SMS. In 2015, PHMSA established a 5-year inter-agency agreement (IAA) with the John A. Volpe National

¹⁸ PHMSA Order 3770.1, Safety Review Board (April 5, 2010).

Transportation Systems Center (Volpe Center). The IAA set aside \$1.5 million for the Volpe Center to support PHMSA's SMS activities. The Volpe Center used some of these funds in 2016 to develop a framework that outlined the importance of an SMS and defined a positive safety culture. However, during our audit, several PHMSA officials told us that the Agency does not have an active, documented SMS.

Between 2015 and 2019, PHMSA used one-third of the \$1.5 million. During our audit, Agency officials used an additional portion of the funding (\$485,840) on training to aid the development of PHMSA's internal SMS.¹⁹ The remaining \$516,004 expired in September 2020.

2016 PHMSA 2021 Initiative. Launched in 2016, the PHMSA 2021 initiative was envisioned as a strategic framework that could enable the Agency to be proactive and data driven. Among other strategic objectives, it aimed to "cultivate organizational excellence and a safety culture for our people." Based on the PHMSA 2021 framework, the Agency developed 2016 priorities and a tactical business plan for fiscal year 2017. We reviewed the 2017 Business Plan, which included safety culture-related objectives, such as implementing SMS internally, evaluating the effectiveness of enforcement actions, and responding to safety issues in a timely manner. However, as discussed above, PHMSA was only able to show us documentation related to the objective "evaluate effectiveness of enforcement actions."

2018 Office of Pipeline Safety Business Plan. This plan was developed by PHMSA's Office of Pipeline Safety (OPS), which is responsible for ensuring the safe, reliable, and environmentally sound operation of the Nation's natural gas and hazardous liquid pipeline transportation system. The plan consisted of several goals, including:

- Strengthen organizational excellence;
- Define and facilitate [a] PHMSA culture that includes transparency, open communications and a workplace supportive of raising concerns; and
- Promote organizational learning.

The business plan outlined the OPS organizational priorities and officials provided evidence that work was underway on some of the plan's

¹⁹ According to PHMSA, through the Volpe Center IAA, PHMSA created the "Fundamentals of SMS" training program. Agency officials say that PHMSA is uploading the program into DOT Learns, the Department's learning management system, and it will be mandatory for all PHMSA employees. According to the officials, the training discusses the importance of a robust safety culture and points to PHMSA's PII on internal SMS implementation.

objectives related to safety culture. However, OPS was unable to provide documentation showing completion of some safety-culture related objectives and, in other cases, the documents provided were not related to internal safety culture.

2019 PHMSA Safety Manual. According to a PHMSA official, the revised 2019 safety manual “incorporates the tenets of the [2010] Safety Review Board.” However, while PHMSA Order 3770.1, which established the board, addressed disputes arising specifically from safety-related decisions, the 2019 manual refers only to addressing employee concerns about personal safety in the workplace.

2020 Efforts. When we asked Agency officials for evidence of their current efforts to foster a positive safety culture, they cited many of the initiatives listed above, including the draft OPS business plan and the unexpended \$1 million-plus. According to PHMSA, those funds were set aside for Volpe to develop a safety management framework and other safety management support by September 30, 2020.²⁰ In an email to us, PHMSA officials described these combined efforts as a “Three-Pronged Approach” that focuses on ensuring employees’ personal safety, developing a safety culture within PHMSA, and promoting a safety culture within the regulated industry. However, this approach has not been communicated to PHMSA employees. In addition, only one of the three prongs relates to the Agency’s internal safety culture.

PHMSA officials also highlighted the PIIs, which are employee-driven teams tasked with defining and making recommendations to resolve Agency-wide issues. They provided a list of 10 PIIs, all of which, according to PHMSA, are designed to enhance safety. From the list, we found seven that would also enhance PHMSA’s safety culture. As of July 31, 2020, recommendations from six of the seven PIIs had yet to be implemented.

Finally, Agency officials cited their efforts to include SMS and safety culture principles in leadership performance plans. Yet these principles are not included in all the plans. For example, the performance plan for the Deputy Associate Administrator for Pipeline Safety includes language about implementing SMS within PHMSA and promoting continuous improvement in safety performance. However, the performance plans for two other Senior Executive Service positions—the Agency’s Executive Director (who serves as Chief Safety Officer) and the Associate Administrator for the Office of Hazardous Materials Safety—do not give either position responsibility for implementing SMS.

²⁰ For details on how the funds were expended, see “2015 Volpe Center Contract to Expand SMS” on pp. 12–13.

According to PHMSA, in some cases, these initiatives were not completed due to successive changes in leadership at the Departmental and Agency levels. For example, the Agency Safety Posture Review and PHMSA 2021 were initiated under the previous administration were not continued by the current one.

Additionally, in 2016, OIG identified shortcomings in the Agency's rulemaking capabilities and processes²¹ and, as part of its response, PHMSA assigned the Chief Safety Officer position's duties to the newly created Executive Director position. Multiple PHMSA senior officials provided evidence that combining the roles of the Chief Safety Officer and Executive Director reduced the prominence of the safety function. The Executive Director—who holds the most senior career-level position in PHMSA—told us that his duties include, but are not limited to, disciplinary actions, PHMSA's budget, and training the next generation of leaders—in addition to safety oversight. In fact, two senior PHMSA officials told us they work with the Executive Director primarily on human resources issues. These duties potentially compete with the position's responsibility to focus on safety. The Executive Director position description also demonstrates that the Chief Safety Officer's safety function does not have a predominant role as Congress initially intended. The description only discusses the Chief Safety Officer position as an additional responsibility and offers no other details. Further, the performance plan and PHMSA's website refer solely to the Executive Director title.

The Chief Safety Officer position had been in place at PHMSA since the Agency's inception in 2004. It was created in response to tragic pipeline incidents in 1999 and 2000 that killed 15 people and to ensure that safety is PHMSA's highest priority. That safety is PHMSA's highest priority was codified in statute (49 USC 108) by the Norman Y. Mineta Research and Special Programs Improvement Act (Mineta Act).²² This statute also requires PHMSA to have an Assistant Administrator for Pipeline and Hazardous Materials Safety who serves as the Chief Safety Officer. The position must be appointed in the competitive service rather than by the President, which enables it to promote a focus on safety regardless of administration changes. Indeed, the debate on the Mineta Act highlighted the importance of the Chief Safety Officer position in the effort to keep "the agency focused on its new safety mission." Changing the Chief Safety Officer from a safety-focused position means that no one individual is focused solely on maintaining the continuity PHMSA requires to foster a positive safety culture at all times, especially during changes of administrations.

²¹ *Insufficient Guidance, Oversight, and Coordination Hinder PHMSA's Full Implementation of Mandates and Recommendations* (OIG Report No. ST2017002), October 14, 2016.

²² Pub. L. 108-426 (November 30, 2004).

The incomplete initiatives may impact employees' views on leadership's commitment to improving PHMSA's safety culture. For example, during our interactions with PHMSA staff, we heard from both supervisors and non-supervisors that the Agency's leadership is committed to *safety*. However, some staff disagree about the leadership's commitment to PHMSA's underlying *safety culture*, with some supervisors and non-supervisors stating that *safety culture* is not a priority.

Finally, our document review indicated that PHMSA does not have an adequate system for maintaining institutional knowledge about safety concerns or solutions for tracking current safety culture-related activities. The Government Accountability Office's (GAO) *Standards for Internal Control in the Federal Government*²³ states that management should evaluate and document the results of ongoing monitoring and separate evaluations to identify internal control issues. There are multiple examples of assessments for which PHMSA officials cannot find the conclusions or recommendations. The lack of a mechanism for documenting and distributing safety culture information across the Agency hinders PHMSA's ability to develop an attitude of continuous learning and improvement.

Conclusion

PHMSA's mission is to protect people and the environment by advancing the safe transportation of energy and other hazardous materials that are essential to our daily lives. In the years since the Chernobyl and Fukushima disasters, investigators have become conscious of the crucial role safety culture plays in creating and preventing accidents and catastrophic events—such as those that can occur during the distribution of natural gas through pipelines and the shipment of hazardous materials. DOT, and by extension, PHMSA, recognizes that its efforts to promote a safety culture within the transportation sector depend on the values, actions, and behavior of its employees. PHMSA's continued and sustained focus on fostering a positive safety culture will enhance the Agency's ability to carry out its mission and other responsibilities.

²³ GAO, *Standards for Internal Control in the Federal Government* (GAO-14-704G), September 2014.

Recommendations

To enhance PHMSA's efforts to foster a positive safety culture, we recommend that the Pipeline and Hazardous Materials Safety Administrator:

1. Describe the responsibilities and tasks necessary to develop and continuously promote a positive safety culture at PHMSA, such as a training plan on safety culture. Then clearly assign those responsibilities to leadership.
2. Establish a method to track and monitor the status of initiatives related to safety culture.

Agency Comments and OIG Response

We provided PHMSA with our draft report on November 16, 2020, and received its response on December 16, 2020, which is included as an appendix to this report. PHMSA concurred with both of our recommendations and proposed appropriate completion dates.

Actions Required

We consider all recommendations resolved but open pending submission and completion of the planned actions.

Exhibit A. Scope and Methodology

We conducted this performance audit between March 2019 and November 2020 in accordance with generally accepted Government auditing standards as prescribed by the Comptroller General of the United States. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

We conducted our work in two parts. For the first part, we conducted an initial assessment of the current state of PHMSA's safety culture. For the second part, our objective was to evaluate PHMSA's efforts to foster a positive safety culture as it carries out its mission and other responsibilities.

Assessment of PHMSA's Safety Culture

Since PHMSA is a regulator of the industry, and given the influential relationship between a regulator and its regulated entities, we focused on those elements pertaining to a regulator safety culture. This included a review of available safety culture reports and assessments and relevant literature to gain an understanding of what constitutes a positive safety culture, including:

- *Development and Initial Testing of a Regulatory Body Safety Culture Perception Survey*, Fleming, Bowers, Thibault, and Cregan;
- *2015 U.S. Nuclear Regulatory Commission Safety Culture and Climate Survey*, U.S. Nuclear Regulatory Commission Office of the Inspector General;
- *Oversight Culture 2015: Swiss Federal Nuclear Safety Inspectorate (ENSI) Report on Oversight Practice*;
- *Canadian Nuclear Safety Commission Regulatory Safety Oversight Culture Assessment*; and
- NEA's *The Safety Culture of an Effective Nuclear Regulatory Body*, on which we ultimately based our framework.

We spoke with DOT Operating Administrations, other Government agencies, and private entities (see exhibit B). We consulted Dr. Sonja B. Haber, Human Performance Analysis, Corp., a leader in conducting safety culture assessments, regarding various safety culture assessment frameworks and the approach to safety culture assessment for regulators and regulated entities.

Further, due to the complex nature of safety culture, to help us conduct our assessment of PHMSA's safety culture, we contracted with a recognized safety culture subject matter expert, Dr. Mark Fleming from St. Mary's University, Halifax. The audit team chose Dr. Fleming because he had expertise in assessing regulator safety culture. Dr. Fleming guided us on which safety culture model to select and how to gather data that would allow us to independently assess PHMSA's safety culture. While there is no standard methodology, according to Dr. Fleming, best practice is to use surveys, focus groups, interviews, document reviews, and observations to help researchers understand an organization's safety culture. While none of these methods alone can determine whether an organization has a positive safety culture, when these approaches are combined, they can provide insight into an organization's strengths and challenges. Accordingly, our work incorporated these approaches, as follows:

- **Survey:** We used a survey to gain insight into PHMSA employees' perceptions of the organization's safety culture. We administered our survey to all 561 non-supervisors, managers, and senior leaders at PHMSA who had valid email addresses on May 13, 2019, and we received a response rate of 64 percent. We also sent survey invitations to 200 PHMSA contractors; however, we considered the response rate, 32.5 percent, too low to include the results in our analysis.

We developed our survey in collaboration with Dr. Fleming, OIG statisticians, and PHMSA leadership and further refined the questions with testers internal and external to OIG. To develop the survey questions, we began with a bank of 71 questions created by safety culture experts to assess safety culture at regulatory agencies.²⁴ We included 48 of these questions (not including demographic questions) in the final survey, with minor modifications—approved by Dr. Fleming—to better address a PHMSA audience. We categorized the questions according to the following principles: leadership, accountability and involvement, cooperation and communication, comprehensive and systematic approach, continuous improvement and learning, fair and just culture, and reporting culture. We took the first five principles from the NEA framework, and PHMSA requested the other two.

Survey respondents responded to statements using a Likert scale (strongly disagree, disagree, neutral, agree, strongly agree, don't know). We also invited them to provide open-ended comments about each principle. Additionally, the survey included demographic questions on

²⁴ For more information on how this initial bank of 71 questions were developed, see Mark Fleming, Kate C. Bowers, Tabatha Thibault, and Brianna Cregan, "Development and Initial Testing of a Regulatory Body Safety Culture Perception Survey," in *Advances in Safety Management and Human Factors*, vol. 604 (Springer, June 23, 2017).

tenure at PHMSA, work location, and role. PHMSA officials identified the survey population, and we verified the data they provided, determining that it was reliable for the purposes of our survey.

We analyzed the survey results by role, location, and office. In consultation with Dr. Fleming, we then reviewed the results of that analysis and the survey's open-ended comments to identify themes—the perceptions most commonly held by survey participants, as well as areas where perceptions seemed particularly positive or negative. We briefed PHMSA leadership on the survey results in October 2019.

- **Focus Groups:** To explore the reasons survey respondents held these perceptions we conducted focus groups and interviews both at Headquarters and in three of PHMSA's five regions: Eastern (Trenton, NJ), Southern (Atlanta, GA) and Southwest (Houston, TX). Additionally we conducted focus groups and interviews at the Training and Qualifications Training Center in Oklahoma City, OK. We worked with OIG's statisticians to select these locations for our site visits. Our criteria were (1) the site was a field office, where (2) the Office of Pipeline Safety and the Office of Hazardous Materials Safety were co-located, and (3) there were a sufficient number of employees to conduct a focus group. We identified potential participants for the focus groups through the Federal Personnel Payroll System and allowed them to self-select whether to attend. Non-supervisors and managers attended separate focus groups. Our questions centered on the themes where survey responses were particularly positive or negative. We examined their understanding of safety culture, perception of the leadership's efforts, relationships with their supervisors, concerns about undue influence, and communication within the organization. We interviewed regional directors about the same themes.
- **Observation and Document Review:** We conducted independent observations and reviewed relevant documents to understand how PHMSA's safety culture plays out in actual practice. For example we observed a pipeline and a hazardous materials facility inspection with Trenton, NJ-based Agency personnel. In Houston, TX, and Atlanta, GA, we observed a hazardous materials facility inspection. In Oklahoma City, OK, we observed classes at the Training and Qualifications Training Center. At Headquarters, we observed a PHMSA town hall. We reviewed the draft Accident Investigation Division Handbook, internal media such as PHMSA's *Daily Communicator*, and town hall meeting minutes, among other documents.

Then we compared the information we collected to the principles of the NEA safety culture model. We identified common themes in the survey, focus groups, and interviews, as well as from our observations and document reviews, and, in

conjunction with Dr. Fleming, developed conclusions about PHMSA's safety culture. We briefed PHMSA leadership on the results of the assessment in March 2020.

Assessment of PHMSA's Efforts To Foster a Positive Safety Culture

To assess PHMSA's efforts, we researched laws and regulations related to safety culture at PHMSA, including the text and debate associated with the Norman Y. Mineta Research and Special Programs Improvement Act.²⁵ We reviewed DOT's and PHMSA's strategic plans, a memo from the Secretary, PHMSA policies and procedures, and testimony on safety culture from PHMSA's leadership. We then identified the Agency's efforts, beginning in 2012, to establish and maintain a positive safety culture. We accomplished this by reviewing PHMSA's orders, plans, reports, and internal website and interviewing senior Agency leaders (listed below) to understand their goals, ongoing efforts, and future initiatives:

- Administrator
- Executive Director
- Associate Administrator of Hazardous Materials Safety
- Associate Administrator of Pipeline Safety
- Associate Administrator of Planning and Analytics
- Deputy Associate Administrator for Field Operations of Pipeline Safety
- Deputy Associate Administrator of Hazardous Materials Safety
- Deputy Associate Administrator of Policy and Programs of Pipeline Safety

We gathered testimonial and documentary evidence to evaluate progress on the Agency's safety culture initiatives. Finally, we reviewed performance plans and position descriptions to gain an understanding of PHMSA leaders' roles and responsibilities.

²⁵ Pub. L. 108-426 (November 30, 2004).

Exhibit B. Organizations Visited or Contacted

Department of Transportation

DOT Safety Council

Federal Aviation Administration

Federal Railroad Administration

National Highway Traffic Safety Administration

Office of the Assistant Secretary for Research and Technology

Pipeline and Hazardous Materials Safety Administration (PHMSA) Headquarters,
Washington, DC

PHMSA Field Offices:

- Eastern Region, West Trenton, NJ
- Southern Region, Atlanta, GA
- Southwest Region, Houston, TX
- PHMSA Training and Qualification Center, Oklahoma City, OK

Other Government Agencies

Department of Energy

National Aeronautics and Space Administration

National Transportation Safety Board

Nuclear Regulatory Commission

Other Organizations

Air Line Pilots Association, International (ALPA)

Exhibit C. List of Acronyms

AFIX	Administrator’s Field Information Exchange
AID	Accident Investigation Division
ASAP	Agency Safety Action Plan
DOT	Department of Transportation
ENSI	Swiss Federal Nuclear Safety Inspectorate
IAA	Inter-agency agreement
IAEA	International Atomic Energy Agency
NEA	Nuclear Energy Agency
OIG	Office of Inspector General
OPS	Office of Pipeline Safety
PHMSA	Pipeline and Hazardous Materials Safety Administration
PII	Process Improvement Initiative
SMS	Safety Management System
Volpe Center	John A. Volpe National Transportation Systems Center

Exhibit D. Major Contributors to This Report

WENDY HARRIS

DAWN FRATRIN

BRIAN PERSSE

ALLIE CLEAVER

JALA MORROW

TONI JAFFIER

SETH KAUFMAN

JANE LUSAKA

GEORGE ZIPF

PROGRAM DIRECTOR

PROJECT MANAGER

SENIOR ANALYST

SENIOR ANALYST

ANALYST

ANALYST

DEPUTY CHIEF COUNSEL

SENIOR WRITER-EDITOR

SUPERVISORY MATHEMATICAL
STATISTICIAN

Appendix. Agency Comments



U.S. Department
of Transportation

Pipeline and Hazardous Materials Safety Administration

Memorandum

Subject: INFORMATION: Management Response to the
Office of Inspector General (OIG) Draft Report on
PHMSA's Safety Culture Efforts

Date: December 16, 2020

From: Drue Pearce
PHMSA Deputy Administrator

12/16/2020

To: David Pouliott
Assistant Inspector General for
Surface Transportation Audits

X 

Signed by: DRUE PEARCE

PHMSA is committed to protecting people and the environment by advancing the safe transportation of energy and other hazardous materials that are essential to our daily lives. PHMSA embraces safety management systems principles, including fostering a robust safety culture, to become more effective and efficient in its safety oversight duties.

The OIG draft report acknowledged that PHMSA exhibits several indicators of a positive safety culture. PHMSA's staff and organizational commitment to its public safety mission is solid – as evidenced by years of Office of Personnel Management Employee Viewpoint Surveys, PHMSA's actions, and the results from the staff interviews conducted by OIG. Over the years, PHMSA invested significant resources and effort in improving how safety decisions are made and how the Agency communicates those decisions with staff. These actions, based on management system principles, are designed to assure the best safety outcomes and to improve the non-supervisors – management trust relationship, which is critical to a robust safety culture.

In addition to our existing program activities, PHMSA has several initiatives underway to further enhance its safety culture. PHMSA developed foundational safety management systems training for all PHMSA staff and is rolling the training out in December 2020 - January 2021. This training focuses on the building blocks of safety management system principles, including safety culture.

In addition, PHMSA approved two more initiatives on December 9, 2020. A staff-led Process Improvement Initiative (PII) to develop an internal safety management system and an Internal Safety Management System Policy Statement that discusses the importance of a robust safety culture.

Upon review of OIG's draft report, PHMSA concurs with the two recommendations as written and will implement them by July 1, 2022.

PHMSA appreciates the opportunity to respond to the OIG's draft report. Please contact Nancy White, Director of Policy and Planning, at (202) 366-1419 with any questions or if you would like additional details.

U.S. DOT IG Fraud & Safety Hotline

hotline@oig.dot.gov | (800) 424-9071

<https://www.oig.dot.gov/hotline>

Our Mission

OIG conducts audits and investigations on behalf of the American public to improve the performance and integrity of DOT's programs to ensure a safe, efficient, and effective national transportation system.

OFFICE OF INSPECTOR GENERAL
U.S. Department of Transportation
1200 New Jersey Ave SE
Washington, DC 20590



www.oig.dot.gov