



ENERGY FACILITY CONTRACTORS GROUP

Safety Culture Practitioner's Resource Guide: A Resource Guide for the DOE Community

Generated by the Integrated Safety Management Working Group

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Introduction

Organizational performance is simply the aggregate performance of the individuals in an organization. And an organization's performance determines mission success or failure. Because the organizational culture—the collection of values, expectations, and practices that guide behavior in an organization—has a direct impact on organizational performance, managers must have a sense of where their organizational culture lies with respect to stated values and norms (i.e., is it a healthy or an unhealthy organizational culture?).

Note: The U.S. Department of Energy's (DOE's) original entrance into organizational culture discussions focused on safety culture. The Energy Facility Contractors Group (EFCOG) recommends taking a holistic approach to organizational culture because improvements that benefit the safety culture will yield dividends for security, quality, and production as well. The terms *organizational culture* and *safety culture* will be used interchangeably in this document.

As such, safety culture practitioners are typically expected to help organizational leadership do the following:

- Define desired behaviors that contribute to a healthy organizational culture.
- Establish a baseline safety culture assessment for the organization.
- Monitor performance and changes in organizational culture to evaluate the effectiveness of continuous improvement actions.

Many people are assigned the role of safety culture practitioner within their organization, yet there is no training program, academic degree, or professional credential that qualifies these individuals for such an assignment. Becoming a safety culture practitioner requires knowledge, skills, and abilities in a variety of disciplines, including safety management, systems thinking, industrial and organizational psychology, statistics, psychometrics, research methods, communication, sociology, project management, instructional design, and marketing. Site familiarity (e.g., knowing an organization's history, being aware of workforce customs, and understanding operational practices) is always beneficial for the safety culture practitioner. Most people do not enter into this position with skills in all these areas and hence must be willing to learn from and collaborate with others when needed.

Members of the EFCOG Safety Working Group, Integrated Safety Management sub-group, Safety Culture task team, developed this resource guide to help safety culture practitioners build a knowledge base and have at their fingertips a useful list of seminal references for their important role. Each topic area in this guide is organized into the following categories:

- Competency—the level of expertise a safety culture practitioner should strive for in order to accomplish their role and assigned duties effectively
- Objectives—those things a safety culture practitioner should learn from each topic area
- References—material to provide a safety culture practitioner with a strong foundation in the topic area

The topic areas covered in this guide and the logic behind them are as follows:

Topic 1: Safety Culture History and the DOE. Topic 1 provides a documented road map that describes how DOE evolved its current understanding and practice of a safety culture based on lessons learned across the DOE National Laboratories, production operations, and other sites across the DOE Complex as well as from other high-hazard industries, seminal system events with major consequences, and interactions with the Defense Nuclear Facilities Safety Board (DNFSB).

Topic 2: Safety-Conscious Work Environments and Proper Work Environments for Raising Concerns. A safety-conscious work environment (SCWE) is the fundamental building block for a healthy organizational culture. Topic 2 provides recent history as well as resources to help the safety culture practitioner understand, influence, and strengthen their organization's ability to foster an SCWE.

Topic 3: Safety Culture Theory and Research. Topic 3 provides direction and references to a large body of theory and research to hone the safety culture practitioner's knowledge base and expertise in both the broad concept and its alignment with DOE's application of integrated safety management, human and organizational performance concepts, and other industry models and tools.

Topic 4: Safety Culture Assessments. A reliable baseline assessment of an organization's existing safety culture is necessary before initiating a process to evaluate and advance that culture in order to achieve optimal performance. DOE, Oak Ridge Associated Universities, commercial nuclear organizations, and others have provided a good foundation for understanding the safety culture assessment process that should be conducted on a routine basis. Topic 4 outlines the basic quantitative and qualitative components of a safety culture assessment and offers the safety culture practitioner a variety of useful resources.

Topic 5: Data Sources to Provide Insight into Safety Culture Changes. It is well-established that an organization's culture affects its performance. An astute safety culture practitioner, therefore, can glean insights into an organization's culture by using the variety of available data resources that track aspects of organizational performance. Topic 5 provides suggestions and references to help the safety culture practitioner in this endeavor.

Topic 6: Monitoring Safety Culture and Engaging Influencers. Based on the results of safety culture assessments and insights gleaned from other data sources, plans are put in place to sustain and improve an organization's safety culture. It is important to provide leadership with information describing whether these improvements are having the desired effect (i.e., improving the work environment such that the organization's culture will better reflect those values that leaders have deemed desirable). Topic 6 introduces, via references, techniques the safety culture practitioner can use to monitor indicators of safety culture change between full organizational culture assessments.

Topic 7: Successful Practices for Improving a Safety Culture. If the collective organization is not continually striving to improve its safety culture, there is a good chance the organization will drift away from desired behaviors. The safety culture practitioner plays a vital role in helping an organization in sustaining this ongoing journey. Topic 7 highlights some methods the safety culture practitioner can use to strengthen and maintain an organization's safety culture.

The insight gained from each topic area, in conjunction with attending meetings with more experienced safety culture practitioners (e.g., EFCOG meetings or DOE Safety Culture Improvement Panel meetings) and working with coworkers who have hands-on site-specific experience, will provide safety culture practitioners with the skills needed to succeed in their assigned duties.

SAFETY CULTURE PRACTITIONER’S RESOURCE GUIDE

Topic 1: Safety Culture History and the DOE

Topic 1 provides a documented road map that describes how DOE evolved its current understanding and practice of a safety culture based on lessons learned from across the DOE enterprise as well as from other high-hazard industries, seminal system events with major consequences, and interactions with the DNFSB.

Category	Content
Competency	Understand the evolution of the safety culture concept to provide context for the DOE approach.
Objectives	<ol style="list-style-type: none"> 1. Evolution of the safety culture concept. Learn about the evolution and collective understanding of a safety culture concept through the years, including research and analytical endeavors. 2. Seminal events. Understand the impact that seminal events within nuclear, petrochemical, and other high-hazard industries have had on the evolution of a safety culture throughout the DOE enterprise. 3. DNFSB interactions. Understand how DOE evolved its approach to a safety culture through interactions with the DNFSB. 4. Employee engagement and accountability. Understand how DOE safety culture practices matured to consider the human element for employee engagement and accountability improvements.
References	<p>Evolution of the Safety Culture Concept</p> <p>Center for Chemical Process Safety. 2021. “Building Process Safety Culture Toolkit: Tools to Enhance Process Safety Performance.” Accessed August 2022. https://www.aiche.org/topics/commit-process-safety/process-safety-culture.</p> <p>DOE, Secretary of Energy’s message on safety culture: DOE Safety Culture.</p> <p>DOE. 2021. DOE G 450.4-1C, <i>Integrated Safety Management Guide</i>, Attachment 10, “Safety Culture Focus Areas and Associated Attributes.” Washington, D.C.: DOE.</p> <p>DOE. n.d. “Building Safety Culture into the Department’s DNA.” Accessed August 2022. https://www.energy.gov/safety-culture/doe-safety-culture.</p> <p>IAEA (International Atomic Energy Agency). 2002. IAEA-TECDOC-1321, <i>Self-Assessment of Safety Culture in Nuclear Installations, Highlights and Good Practices</i>. Vienna: IAEA.</p> <p>———. 2002. IAEA-TECDOC-1329, <i>Safety Culture in Nuclear Installations: Guidance for the Use in Enhancement of Safety Culture</i>. Vienna: IAEA.</p> <p>———. 2008. IAEA Services Series No. 16, <i>SCART Guidelines: Reference Report for IAEA Safety Culture Assessment Review Team (SCART)</i>. Vienna: IAEA.</p> <p>INPO (Institute of Nuclear Power Operations). 2012. INPO 12-012, <i>Traits of a Healthy Nuclear Safety Culture</i>. Atlanta, GA: INPO.</p>

Category	Content
	<p>INSAG (International Nuclear Safety Advisory Group). 1986. Safety Series No. 75-INSAG-7, <i>Summary Report on the Post-accident Review Meeting on the Chernobyl Accident</i>. Vienna: IAEA. Note: This article introduces the term safety culture for the first time.</p> <p>———. 1991. Safety Series No. 75-INSAG-4, <i>Safety Culture</i>. Vienna: IAEA. Note: This report attempts to define safety culture as it relates to organizations and individuals engaged in nuclear power activities.</p> <p>———. 2002. INSAG-15, <i>Key Practical Issues in Strengthening Safety Culture</i>. Vienna: IAEA.</p> <p>NEI (Nuclear Energy Institute). 2014. NEI 09-07, Revision 1, <i>Fostering a Healthy Nuclear Safety Culture</i>. Washington, D.C.: NEI.</p> <p>NRC (U.S. Nuclear Regulatory Commission). 2004. SECY-04-0111, “Policy Issue Notation Vote: Recommended Staff Actions Regarding Agency Guidance in the Areas of Safety Conscious Work Environment and Safety Culture.” Washington, D.C.: NRC.</p> <p>———. 2006. Regulatory Issue Summary 2006-13, <i>Information on the Changes Made to the Reactor Oversight Process to More Fully Address Safety Culture</i>. Washington, D.C.: NRC.</p> <p>———. 2012. Regulatory Issue Summary 2012-01, <i>Availability of Safety Culture Policy Statement</i>. Washington, D.C.: NRC.</p> <p>Reiman, T. and P. Oedewald. 2002. VTT Research Notes 2140, <i>The Assessment of Organisational Culture: A Methodological Study</i>. Espoo, Finland: Technical Research Centre of Finland.</p> <p>———. 2009. VTT SSM--2009:12, <i>Evaluating Safety-Critical Organizations-Emphasis on the Nuclear Industry</i>. Espoo, Finland: Technical Research Centre of Finland.</p> <p>Schein, E. H. 2014. National and Occupational Culture Factors in Safety Culture, IAEA meeting, April 9, 2014.</p> <p>Wellock, T. R. 2021. “Social Scientists in an Adversarial Environment: The Nuclear Regulatory Commission and Organizational Factors Research.” <i>Nuclear Technology</i>. DOI: 10.1080/00295450.2020.1826273.</p> <p>Seminal Events</p> <p>2EC, 2021. Independent Safety Culture Assessment of SoCalGas and Sempra Energy, prepared for California Public Utilities Commission.</p> <p>NRC. 2021. 05000346/2004003, <i>Davis-Besse Nuclear Power Station—Special Inspection Reactive Report 05000346/2004003 and Apparent Violation</i>. November 19, 2021. Lisle, IL: NRC Region III.</p> <p>CSB (U.S. Chemical Safety and Hazard Investigation Board). 2007. “BP America Refinery Explosion.” Accessed: August 2022. https://www.csb.gov/bp-america-refinery-explosion/.</p>

Category	Content
	<p>—. 2007. <i>CBS Safety Video: Anatomy of a Disaster—Explosion at BP Texas City Refinery</i>. Washington, D.C.: CSB.</p> <p>—. 2007. <i>The Report of the B.P. U.S. Refineries Independent Safety Review Panel</i>. Washington, D.C.: CSB.</p> <p>CAIB (Columbia Accident Investigation Board). 2003. <i>CAIB Report</i>. Washington, D.C.: CAIB, National Aeronautics and Space Administration.</p> <p>National Academies of Sciences, Engineering, and Medicine. 2012. <i>Macondo Well Deepwater Horizon Blowout: Lessons for Improving Offshore Drilling Safety</i>. Washington, D.C.: National Academy of Sciences, Engineering, and Medicine.</p> <p>National Research Council. 2014. Chapter 7: Lessons Learned: Nuclear Safety Culture. <i>Lessons Learned from the Fukushima Nuclear Accident for Improving Safety of U.S. Nuclear Plants</i>. Washington, DC: The National Academies Press. https://doi.org/10.17226/18294.</p> <p>IAEA. 2019. Human and Organizational Aspects of Assuring Nuclear Safety — Exploring 30 Years of Safety Culture. Proceedings of an international conference organized by the International Atomic Energy Agency and held in Vienna, 22-26 February 2016.</p> <p>IAEA. 2015. <i>The Fukushima-Daiichi Accident</i>, volumes 1–5. Vienna: IAEA.</p> <p>IAEA. 2014. <i>IAEA Report on Human and Organizational Factors in Nuclear Safety in the Light of the Accident at the Fukushima Daiichi Nuclear Power Plant</i>. Vienna: IAEA.</p> <p>DNFSB Interactions that Evolved the DOE Approach to a Safety Culture</p> <p>DNFSB. 2004. Recommendation 2004-1, <i>Oversight of Complex, High-Hazard Nuclear Operations</i>. Washington, D.C.: DNFSB.</p> <p>—. 2011. DNFSB 2011-1, <i>Safety Culture at the Waste Treatment and Immobilization Plan</i>. Washington, D.C.: DNFSB.</p> <p>—. n.d. “DNFSB Recommendations. Accessed August 2022. https://www.dnfsb.gov/board-activities/recommendations.</p> <p>DOE. 2011. DOE P 420.1, <i>Department of Energy Nuclear Safety Policy</i>. Washington, D.C.: DOE.</p> <p>—. 2017. DOE G 450.4-1C, <i>Integrated Safety Management System Guide</i>. Washington, D.C.: DOE.</p> <p>—. 2017. DOE O 450.2, Chg 1, <i>Integrated Safety Management</i>. Washington, D.C.: DOE.</p> <p>—. 2018. DOE P 450.4A Chg1, <i>Integrated Safety Management System Policy</i>. Washington, D.C.: DOE.</p> <p>—. n.d. “DOE Guidance.” Accessed August 2022. https://www.directives.doe.gov/guidance#b_start=0.</p> <p>Employee Engagement and Accountability</p>

Category	Content
	<p>DOE. 2009. DOE-HDBK-1028-2009, <i>Human Performance Improvement Handbook</i>, Volume 1, “Concepts and Principles.” Washington, D.C.: DOE.</p> <p>———. 2009. DOE-HDBK-1028-2009, <i>Human Performance Improvement Handbook</i>, Volume 2, “Human Performance Tools for Individuals, Work Teams, and Management.” Washington, D.C.: DOE.</p> <p>EFCOG. n.d. “EFCOG Human Performance Improvement Task Team.” Accessed August 2022. https://efcog.org/safety/integrated-safety-management-subgroup/human-performance-improvement-task-group/.</p> <p>———. n.d. “EFCOG Safety Culture Task Team.” Accessed August 2022. https://efcog.org/safety/integrated-safety-management-subgroup/safety-culturehro-task-group/.</p> <p>NRC. 2002. NUREG/CR-6751, <i>The Human Performance Evaluation Process: A Resource for Reviewing the Identification and Resolution of Human Performance Problems</i>. Washington, D.C.: NRC Office of Nuclear Regulatory Research.</p> <p>———. 2021. 05000346/2004003, <i>Davis-Besse Nuclear Power Station—Special Inspection Reactive Report 05000346/2004003 and Apparent Violation</i>. November 19, 2021. Lisle, IL: NRC Region III.</p>

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Topic 2: Safety-Conscious Work Environments and Proper Work Environments for Raising Concerns

An SCWE is the fundamental building block for a healthy organizational culture. Topic 2 provides recent history as well as resources to help the safety culture practitioner understand, influence, and strengthen their organization’s ability to foster an SCWE.

Category	Content
Competency	Learn the DOE definitions of and relationships between an SCWE and a positive work environment and why these are fundamental to a healthy organizational culture.
Objectives	<ol style="list-style-type: none"> 1. Safety-conscious work environment. Be able to define SCWE and describe how it relates to a safety culture. 2. SWCE and healthy safety culture characteristics. Understand the characteristics of an SCWE and a healthy safety culture. 3. Human impacts on organizational culture. Understand how human responses and interactions affect organizational culture, safety culture, and an SCWE (including the potential role of physical and psychological well-being as a benefit or risk). 4. Safe workplace requirements. Understand the requirements for providing a safe workplace. 5. Site-specific expectations for an SCWE. Learn the organization’s expectations for integrating an SCWE (e.g., reporting employee concerns and differing professional opinions).
References	<p>DOE Implementation Plan for Recommendation 2011-1, <i>Safety Culture at the Waste Treatment and Immobilization Plant</i>. Washington, D.C.: DNFSB.</p> <p>DOE. 1993. 10 CFR 820, <i>Procedural Rules for DOE Nuclear Activities</i>. Washington, D.C.: DOE.</p> <p>—. 2006. 10 CFR 851, <i>Worker Safety and Health Program</i>. Washington, D.C.: DOE.</p> <p>—. 2014. DOE P 444.1, <i>Preventing and Responding to all Forms of Violence in the Workplace</i>. Washington, D.C.: DOE.</p> <p>—. 2014. Independent Oversight Evaluation of Line Self-Assessments of Safety Conscious Work Environment. Washington, D.C.: DOE Office of Enforcement and Oversight.</p> <p>—. 2016. DOE O 442.2, <i>Differing Professional Opinions for Technical Issues Involving Environmental, Safety, and Health Technical Concerns</i>. Washington, D.C.: DOE.</p> <p>—. 2019. 10 CFR 708, <i>DOE Contractor Employee Protection Program</i>. Washington, D.C.: DOE.</p>

Category	Content
	<p>——. 2019. DOE O 442.1B, <i>Department of Energy Employee Concerns Program</i>. Washington, D.C.: DOE.</p> <p>——. 2021. DOE G 450.4-1C, <i>Integrated Safety Management Guide</i>, Attachment 10, “Safety Culture Focus Areas and Associated Attributes.” Washington, D.C.: DOE.</p> <p>——. n.d. “Course Catalog.” Accessed August 2022. https://ntc.doe.gov/student/course-catalog. Washington, D.C.: DOE.</p> <ul style="list-style-type: none"> • TLP-100, <i>Safety Culture Leadership Fundamentals</i> • TLP-150, <i>Safety Culture Training for Front Line Leaders</i> • TLP-200, <i>Safety Culture for DOE and DOE Contractor Senior Leaders</i> <p>——. n.d. “Safety Culture Improvement Panel.” Accessed August 2022. https://www.energy.gov/safety-culture/safety-culture-improvement-panel.</p> <p>——. n.d. “Training.” Accessed August 2022. https://www.energy.gov/safety-culture/training. Washington, D.C.: DOE.</p> <p>Edmondson, A. C. 2018. <i>The Fearless Organization: Creating Psychological Safety in the Workplace for Learning, Innovation, and Growth</i>. Hoboken, NJ: John Wiley & Sons.</p> <p>INPO. 2012. INPO 12-012, <i>Traits of a Healthy Nuclear Safety Culture</i>. Atlanta, GA: INPO.</p> <p>NRC. 1996. NRC Policy Statement, “Freedom of Employees in the Nuclear Industry to Raise Safety Concerns Without Fear of Retaliation.” Washington, D.C.: NRC.</p> <p>——. 2005. NRC Regulatory Issue Summary 2005-18, “Guidance for Establishing and Maintaining a Safety Conscious Work Environment.” Washington, D.C.: NRC.</p> <p>——. 2015. <i>Allegation Manual</i>, Section 5.2.j.6, “Chilling Effect Letters.” Washington, D.C.: NRC.</p> <p>——. n.d. “Safety Conscious Work Environment Policy Guidance.” Accessed August 2022. https://www.nrc.gov/about-nrc/regulatory/allegations/scwe-mainpage.html.</p>

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Topic 3: Safety Culture Theory and Research

Topic 3 provides direction and references to a large body of theory and research to hone the safety culture practitioner’s knowledge base and expertise in both the broad concept and its alignment with DOE’s application of integrated safety management, human and organizational performance concepts, and other industry models and tools.

Category	Content
Competency	Understand the theory, associated and interrelated concepts, and terminology for assessing, monitoring, and communicating about safety culture.
Objectives	<ol style="list-style-type: none"> 1. Safety culture relationship with DOE systems. Understand safety culture as it relates to the DOE application of an integrated safety management system, an SCWE, human performance indicators, other related deliverables and programs, and other industry concepts and tools. 2. Related theories. Review related theories as described or applied in academia and other industries. <p>Note: Not all safety culture concepts can be applied at all sites, nor is it desirable to do so; the purpose of this topic is to become familiar with safety culture concepts and terminology in order to identify what may already exist and then augment or introduce further concepts and models as appropriate. Human resources and labor relations organizations (as applicable) can help implement concepts and models listed in the References section or identify known challenges to doing so (e.g., implementing a human performance culpability matrix would require a change to the labor contract).</p>
References	<p>Safety Culture Relationship with DOE Systems</p> <p>DOE. 2009. DOE-HDBK-1028-2009, <i>Human Performance Improvement Handbook</i>, Volume 1, “Concepts and Principles.” Washington, D.C.: DOE.</p> <p>———. 2009. DOE-HDBK-1028-2009, <i>Human Performance Improvement Handbook</i>, Volume 2, “Human Performance Tools for Individuals, Work Teams, and Management.” Washington, D.C.: DOE.</p> <p>———. 2019. “Voluntary Protection Program Manuals” (4 volumes). Accessed August 2022. https://www.energy.gov/ehss/voluntary-protection-program-manuals.</p> <p>———. 2021. DOE G 450.4-1C, <i>Integrated Safety Management Guide</i>, Attachment 10, “Safety Culture Focus Areas and Associated Attributes.” Washington, D.C.: DOE.</p> <p>———. n.d. “Safety Culture Improvement Panel.” Accessed August 2022. https://www.energy.gov/safety-culture/safety-culture-improvement-panel.</p> <p>DNFSB. 2011. DOE IP for Recommendation 2011-1, <i>Safety Culture at the Waste Treatment and Immobilization Plant</i>. Washington, D.C.: DNFSB.</p> <p>EFCOG. n.d. EFCOG Human Performance Improvement Task Team website. “HPI Reading List.”</p>

Category	Content
	<p>——. n.d. “EFCOG Safety Culture Task Team.” Accessed August 2022. https://efcog.org/safety/integrated-safety-management-subgroup/safety-culturehro-task-group/.</p> <p>INPO. 2012. <i>INPO 12-012, Traits of a Healthy Nuclear Safety Culture</i>. Atlanta, GA: INPO.</p> <p>NEI. 2014. <i>NEI 09-07, Revision 1, Fostering a Healthy Nuclear Safety Culture</i>. Washington, D.C.: NEI.</p> <p>Site-specific voluntary protection program as applicable.</p> <p>Related Theories</p> <p>While not an exhaustive list by any means, some well-known publications that have contributed to our collective understanding and advancement of culture and organizational performance include:</p> <p>Dekker, Sidney. 2019. <i>Foundations of Safety Science: A Century of Understanding Accidents and Disasters</i>. Boca Raton: Taylor & Francis Group.</p> <p>Dekker, Sidney. 2012. <i>Just Culture: Balancing Safety and Accountability</i> (2nd ed.). Surrey, England: Ashgate.</p> <p>Gilbert, C., B. Journe, H. Laroche, and C. Bieder, eds. 2018. <i>Safety Cultures, Safety Models: Taking Stock and Moving Forward</i>. Cham, Switzerland: Springer Open.</p> <p>Fleming, Mark, Harvey, Keri, and Cregan, Brianna. 2018. “Safety culture research and practice: A review of 30 years of research collaboration,” <i>Special Issue on Industrial-Organizational Psychology and Health for the Journal of Applied Biobehavioral Research</i> 23(4).</p> <p>Haber, Sonja. 1996. <i>Safety Culture in the Nuclear versus Non-nuclear Organization</i> (BHL—63336). Upton, N.Y.: Brookhaven National Laboratories.</p> <p>IAEA. 2019. <i>Human and Organizational Aspects of Assuring Nuclear Safety – Exploring 30 Years of Safety Culture</i>, Proceedings of an international conference organized by the International Atomic Energy Agency and held in Vienna, 22-26 February 2016. Accessed August 2022.</p> <p>Reason, James. 1990. <i>Human Error</i>. New York: Cambridge University Press.</p> <p>Schein, Edgar. 2004. <i>Organizational Culture and Leadership</i> (3rd ed.). San Francisco: Jossey-Bass.</p> <p>There is a plethora of articles on the topic of safety culture available within DOE OPEXShare, https://doeopexshare.doe.gov, the central repository for operating experiences, lessons learned, and best practices across the DOE complex. Registration is required, but free and available to DOE affiliated contractors.</p>

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Topic 4: Safety Culture Assessments

A reliable baseline assessment of an organization’s existing safety culture is necessary before initiating a process to evaluate and advance that culture and thus achieve optimal performance. DOE, Oak Ridge Associated Universities, commercial nuclear organizations, and others have provided a good foundation for understanding the safety culture assessment process that should be conducted on a routine basis. Topic 4 outlines the basic quantitative and qualitative components of a safety culture assessment and offers the safety culture practitioner a variety of useful resources.

Category	Content
Competency	Become familiar with the strengths and weaknesses of available safety culture assessment methodologies and begin to develop the ability to interpret safety culture assessment results.
Objectives	<ol style="list-style-type: none"> 1. Strengths and limitations of safety culture assessment methodologies. Understand the strengths and limitations of possible safety culture assessment components: <ul style="list-style-type: none"> • Surveys • Focus groups • Interviews • Field observations • Documentation reviews 2. Safety culture assessments. Explain the steps in developing and administering culture assessments. 3. Safety culture assessment team. Be familiar with assessment team dynamics and expectations for facilitating group discussions of emerging themes. 4. Safety culture assessment results interpretation. Understand what factors to consider when interpreting safety culture assessment results.
References	<p>American Association for Public Opinion Research. 2022. “Best Practices for Survey Research,” Accessed August 2022. https://www.aapor.org/Standards-Ethics/Best-Practices.aspx.</p> <p>DOE Office of Enterprise Assessments. 2014. <i>CRAD 30-08, Rev. 0, Safety Culture Assessment Criteria and Review Approach Document - December 7, 2021</i>.</p> <p>DOE Office of Enterprise Assessments. 2021. <i>Independent Oversight Evaluation of Line Self-Assessments of Safety Conscious Work Environment</i></p> <p>EFCOG. 2015. <i>Guide to Safety Culture Evaluation</i>.</p> <p>Fleming, Mark, Harvey, Keri, and Bowers, Kate C. 2022. “Development and testing of a nuclear regulator safety culture perception survey,” <i>Safety Science</i> (153), https://doi.org/10.1016/j.ssci.2022.105792.</p> <p>Fleming, Mark. 2000. <i>Offshore Technology Report 2000/049, Safety Culture Maturity Model</i>. Edinburgh, Scotland: The Keil Centre.</p>

Category	Content
	<p>IAEA. IAEA-TECDOC-1321, <i>Self-Assessment of Safety Culture in Nuclear Installations Highlights and Good Practices</i>. Vienna: IAEA.</p> <p>IAEA. 2017. IAEA Safety Culture Perception Questionnaire for License Holders. Working Document. Vienna: IAEA.</p> <p>Interaction Design Foundation. n.d. “How to Conduct Focus Groups.” Accessed August 2022. https://www.interaction-design.org/literature/article/how-to-conduct-focus-groups.</p> <p>King, Adrienne and Hammond, Davyda. 2021. <i>Best Practice 240: Strategy and Design for Internal Surveys Facilities</i>. EFCOG, accessed September 2022, https://doeopexshare.doe.gov/lesson/38024.</p> <p>Mkrtchyan, L. and Turcanu, C. 2012. BLG—1085, <i>Safety Culture Assessment Tools in Nuclear and Non-Nuclear Domains</i>. Belgium: Belgian Nuclear Research Center SCK-CEN Belgium.</p> <p>Miller, J., Hammond, D., & Smith, D. 2016. <i>Guide for Collecting and Analyzing Qualitative Data for Safety Culture Evaluations</i>. Oak Ridge, TN: Oak Ridge Associated Universities.</p> <p>Miller, J. and Taylor, R.T. 2014. Guide for Developing and Using Safety Culture Questionnaires. Oak Ridge, TN: Oak Ridge Associated Universities.</p> <p>National Academies of Sciences, Engineering, and Medicine. 2016. Chapter 6: Implementing Change in Offshore Safety Culture, from <i>Strengthening the Safety Culture of the Offshore Oil and Gas Industry</i>. Washington, DC: The National Academies Press. https://doi.org/10.17226/23524.</p> <p>NRC. n.d. ML071830168, “Interview Techniques for Assessing Safety Culture” Accessed August 2022. https://www.nrc.gov/docs/ML0718/ML071830168.pdf.</p> <p>Roller, M. R., & Lavrakas, P. J. 2015. <i>Applied Qualitative Research Design: A Total Quality Framework Approach</i>. New York: The Guilford Press.</p> <p>Scheuren, Fritz. 2004. What is a Survey (2nd ed.). Washington, D.C.: American Statistical Association.</p>

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Topic 5: Data Sources to Provide Insight into Safety Culture Changes

It is well-established that an organization’s culture affects its performance. An astute safety culture practitioner, therefore, can glean insights into an organization’s culture by using the variety of available data resources that track aspects of organizational performance. Topic 5 provides suggestions and references to help the safety culture practitioner in this endeavor.

While there are no direct safety culture metrics,¹ a multitude of data sources provide rich context. These data sources include: issues management program data, corrective action plan data, regulatory communications, safety culture assessments, industry evaluations, safety committees, employee surveys, ombudsman office feedback, and human resources data (e.g., exit and stay interviews, and retention numbers). These data sources, properly mined and distilled, may provide insights on the evolution of the organization’s safety culture at any given point in time.

Category	Content
Competency	Learn how to leverage management processes as data trending sources for identifying safety culture-related changes.
Objectives	<ol style="list-style-type: none"> Endorsed safety culture attributes. Have a working understanding of the organization’s endorsed safety culture attributes. Integrated safety culture attributes. Understand how safety culture attributes are integrated into the management processes used to identify and track issues and trends. Data collection tools. Understand how to use process tools to collect and extract useful safety culture data to add value to trend analyses.
References	<p>DOE. 2016. SCIP-16-001, <i>Safety Culture and Monitoring Means</i>. Washington, D.C.: DOE Safety Culture Improvement Panel.</p> <p>———. 2018. DOE P 450.4 Chg 1, <i>Integrated Safety Management Policy</i>. Washington, D.C.: DOE.</p> <p>———. 2019. DOE O 232.2A, <i>Occurrence Reporting and Processing of Operations Information</i>. Washington, D.C.: DOE.</p> <p>———. 2020. DOE O 414.1D Chg 2, <i>Quality Assurance</i>, Attachment 1, “Contractor Requirements Document.” Washington, D.C.: DOE.</p>

¹ Renowned DOE Safety Culture and High Reliability Organization Advisor (retired), Earl Carnes, explains the challenge: “In our zeal to quantify, analyze, systematize and proceduralize, we risk overlooking an essential truth; culture is but a construct, a lens through which we may notice and contemplate our fundamental humanity. Culture is not a property, not a set of attributes we can manipulate, dissect and reconstruct. Culture is rather ‘the medium of lived experience’—a manifestation of relationships, psychological processes, and communication—a resultant not an antecedent. The discussion of safety culture is but our most recent attempt to understand the human relationships with our technologies, how we create them, how they in turn shape us. It is not a linear predictable projection, rather an eternal dance of discovery and reinvention. As we seek to understand how we as technical professionals co-create technical marvels to improve the human condition, let us not forget that we design technology so it may serve us, not that we may serve technology. Let us keep humanity as our focus, careful that we not reduce that which makes us human to some mechanistic model, and always honor the mystery of who we are and how we together create our experiences.” Earl Carnes, “Organizational Factors & Safety Culture: A Human Centric Perspective,” presented at the American Nuclear Society Winter Meeting and Nuclear Technology Expo, “Influences Organizational Factors and Safety Culture on Risk of Technical Systems” on November 12, 2013.

Category	Content
	<p>——. 2021. DOE G 450.4-1C, <i>Integrated Safety Management Guide</i>, Attachment 10, “Safety Culture Focus Areas and Associated Attributes.” Washington, D.C.: DOE.</p> <p>——. 2022. DOE O 226.1B Chg 1, <i>Implementation of Department of Energy Oversight Policy</i>, Attachment 1, “Contractor Assurance System.” Washington, D.C.: DOE.</p> <p>Carleton, J. R. and Lineberry, C. 2003. <i>Achieving Post-Merger Success: A Stakeholder’s Guide to Cultural Due Diligence, Assessment, and Integration</i>. Hoboken, NJ: John Wiley & Sons.</p> <p>EFCOG. 2006. <i>White Paper: Extent of Condition Evaluations</i>. EFCOG Price-Anderson Amendments Act Working Group.</p> <p>——. 2017. <i>Guide to Monitoring and Improving Safety Culture</i>. Washington, D.C.: EFCOG Safety Management Working Group. EFCOG - Guide to Monitoring and Improving Safety Culture, revision 1 (2020).</p> <p>——. n.d. “EFCOG Safety Culture Task Team.” Accessed August 2022. https://efcog.org/safety/integrated-safety-management-subgroup/safety-culturehro-task-group/.</p> <p>INPO. 2012. INPO 12-012, <i>Traits of a Healthy Nuclear Safety Culture</i>. Atlanta, GA: INPO.</p> <p>Site-specific policies, procedures, and guidance used to identify and manage safety culture issues (e.g., event reporting, assessments, and causal analysis).</p>

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Topic 6: Monitoring Safety Culture and Engaging Influencers

Based on the results of culture assessments and insights gleaned from other data sources, plans are put in place to sustain and improve an organization’s culture for safety. It is important to provide managers with information describing whether these improvements are having the desired effect (i.e., improving the work environment such that the organization’s culture will better reflect those values that managers have deemed desirable). Topic 6 introduces, via references, techniques the safety culture practitioner can use to monitor indicators of safety culture change in between full culture assessments.

Category	Content
Competency	Become familiar with tactics for monitoring a safety culture while continually striving toward a healthy safety culture.
Objectives	<ol style="list-style-type: none"> 1. Roles, responsibilities, accountabilities, and authorities. Understand the roles, responsibilities, accountabilities, and authorities of those individuals involved in safety culture improvement (e.g., a site-specific safety culture improvement team, or equivalent, or the DOE Safety Culture Improvement Panel). If there is no established point of contact, talk to site leadership. 2. Site-specific requirements. Understand the local DOE field office’s expectations and contractor requirements relative to safety culture. 3. Safety culture sustainment strategy. Be familiar with the organization’s safety culture sustainment strategy (plan). 4. Safety culture metrics. Understand existing site-specific metrics used to monitor safety culture changes. 5. Safety culture trend evaluation. Understand the methods used to monitor the safety culture and evaluate changes in trends that have the potential to impact the organization. 6. Safety culture data interpretation. Develop the skill set necessary to interpret data and gain insights into the organization’s safety culture in order to provide recommendations to leadership and communicate with the workforce. 7. Change management. Understand the advantages of effective change management to support organizational changes.
References	<p>Campbell Institute, The. n.d. “Research – White Papers.” Accessed August 2022. https://www.thecampbellinstitute.org/research/.</p> <p>DOE. 2015. <i>SCIP-16-001, Safety Culture and Monitoring Means</i>. Washington, D.C.: DOE Safety Culture Improvement Panel.</p> <p>———. 2016. <i>SCIP-16-001, Safety Culture and Monitoring Means</i>. Washington, D.C.: DOE Safety Culture Improvement Panel.</p> <p>———. 2020. <i>Assessment of Safety Culture Sustainment Processes at U.S. Department of Energy Sites</i>. Washington, D.C.: DOE Office of Enterprise Assessments.</p>

Category	Content
	<p>——. 2022. <i>Tailoring the Analysis of Safety Culture Health</i>. Washington, D.C.: DOE Safety Culture Improvement Panel.</p> <p>——. n.d. “Safety Culture Improvement Panel.” Accessed August 2022. https://www.energy.gov/safety-culture/safety-culture-improvement-panel.</p> <p>EFCOG. 2015. Best Practice 181, <i>Safety Culture Monitoring Process/Panel</i>.</p> <p>——. 2015. <i>Guide for Collecting and Analyzing Qualitative Data for Safety Culture Evaluations</i>.</p> <p>——. 2017. <i>Guide to Monitoring and Improving Safety Culture</i>. Washington, D.C.: EFCOG Safety Management Working Group. EFCOG - Guide to Monitoring and Improving Safety Culture, revision 1 (2020).</p> <p>——. n.d. “EFCOG Safety Culture Task Team.” Accessed August 2022. https://efcog.org/safety/integrated-safety-management-subgroup/safety-culturehro-task-group/.</p> <p>INPO. 2012. <i>INPO 12-012, Traits of a Healthy Nuclear Safety Culture</i>. Atlanta, GA: INPO.</p> <p>NEI. 2014. <i>NEI 09-07, Revision 1, Fostering a Healthy Nuclear Safety Culture</i>. Washington, D.C.: NEI.</p>

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Topic 7: Successful Practices for Improving Safety Culture

If the collective organization is not continually striving to improve its safety culture, there is a good chance the organization will drift away from desired behaviors. The safety culture practitioner plays a vital role in helping an organization in sustaining this ongoing journey. Topic 7 highlights some methods the safety culture practitioner can use to strengthen and maintain an organization’s safety culture.

Category	Content
Competency	Understand and demonstrate the ability to identify, adapt, apply, and evaluate safety culture successful practices for the organization.
Objectives	<ol style="list-style-type: none"> 1. Safety culture issues. Learn how to identify and define site-specific safety culture issues. 2. Successful practices identification. Learn how to identify best practices to strengthen the organization’s safety culture. 3. Successful practice adaptation. Learn how to adapt a best practice so that it may be applied within the organization. 4. Successful practice application. Learn how to apply an adapted best practice within the organization. 5. Successful practice effectiveness evaluation and adjustment. Learn how to evaluate the adapted practice’s effectiveness and make adjustments based on feedback to sustain the safety culture.
References	<p>DOE. n.d. “Building Safety Culture into the Department’s DNA.” Accessed August 2022. https://www.energy.gov/safety-culture/doe-safety-culture.</p> <p>DOE. 2011. <i>DOE G 450.4-1C, Integrated Safety Management Guide</i>, Attachment 12, “Changing Values and Behaviors.” Washington, D.C.: DOE.</p> <p>DOE. 2013. <i>Analysis of ISM Activity-level Work Planning and Control Within DOE</i>. Washington, D.C.: DOE Office of Analysis, Office of Health, Safety and Security.</p> <p>DOE. 2014. <i>Independent Oversight Follow-up Assessment of Safety Culture at the Waste Treatment and Immobilization Plant</i>. Washington, D.C.: DOE Office of Environment, Safety and Health Assessments, Office of Independent Enterprise Assessments.</p> <p>DOE OPEXShare. n.d. “Operating Experience, Lessons Learned, Best Practices.” Accessed August 2022. https://doeopexshare.doe.gov/.</p> <p>EFCOG. n.d. “Safety Working Group: Best Practices.” Accessed August 2022. https://efcog.org/safety/.</p> <p>INPO. 2012. <i>INPO 12-012, Traits of a Healthy Nuclear Safety Culture</i>. Atlanta, GA: INPO.</p> <p>NEI. 2014. <i>NEI 09-07, Revision 1, Fostering a Healthy Nuclear Safety Culture</i>. Washington, D.C.: NEI.</p>

Category	Content
	<p>Nuclear Energy Agency. 2021. NEA No. 7535. <i>Methods for Assessing and Strengthening the Safety Culture of the Regulatory Body</i>. OECD.</p> <p>Rittel, H. W., and M. W. Webber. 1973. “Dilemmas in a General Theory of Planning.” <i>Policy Sciences</i> 4: 155–169.</p> <p>Schein, E. H. and Schein, P. A. 2021. <i>Humble Inquiry: The Gentle Art of Asking Instead of Telling</i> (2nd ed.). Oakland, C.A.: Berrett-Koehler.</p> <p>Schein, E. H. 2010. <i>Organizational Culture and Leadership</i> (4th ed.). Hoboken, NJ: Wiley.</p> <p>Schobel, Markus, et al. 2022. “Human and organizational factors in European nuclear safety: A fifty-year perspective on insights, implementations, and ways forward,” <i>Energy Research & Social Science</i> (85).</p>

Appendix. Guidance and Considerations for Safety Culture Communication

A new safety culture practitioner, especially one who may also be new to the DOE complex, will need to establish communication channels within the organization and externally. There are several reasons for an organization's safety culture practitioner to initiate a new or ongoing communication campaign, such as:

- Address specific challenges impacting the culture, such as COVID-19, major site-specific incidents or issues, or generational turnover in the workforce.
- Promote data collection methods, such as all-employee surveys or focus groups, either internally or externally conducted.
- Ensure employee familiarity with safety culture concepts, such as SCWE, and the safety culture focus areas and associated attributes from DOE G 540.4-1c, *Integrated Safety Management System Guide*, Attachment 10.

A clear, documented plan for communications initiatives—including who will be doing the communicating (particularly those situations with potential legal repercussions)—helps to maintain message consistency and clarity. Communications plans can assist in explaining processes and products to external oversight as well.

Note: The safety culture scope is often established in an organization's worker safety and health department, employee concerns program, or organizational excellence department (the latter is common in those companies that establish their contractor assurance system separately from their quality assurance program). It is also common for human resources departments to own organizational culture as part of employee morale; retention; or diversity, equity, and inclusion initiatives. Regardless of which department owns safety culture program responsibilities, it is important to build bridges with other organizations with related missions.

Interrelated Programs and Departments

Due to the overlap between safety culture and other concepts, it is recommended that communications initiatives be coordinated with other like programs. Depending on the contractor, these may include:

- **The behavior-based safety program**, often owned by the safety organization, is a peer-observation based program that is intended to engage workers in improving safety practices and work planning and decrease accidents and injuries.
- **The contractor assurance systems organization** usually owns the company's performance dashboard (tracking metrics) and may oversee mechanisms to track the efficacy of safety culture initiatives (e.g., "Has the rate of issues reported to issues management program personnel been affected by a recent focus on a questioning attitude?").
- **Diversity, equity, and inclusion initiatives**, usually owned by the human resources organization, often includes either data collection and analysis or worker interface forums (or both) that augment information pertaining to the organization's culture.
- **The employee concerns program** focuses on an SCWE and serves as an avenue for raising issues. Effective partnership with employee concerns program personnel can provide the practitioner an additional data source on emerging issues that may require initiatives or communications.
- **The environmental management system**, usually owned by an environmental programs department, includes elements that touch on safety culture and integrated safety management and may benefit from collaboration (e.g., OPEXShare article, "Systematic Integration Best Practices" (2019), <https://doeopexshare.doe.gov/lesson/27997>).
- **Human performance improvement initiatives**, often owned by the safety organization, focuses

on reducing and mitigating errors, and incorporate culture components such as a culpability matrix that addresses issues constructively rather than blaming individual workers. This supports SCWE.

- **The integrated safety management system**, often owned by the safety organization, includes guiding principles that overlap with safety culture concepts, and, like an environmental management system, may be relevant to safety culture concepts and initiatives being promoted. Including initiatives (communication or otherwise) in the integrated safety management system annual performance objectives, measures, and commitments to DOE can elevate the visibility of such activities with both managers and the customer (i.e., the local DOE field office).
- **A voluntary protection program**, often owned by the safety organization, is intended to develop worker engagement in safety, work planning, and hazard identification. A voluntary protection program will have a steering committee that can be tapped for input on safety culture initiatives, which can be especially important in building buy-in with a largely union workforce.
- **The communications (or public relations) department** should be able to assist with branding and messaging (i.e., developing logos, posters, a web presence, all-employee emails, photography, and videography) as well as with helping the safety culture practitioner navigate requirements such as the public release process or reprographics contracts.
- **The information technology (IT) department** can provide guidance on website maintenance and other IT topics. **Note:** Some companies subcontract IT support functions, especially reprographics. Ensure that costs associated with such support (including charge code numbers or subcontracts) are established during the planning phase for any new safety culture initiative.

Safety Culture Communications with Internal Audiences

Safety culture practitioners primarily communicate internally with employees and senior leaders:

- **Employees.** It is important to communicate culture information with employees effectively. Especially in the case of surveys or emerging issues for which employee input has been solicited, having a full loop of “we want to hear from you” and “this is what we heard from you and when we’ll ask again” can establish credibility with the workforce and improve survey response rates. **Note:** Communication to employees often requires coordination with a variety of entities. For example, COVID-19 information required coordinated efforts with DOE, and communication usually came from managers in collaboration with the safety and legal departments.
- **Senior leaders and managers.** It is important that the safety culture practitioner establish trust and credibility with management, which may come in the form of a senior leader champion or sponsor. Ideally, the safety culture practitioner has a standing forum, such as a safety culture monitoring panel, that supports ongoing communication. (See NEI 09-07, *Fostering a Healthy Nuclear Safety Culture*, and EFCOG Best Practice 181, *Safety Culture Monitoring Process/Panel* for guidance; both are cited in Topic 6).

Safety Culture Communications with External Audiences

Safety culture practitioners primarily communicate with the following three external customers:

- **DOE field office personnel.** As contract direction for safety culture becomes more common, establishing regular communications with local oversight and providing transparency into initiatives and communications is beneficial.
- **DOE Safety Culture Improvement Panel.** The Safety Culture Improvement Panel is the DOE safety culture monitoring panel. While this panel is run by and for federal employees, information on safety culture is disseminated to contractors via monthly and annual meetings.
- **EFCOG.** EFCOG participation is voluntary, but, in conjunction with the Safety Culture Improvement Panel, this group can ensure that a contractor's organization is in alignment with industry standards and best practices.