RECOMMENDATIONS FOR ESTABLISHING PROCESS SAFETY INVESTIGATION BOARDS

November 14, 2014

Executive Summary

Global population growth and the associated growth in the production of goods and services provided by high-hazard process industries require increasingly stronger safety systems that reduce the potential for catastrophic failures. One contribution toward enhancing safety is to expand the number of national Process Safety Investigation Boards (PSIBs). As recent experience has shown, PSIBs can: investigate catastrophic events resulting in severe damages; identify their circumstances and causes; recommend specific ways to prevent their recurrence; communicate with audiences vulnerable to experiencing similar incidents; and coordinate with other relevant governmental agencies and the private sector to strengthen the policies and practice of process safety. A knowledgeable, skilled, diverse board selected by high-level, public officials and subject to limited terms, can help ensure performance and accountability for the PSIB and its more permanent, hired expert staff who establish and maintain the

Key factors critical to the success of a PSIB include:

Create a high performance organization

Create a board with a sufficient number of qualified members with diverse backgrounds. Board members should have the nJETBTTJ1 144.1-3(a)-3(ckg)unacn

- Technical skills include a deep knowledge of process safety and the process of root cause investigation.

Define clear scope of investigations

- Identify reliable methods to learn the occurrence of incidents and means to track incident statistics
- Establish clear criteria to define which incidents to investigate, and mechanisms to choose between incidents when resources are constrained
- Define a clear scope of investigations

Ensure high-quality investigations

- Conduct in-depth investigation to identify root causes and contributing causes, either of individual incidents or groups of similar incidents
- Be timely in completing investigations and reporting findings
- Issue recommendations that are supported by evidence to the parties best placed to respond, and track recommendations to resolution. Such recommendations may address regulations, enforcement, consensus standards, industry guidelines, practices at the company whose incident is being investigated, and others relevant to improvements to process safety

Operate effectively and efficiently

- Create trust among government, industry, labor, public, and other stakeholders
- Increase efficiency by partnering with other national and local agencies and with industry to maximize the accumulation and communication of lessons learned
- Streamline investigations by pre-establishing mechanisms with other national and local agencies to provide investigators with access to the site as soon as feasible

Share lessons learned

- Issue communications which inform stakeholders of lessons learned and maintain continued awareness

Support the mission of the Board with policies that encourage cooperation

I. Introduction

Process industries support essential economic and social development. They have vast impacts that are felt locally, nationally and globally. However, businesses dependent on highly hazardous materials and processes operate with the daunting challenge of preventing catastrophic incidents. While incidents are relatively rare, a single catastrophic event, like that experienced by the Union Carbide pesticide facility in Bhopal, India, in 1984; the Phillips plastics facility along the Houston Ship Channel in T

also encompassed the adequacy of DOT regulations and the performance of regulators and all other aspects of the system of transportation safety. NTSB has no authority to regulate, fund, or be directly involved in the operation of any mode of transportation.

NTSB has investigated more than 100,000 aviation accidents and thousands of surface transportation accidents and has issued more than 10,000 safety recommendations to more than 2,500 recipien
conducting thorough, accurate, unbiased and independent investigations and for producing timely, well-considereTJEdrecipipendatioons tortadas ie oftateorta3(n)-3(s)8(a)6(f)-11(e)-3(

health and safety standards, as well as other requirements, relating to the design, construction, operation, and decommissioning of nuclear facilities.[6]

In India, the Oil Industry Safety Directorate, a technical directorate under the Ministry of Petroleum and Natural Gas, formulates and coordinates the implementation of a series of self-regulatory measures aimed at enhancing process safety in the oil and gas industries.[7] OISD is staffed by a small core group of technical experts of diverse disciplines on deputation from industry, and has the responsibility to analyze incidents in the oil and gas industries to identify root causes and formulate remedial action plans.

Finally, corporations can also impanel and provide independent experts to investigate catastrophic incidents and broadly communicate their results. After the 2005 explosion and fire at its Texas City refinery that claimed the lives of 15 workers and injured more than 170 more, British Petroleum (BP) commissioned former U.S. Secretary of State James A. Baker, III, to chair an independent panel that reviewed and made recommendations for improving safety management systems and the corporate safety culture at BP Products North America, Inc., the subsidiary responsible for the [8] Such efforts can impact the system of safety far beyond the nation where an incident occurred. [9]

Where an incident, pattern of incidents or other analyses identify a significant gap in safety information, PSIBs may conduct, commission or stimulate special research into the sources of systemic weakness and identify ways to reduce their potential role in process-related catastrophic events. Safety studies can evaluate topics such as the effectiveness of, or need for, actions by a government agency in reducing losses from process incidents, technical aspects of particular processes, or analysis of incident data. Safety studies also lend themselves to gathering broader input from a wider number of stakeholders than might occur with a single incident investigation. The study results in the issuance of a narrative report on the facts, conclusions and any applicable recommendations.

PSIB

incident reporting system that is designed to serve many public needs, such as emergency response, and ensuring compliance with governmental standards and regulations administered through inspectorates/regulatory agencies. Consequently, PSIBs have a special need to ascertain and assure the adequacy of the system of reporting for process incidents subject to its immediate investigative efforts. PSIBs also rely upon effective reporting systems to discern which process sectors are most prone to failure and which incident types more commonly occur in many different process industries. Where needed and as communication systems evolve, PSIBs have a role in proposing systemic improve

governmental body, such as a legislative branch, then new board members begin executing their PSIB responsibilities with very high public confidence.

PSIBs are best populated when their authorizing policies define the technical skills, knowledge and experience needed by members to render decisions about investigations and recommendations. Board member competencies for nomination and confirmation rely on a balance of specified mandatory and desirable skills: formal education, experience, professional standing, and demonstrated knowledge in the fields of catastrophic incident reconstruction, chemical engineering, safety engineering, human factors science or process safety regulation.

While individual board members may be well qualified to serve as members, the success of the institution requires that nominating and approving authorities also ensure board membership diversity
and recommendations depends upon the board as a whole commanding a wider range of knowledge, expertise and relationships with key stakeholders. PSIBs will be weak if, collectively, the board members reflect a narrow range

safety recommendations generated before their arrival, as well as to assist with and complete new investigations. Since term renewal is subject to the same formal, transparent nomination and approval process, candidates seeking renewal allow many others to evaluate performance of the individual and of the board as a whole during their tenure. Furthermore, since the five-year term may exceed the tenure of the nominating executive and many others involved in the approval process, renewal will bring broader, new perspective to the roles and responsibilities of the PSIB. Staggering the terms of individual board members also creates the opportunity for measured renewal of leadership without threatening organizational continuity.

and senior staff executives, whistle-blower protections can enable hired staff to present evidence of inefficiency, neglect, or malfeasance within PSIB leadership.

While multiple board members with great expertise can help ensure the quality of investigations and recommendations and grow public trust in the PSIB, defining the _____ improves the efficiency of essential technical, legal, administrative and communication functions by staff. PSIBs generally are guided by policies that authorize one board member to serve as board chair, often with assignment of that title

ultimately is determined by the hired technical staff and is measured by the quality and timeliness of their detailed investigative work, insightful safety recommendations, and effective collaboration with key stakeholders. They and other essential staff who provide legal, fiscal, administrative and communication support, sustain the organization.

What key aspects should be considered in forming the PSIB organization?

Similar to the competencies for filling board positions, PSIBs must be staffed in ways that maintain and grow technical investigative and safety expertise. Investigation and safety recommendation staff need to be technically expert in relevant fields and collectively even more diverse than the board members in experience and knowledge of process safety. Strategic hiring ensures that the staff possesses professional standing and demonstrated knowledge in preventing catastrophic process safety incidents. Staff should have special skills, such as catastrophic incident reconstruction, chemical engineering training with operational and safety experience, as well as expertise in human factors, mechanical integrity and reliability, process hazards analysis and process safety regulations, standards and best practices. Effective annual training of technical staff can maintain and grow expertise.

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associations[12] and other private sector organizations that might set domestic or international standards for equipment, operations and best practices relevant to process safety. PSIB staff collaborates and coordinates with standard-setting organizations to better understand their current and long-term capacity to strengthen process safety through improvements in standards, best practice guidelines, regulations and compliance enforcement.

PSIB staff establishes administrative procedures to conduct business, such as hiring processes, staff evaluations, setting salaries and bonuses, ensuring compliance with broad governmental policies, proposing and administering contracts, leases, etc. Staff develops the legal framework that enables board members, chair and the board as a whole to work effectively. Possessing more intimate knowledge of, and interactions with, other relevant governmental agencies, PSIB staff also will plan, implement and update memoranda of understanding (MOUs) with others who can assist PSIBs in fulfilling technical and administrative roles. Particularly during its early development, a PSIB may need to draw upon resources from occupational safety and health and environmental protection inspectorates/regulatory agencies, professional engineering and safety organizations, industrial process safety experts, etc., to initiate investigative activities until more permanent staff and resources become available. Staff brings awareness of the expertise needed to augment its capabilities, where such contract talent is located, and how to engage it in ways that ensure the integrity of contracted work. Further, PSIB senior staff knows what expertise to maintain and nurture as in-house staff and which should remain contracted resources.

Finally, PSIBs have urgent needs to benchmark infrastructure and performance with the highest performing safety investigation boards. Such comparisons include regular assessments of staff expertise, experience and training, as well as the competency and timeliness of core products, the effecti
stakeholders, and the quality and competency of legal, administrative, financial and communication efforts.

[12] For example, see: http://www.api.org/publications-standards-and-statistics

VI. Other Key Concepts Relevant to Forming Process Safety Investigation Boards

What other issues should be considered in forming Process Safety Investigation Boards?

PSIBs are best established when public officials create PSIBs through legislation. Proposing specific authorizing policies, seeking broad public input, weighing alternative policy options and, ultimately, approving a PSIB through law, enhances the visibility, support for and accountability of the institution. Statutes specify the PSIB structure, define roles and responsibilities of board members and chair, articulate key board functi

safety organizations, such as inspectorates/regulatory agencies. Some nations start the process of forming PSIBs by first commissioning special *ad hoc* expert panels when a major catastrophic incident occurs in a hazardous process sector.[13] Successful experiences with specially chartered independent investigations can build national confidence and demonstrate the need for and ability to-- establish a permanent PSIB.

The breadth and scope of process industries can be so large that new PSIBs might be unable to meet the technical and economic challenges of investigating many major catastrophic incidents,

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such special expert staff. However, other governmental agencies, national laboratories, other PSIBs, universities and private entities involved with process safety may retain the