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Managing the Health and Safety Impacts of Organizational Change

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Foreword

This document has been produced by the process safety management division of the Canadian Society for Chemical Engineering in conjunction with the process safety management committee of the Canadian Chemical Producers' Association. It is sincerely hoped that the information in this document, which provides introductory guidelines for users to consider and not standards or procedures that must be followed, will lead to an even better safety record for the process industries of Canada.

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1. Introduction

This document provides guidance for Canadian process industries on how to manage the health and safety aspects of organizational change. The process described is only one method of addressing the issue of organizational change.

Organizational change is a normal and inevitable part of business life. It is an opportunity to improve business performance and can improve safety and health performance if properly implemented. If not properly planned, assessed and implemented, organizational change can result in not only reduced business performance but – more importantly – reduced health and safety performance and even significant hazardous events.

Management of change is recognized as a key element in the control of major accident hazards, and management of change for changes to process, technology, equipment, etc. is well established for the process industries. Changes to facility organization and personnel can have an equivalent effect upon the safety and health of a facility and yet such changes are not as well addressed. Such changes include:

- Reorganization or re-engineering
- Downsizing of the workforce
- Attrition and ageing of the workforce
- Outsourcing of critical services under contract
- Changes affecting the competence or performance of other organizations providing critical services under contract (e.g. equipment design, process control soft ware, hazard and risk assessment)
- Loss of skills, knowledge or attitudes as a result of the above

2. Scope

This guideline is intended to help manufacturing facilities assess the health and safety effects of organizational change. It applies to changes in positions and functions considered to be safety critical. These would be positions through which the exercise of normal roles and responsibilities can directly, by lack of awareness, lack of training or negligence, cause a major incident involving a fatality, fire, explosion, toxic release or community impact. Examples are positions related to the safe design, operation and maintenance of a plant and may include operators, line management and also support staff such as engineers, maintenance, safety and

emergency response and contractors performing safety critical work. It does not generally apply to administrative personnel or groups not related to production that have no impact on the safe operation of a process. (e.g. cost accounting), though caution is advised in ensuring that there are no significant indirect safety and health effects as responsibilities are transferred to others or eliminated.

This document has been prepared to meet the needs of both significant changes and small changes. It applies to temporary changes as well as permanent changes and may also be applied to the assessment of environmental or quality effects.

3. The Need to Manage Organizational Change

Organizational change is an opportunity to improve business performance and also safety and health performance. Without planning and analysis, organizational change may result in inadvertent reduction of emphasis on safety and health, loss of established formal and informal safety processes, loss of critical knowledge and expertise or lack of sufficient personnel to safely operate and maintain a process. These can result in deterioration of performance and significant hazardous incidents.

Organizational changes can affect the safe operation of a facility in a multitude of ways. Staff reductions can lead to inadequate personnel to respond to and manage unusual events or to maintain a process in a safe condition. Reductions in personnel or increases in responsibility can lead to increased fatigue and stress, resulting in reduced reliability and the introduction of errors and compromising shortcuts. Loss of knowledge or expertise can affect operations, maintenance, design or the ability to diagnose and respond to unsafe situations. Organizational changes can lead to changes in safety culture, and unintentional reduction in safety emphasis. Organizational changes can impact the behaviour and performance of people in critical functions, and plants must therefore have systems to monitor and control organizational effectiveness. Even planned improvements can compromise organizational integrity if their function and purpose is not fully understood.

As companies continue to streamline staffing, there comes a point beyond which any further reductions can have serious safety implications. This may not be apparent under normal operation but in an emergency, if staffing levels and/or staff experience levels are too low, a minor problem could easily escalate to become a major incident. Special care should be taken to assure that staffing plans are not inadvertently based on overlapping staff assignments.

Decisions about organizational changes and staffing levels are often made by high level management without consultation or awareness of safety and health implications as such changes are often considered to be confidential. As a consequence, the change can have a negative safety or operability impact.

Failure of the management of organizational change is now increasingly being identified as a contributing cause in a number of significant incidents (e.g. Bhopal 1984, the space shuttle Challenger 1986, Esso Longford 1998, Hickson & Welch 1992, BP Grangemouth 2000)

The importance of managing organizational change has been increasingly recognized and guidelines of varying depth have been issued by several organizations including the Center for Chemical Process Safety, The Chemical Manufacturers Association (now the American Chemistry Council), the United Kingdom Health and Safety Executive, Contra Costa County in

California, FM Global and the Canadian Chemical Producers' Association through the Responsible Care initiative.

There is a strong case that effectively managing the health, safety and environmental effects of organizational change will have a good financial payback – it is simply good business.

4. General Requirements of Organizational Change Management

No standard method exists for the evaluation of organizational changes. Each company will need to develop its own policies, procedures and guidelines as appropriate for its company culture. Begin with senior management commitment. This is critical to make the program a success as there will be resistance to the need to manage organizational change and the increased time and discipline involved. It will not be a priority without senior management commitment. Consider having a senior corporate manager act as a champion to support and drive the program, ensuring that the safety aspects of the change receive an appropriate level of resources and attention.

Written guidance in the form of a corporate standard should be developed. The standard should begin with a clear policy stating the principles, commitment and accountability of the organization. The policy should commit to proportionate consideration of all organizational changes, large and small, as even those not at first connected to safety need to be given consideration to confirm whether or not they have indirect impacts on safety.

There should be a procedure that involves risk assessment, development of action plans and follow up to ensure completion. Management approval is needed at appropriate stages. The standard should include the requirement for periodic auditing to ensure compliance and for improvement of the process.

The assurance of an adequate number of qualified personnel is an important and difficult issue. It is recommended that a policy for minimum staffing and experience level be developed for each process unit. The required minimum knowledge and experience level should be developed for all critical positions. Certify through testing that individuals have reached such levels before they are permitted to cover a position totally on their own. Minimum staffing can be assessed by identifying and analyzing the actions that must be taken by an individual in both normal and abnormal or emergency situations. Ensure that the total number of positions is adequate to deal with all forseable events. A good approach would be to identify possible emergency events, develop detailed procedures to handle such events and identify the actions required by specific positions or workers in those events. Verify that individuals can complete their responsibilities in a reasonable amount of time. The conduct of a field “dry run” would assist in making this assessment. If the workforce is being reduced, such responsibilities and actions must be redistributed and an analysis conducted to ensure the required actions can continue to be completed as required to handle the scenario. Such analysis could lead to a review of procedures or introduction of additional automation or hardware. When staffing experience in a unit becomes too low, certain measures should be initiated, such as increased training, the temporary retention of transferees, or the use of retirees as temporary consultants.

Other factors to consider are:

- Involve all concerned at an early stage. They have unique knowledge of what their work involves and how it is really done. This may include contractors.

- Efforts and resources should be proportionate to the complexity of the change, the scale of the hazards concerned and the degree to which the change may impact on the management of major hazards.
- Include review by independent internal or external experts. Those making decisions may lack objectivity. This might be because of enthusiasm for a particular plan, pressures from higher management, cost pressures or simply the stress of high workload and uncertainty. Decision makers should be careful to analyze information and views carefully and have an independent challenge.

Companies should have in place procedures or practices to make the transition more successful. This would include identification of critical and key skills and knowledge for all personnel and training matrices.

5. The Organizational Change Management Procedure (see flowchart)

As stated earlier, each organization should develop its own procedures for managing organizational change. The following is a process that companies may use to assist in the development of their procedure.

The main steps of the Organizational Change Management Procedure are as follows:

i) Identification of the Change
ii) Preliminary Screening
iii) Preliminary Plans
iv) Risk Assessment
v) Development / Approval of Action Plans
vi) Implementation
vii) Final Assessment and Close Out

i) Identification of the Change

The first step is to identify and understand the nature and scope of the pending change so that an effective assessment can be conducted. Provide a description of the change and identify the scope, purpose, and potential timing of the change. Identify if it is a temporary or permanent change.

ii) Preliminary Screening of safety and health Impacts

Preliminary screening can be accomplished through identification of the personnel or positions affected by the change and the type of change. Include positions that may be indirectly affected, such as those who will have to assume additional responsibilities due to changes in other positions. Changes affecting personnel that operate, manage, maintain or provide technical service can have a significant health and safety impact. The same applies to personnel working in the safety field or who provide emergency services. Appendix 1 provides a checklist to aid the screening process.

iii) Preliminary Plans

Prior to the risk assessment, plans should be developed for implementation of the change. The depth of such plans will depend on the magnitude of the job. Development of the plan may be aided by review of training matrices and critical and key skills of personnel involved. Job task mapping may be employed at this stage to ensure that all required tasks are covered with the new organization. Include administrative tasks that may not be safety related but can take away time available for safety management. This involves identifying the tasks of personnel in the old organization and then ensuring that all tasks are covered with the new organization.

iv) Risk Assessment

The Risk Assessment should consider potential impacts upon safe operation of the full range of foreseeable conditions as well as activities required to keep the plant in a safe condition, activities required for full functioning of the health and safety system and requirements for an effective emergency response.

The depth and involvement of the risk assessment should be dependent on the magnitude and complexity of the change. It is recommended that a What-if checklist review be used to initially assess the safety and health impact and identify required actions. Appendix 2 provides a Risk Assessment Checklist that can be used for this purpose. Additional items may be added to the checklist as appropriate.

The impact is best assessed by a team involving multiple disciplines relevant to the change. In general, this would be plant management, a safety liaison, engineering, maintenance and a representative from the work group involved. As a minimum, at least two should be involved, one being a safety liaison.

The assessment should consider many aspects of the change including:

- Past experience (e.g. previous incidents, maintenance records, hours worked).
- Risk from contractors with respect to safety critical activities.
- Workload. Overloading leads to omission or poor execution of activities, fatigue, reduced reliability, errors, use of shortcuts that may be unsafe. Look for bunching of tasks that may prevent quick response or adequate execution.
- Minimum knowledge and experience levels and requirements.
- Conflicting priorities.
- Human reliability and competence (consider potential human failures).
- Emergency as well as normal operations

Due to the sensitivity of some organizational changes, knowledge of the change may be limited to a select few personnel. The review should still be conducted by a representative team that in some cases may consist solely of senior management. A senior safety representative should be involved in this review. A second review involving a work group representative should be conducted at the earliest opportunity.

Depending on the type of change, a more detailed analysis may be needed. This may involve an exercise in task mapping, time studies, scenario analysis or the involvement of additional personnel from within or without the company.

The organization should be prepared to change plans if the risk assessment shows a high potential risk.

v) Action Plan Development and Approval

The What-if Checklist worksheets and detailed analysis are used to prepare the action plan. In many cases it will be necessary to identify those action items that must be completed before the change is introduced and others that can be completed after the change. The plan may include temporary actions to maintain the safety and integrity of the plant until all identified actions can be completed. This may include holding over workers on the job to assist or train others, additional overtime or hiring contract help. Individuals should be assigned to complete the actions and target completion dates established. An appropriate level of management should approve the plan (at least one level above the manager of the area being changed is suggested).

The action plan should also consider the need to monitor leading safety and health indicators or key work processes during the implementation of the change. Measures chosen should be specific to the change and the potential risks identified by the assessments. They should be leading indicators as opposed to following indicators. Some examples of leading indicators include:

- Work group overtime
- Maintenance backlogs
- Maintenance quality
- Sickness absence/health records
- Near misses
- Average plant availability

Measurement should begin before implementation so there can be meaningful data comparison.

viii) Implementation

The approved action plan should be communicated to the personnel involved. The potential benefits of such communication include easier and faster implementation of the actions, familiarity with and feedback on the planned monitoring process and improved understanding and support of the change itself. Such communication may result in the identification of other issues or actions not previously identified.

There should be a tracking system in place to ensure the action items are completed as per the approved plan. Progress should be communicated to involved employees and contract workers regularly and frequently.

Before implementing the actual change, there should be the equivalent of a pre-startup review to ensure all required recommendations have been addressed and the organization is ready for the change. Written management approval should be given before the new organization takes effect.

Once the change has been introduced, performance should be tracked to ensure there are no adverse impacts as measured by the identified key results indicators or other measures. Unfavourable impacts may require further analysis and development of additional action items. Action items identified for completion after the date of the organizational change must be tracked to completion as well.

ix) Final Assessment and Closeout

Once all recommendations are complete and sufficient time has elapsed to evaluate the effects of the change, change leaders should conduct a final review to verify that all actions are complete and that key results indicators do not indicate any unfavourable results. That being the case, the change is considered complete and signed off by management.

5. References

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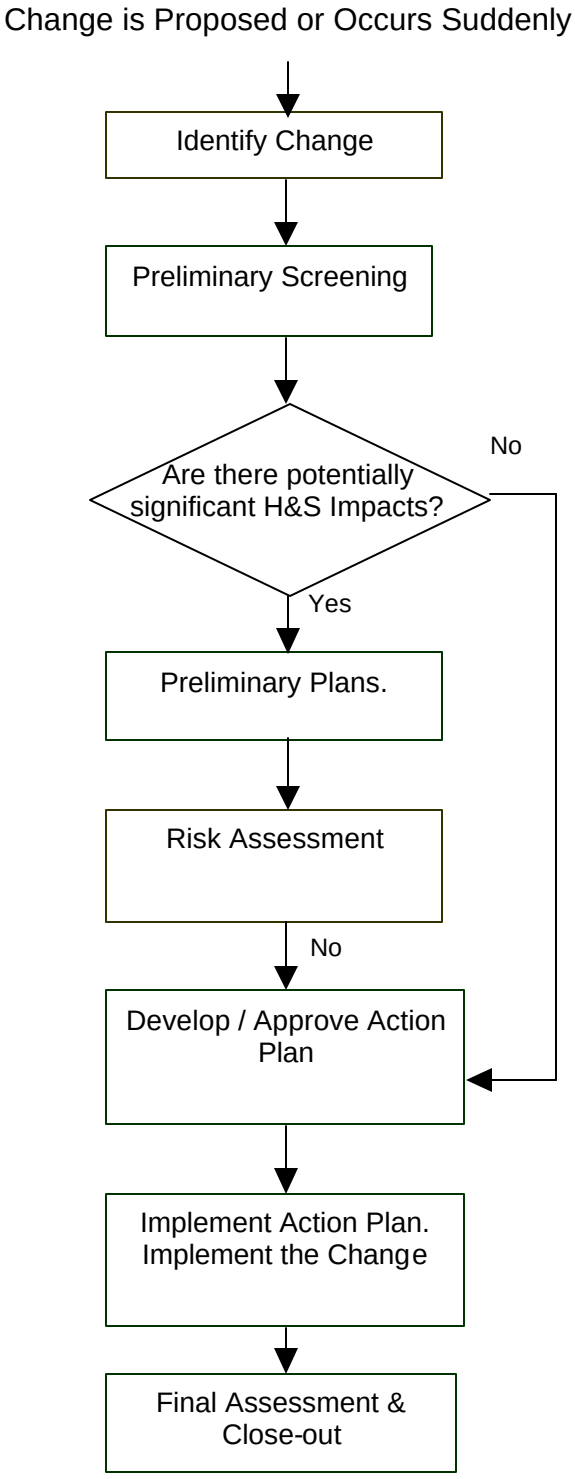
Flowsheet



APPENDIX 1

Managing Organizational Change – Screening Checklist

	Y	N
A) Does the change involve a position with potentially significant H&S impacts?		
• **Process operator (or technician)**		
• **Line supervision or management**		
• **Maintenance personnel**		
• **Technical operations support (operations engineer, plant engineer, etc)**		
• **Technical support (service engineer, inspection)**		
• **Safety Personnel**		
• **Emergency Response Personnel**		
B) With respect to the above positions, does the change involve:		
• **Reduction in number of positions**		
• **Reduction in number of personnel in those positions**		
• **Substantive increase in duties**		
• **Significant change in responsibilities**		

If yes to any position in A) above and the change is of a type in B), then there may be potentially significant health and safety impacts and a more detailed assessment is required.

APPENDIX 2

Managing Organizational Change – Risk Assessment Checklist

COULD THE CHANGE AFFECT S&H IN THE FOLLOWING AREAS:	Effect	Priority H/M/L	Safeguard	Action
Operation of the Process				
• Startup or shutdown				
• Normal operation				
• Identification of unsafe situations				
• Emergency shutdown (including ability of operator to complete required tasks in given time frame)				
• Emergency operations				
• Ability of operator to monitor critical controls & alarms				
• Ability to deal with the number of alarms associated with an upset or emergency				
• Recovery from an incident				
• Knowledge/expertise of workers				
• Development & Maintenance of operating procedures				
• Level of staffing for special procedures				
• Communications between shifts				
• Decision making and lines of authority				
• Ability of operator to intervene or respond in an emergency as a safeguard (as identified in PHA or Layers of Protection Analysis)				
• Accuracy of operating procedures				
Safe Work Practices				
• Safe Work Permits (e.g. hot work, cold work, etc.)				
• Isolation, Lockout, Tagout				
• Confined space entry				
• Blinding or isolation procedures				
• Flare or line entry procedures				
• Periodic audits of safe work practices				
• Firewatch procedures				
• Line opening				
• Other safe work procedures				
Maintaining Plant in a Safe Condition				
• Knowledge / skill of trades				
• Technical expertise of engineering support				
• Test and Inspection programs (with zero overdue)				
• Preventive Maintenance or Reliability program				
• Quality assurance of trades work				

Safety and Health Management				
• Perception and/or reality of line management commitment to S&H				
• Accountability & responsibility for safety				
• Changed lines of authority and decision making				
• Maintenance & development of S&H standards & procedures				
• Responsible Care management				
• S&H awareness programs				
• S&H communications				
• Incident and near miss investigation				
• Action item tracking and management				
• Injury and illness reporting & investigation				
• S&H meetings				
• Departmental Safety Meetings				
• Self Safety Audits and Inspections				
• Safety suggestion systems				
• Safety & Health committees				
• Enforcement & corrective actions				
• Safety performance goals or targets				
Safety and Health Training				
• Ability to conduct S&H training				
• Effectiveness of S&H training				
• Knowledge & expertise of S&H trainers				
Process Safety Management				
• Process Safety knowledge/expertise				
• Process Safety Information				
• Process Hazard & Risk Assessments				
• Management of Change				
• Pre-Startup Safety Reviews				
• Mechanical integrity				
• Process Safety Training				
• Compliance Audits				
Emergency Response				
• Knowledge / skill of emergency responders				
• Ability of crew to manage emergencies				
• Availability of emergency responders				
• Development and maintenance of ER procedures				
• Emergency response training				
Contractor Safety				
• Contractor pre-qualification (does the contractor have acceptable safety standards and practices?)				

• Contractor safety training				
• Knowledge and expertise of contractors				
• Monitoring of Contractor compliance				
• Inspections / audits of contractor work in progress				
• Periodic evaluation of contractors S&H performance				
Occupational Health				
• Administration & management of wellness programs				
• Industrial hygiene programs				
• Ergonomics programs				
• Management of stress				
• Respiratory Protection programs				
• Hearing conservation				
• PPE				
• Hazard communication / WHMIS				
Regulatory Compliance				
• Awareness of relevant legislation				
• Programs to monitor changing regulations				
• Injury/Illness recordkeeping and reporting				
• Audits to ensure regulatory compliance				
• Responsible Care commitments				