



MANAGEMENT OF CHANGE PROGRAM – PROCESS GUIDANCE

The intent of this data form is to assist the facility with determining that their procedure governing their MOC program adequately identifies change and provides for thorough review to assess the safety & health impacts of the proposed change. The following comments are intended to supplement the flow chart that is appended to this data form.

<p>A note about the Purpose for management of change</p>	<p>The concept of Management of Change (MOC) is relatively simple:</p> <ol style="list-style-type: none">1. Prior to making any change, an operating process is in place for which a process hazard analysis has been conducted, other accident prevention program elements are in place, and the risk <i>(to the safety and health of employees and the public)</i> is deemed to have been minimized by rigorous implementation of the accident prevention program.2. Now there is a desire or need to make a change to this process. The MOC is a structured program used to ensure that this proposed change does not introduce an unacceptable change in the risk. <i>Note that risk is intended to be minimized through the MOC process, but may not always be lower. For example, installing an additional chlorine cylinder loading station in parallel to an existing one may intuitively increase the probability of an accidental release, but a properly executed MOC would ensure steps are taken to minimize that probability.</i> <p>The intent of evaluating change per an MOC procedure is to ensure that:</p> <ol style="list-style-type: none">1. The potential safety and health impacts of the proposed change on the employees and public are adequately identified.2. When identified through the MOC procedure, the potential safety and health impacts are adequately safeguarded <i>(steps are taken to reduce likelihood of the occurrence)</i> or mitigated <i>(steps are taken to reduce the severity of the consequence of the occurrence)</i> through the MOC procedure. <i>Note that this is the primary function of the MOC and this is how risk minimization is achieved.</i>3. Necessary changes to procedures are identified and subject to the evaluation of safety and health impacts.4. Personnel are adequately informed of the change and provided in-depth training as required.5. Changed procedural and technical documents are revised.
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A note about
Identifying what must be
reviewed through the
management of change
process

Regulation indicates what is subject to MOC. In this regard, two things must be made very clear through the MOC program.

First, the types of change subject to MOC must be defined in procedure. This is often supplemented with relevant examples to provide guidance for employees. (Also refer to 'Replacement in Kind' discussion below)

Second, every employee that is in a position to deliberately or unwittingly introduce a change that requires review through the MOC procedure must be trained in MOC. The employee must be specifically made aware of how to recognize a change and to understand that the change cannot be implemented without being subject to an MOC. This training must occur whether or not the employee is part of the team evaluating the change.

The following must be evaluated through the CAPP MOC procedure:

1. **Changes to chemicals, technology, equipment and procedures that are used in a process.** This is simply a change to any process safety information or any procedure (including standard operating procedures, safe work practices, maintenance procedures, emergency response procedures). Often, facilities will attempt to define varying degrees of change (scope of a change, such as minor or major revision) and associate a unique MOC evaluation process to each degree of change. While this may be necessary or desirable, particularly in large organizations, the facility is encouraged to make the MOC process as simple as possible.
2. **Changes to buildings, structures and equipment that affect a process.** Any alteration outside of the regulated process that has the possibility of impacting the risk of a catastrophic accident must be evaluated through the MOC. **For Example:** 1. Altering the size of a building containing a regulated process may necessitate re-evaluation of a building toxic gas scrubber and ventilation system; 2. Altering the support structure of a process may necessitate structural re-evaluation to ensure that the process will not be compromised; 3. Altering



A note about
Identifying what must be
reviewed through the
management of change
process (continued)

process auxiliary equipment like a cooling water pump capacity or discharge head may necessitate re-evaluation of the regulated process to ensure the associated hazards of the change are adequately safeguarded; 4. Altering or adding equipment external to the process, like locating a pressurized flammable materials storage tank adjacent to the process, may have the potential to exert external forces on the process. This situation would merit evaluation of potential safeguards or mitigation measures to minimize the impact of the external force on the process.

3. ***The impact of changes to organizational structure or staffing levels on the implementation of the prevention program and the emergency response program.*** Whether restructuring the organization or adjusting the number of staff, there is a potential for impacting every prevention program and emergency response program element. ***For example:*** Fewer operators may necessitate procedure revision or greater automation; More operators may necessitate a revision of responsibilities in procedures; Fewer maintenance personnel may necessitate the need for additional contractor assistance; Reorganization under a different manager may necessitate implementation plan revisions and additional training. The MOC must prompt for evaluation in these types of circumstances and require remedial action as necessary.

In each of these three preceding circumstances, the MOC process ensures that the proper evaluations are conducted and that any identified hazards are safeguarded or mitigated.



<p><i>A note about The importance of process safety information, current procedures and document control to the MOC process</i></p>	<p>As the MOC procedure is focused upon evaluating change, it is necessary to be able to identify the basis from which change is determined.</p> <p>To that end, it is essential that the Process Safety Information (PSI) is thoroughly developed, validated and accessible to the MOC team and all employees. Physical change is determined relative to PSI, not relative to what is in place in the field. (Also refer to 'Replacement in Kind' discussion below). Utilizing similar logic, it is essential that all procedures accurately reflect current operation so that a proposed procedural change is apparent.</p> <p>A document control process is necessary to ensure that PSI and procedures are accurately revised and disseminated when changes are made and outdated materials are removed from use. Additionally, the MOC program itself will be difficult to administer without document control.</p>
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A note about **The importance of fully developing the technical basis**

The evaluation of any MOC must not proceed until a detailed technical basis is defined that indicates the reason a change is being proposed. The technical basis must also provide relevant details such as a description of the change, engineering studies, associated PSI, including revised process chemistry, plot plans, marked-up P&IDs, control logic, specifications and calculations. The relevant details are essentially the completed design package. The MOC evaluates the completed design package.

Regarding the development of a detailed technical basis, note that it is not possible to thoroughly evaluate the potential hazards posed by the change if the detail is not defined. Also note that it is not possible to determine the impact on procedures without fully understanding the scope of the change as defined in a detailed technical basis. While this information could be voluminous at times, it is a required part of the MOC documentation.

Note that the impact of the change cannot be evaluated with a reasonable level of confidence unless the change is accurately represented. **For example:** In evaluating the replacement of an evaporative condenser on the roof of a building with a unit having a different heat transfer duty, if the process performance conditions and materials of construction are accurately defined, but the weight of the new condenser is understated, the MOC may adequately evaluate the impact of the condenser replacement on the process, but may miss the potentially detrimental impact of the heavier unit on the roof. **It is critical to confirm that the technical basis is accurate and complete.** Additionally, it is critical to ensure that any modifications to the technical basis are reconsidered through the MOC process. The facility should not rely solely on the pre-startup safety review process to identify a difference between the MOC technical basis and what was ultimately installed in the field.

It should also be noted that in some cases, it may not be possible to distinguish between a change or a Replacement in Kind without a fully developed technical basis. Technical basis development should be considered prior to conducting the Replacement in Kind evaluation.



<p>A note about Replacement in kind</p>	<p>Regulation defines 'Replacement in Kind' as a replacement of equipment, instruments, procedures, raw material and processing conditions that satisfy the design specifications. The regulation indicates that a 'Replacement in Kind' does not require an MOC. Note that determination of 'Replacement in Kind' can sometimes be nearly as involved as conducting an MOC on an actual change.</p> <p>As determination of replacement in kind is not always obvious, consider the following when developing an MOC program:</p> <ol style="list-style-type: none">1. It may not always be clear if a replacement satisfies the design specifications. First example: Replacing one ball valve with another of exactly the same manufacture and model is likely a 'Replacement in Kind'. However, replacement of one ball valve with a ball valve of different manufacture may or may not be 'Replacement in Kind'. Some review to determine if the replacement meets all of the original valve design specifications (materials of construction, design ratings, etc.) is necessary. If the valve meets all of the original valve design specifications, then it would be determined to be a 'Replacement in Kind' and the MOC evaluation would not be necessary. Second Example: Replacing one shell and tube heat exchanger with another shell and tube heat exchanger of identical nominal heat transfer duty may or may not be 'Replacement in Kind'. In order to make the determination, materials of construction, design ratings and heat exchanger configuration would have to be among the considerations.2. The MOC procedure needs to address how personnel determine if the proposal is a change or is a 'Replacement in Kind'. <p>It is also critical to understand that 'Replacement in Kind' DOES NOT mean replacing a component in the field with an exact duplicate component. When determining 'Replacement in Kind', the replacement should be compared with the design specification, not with the component in the field. The concept is to prevent the perpetuation of an error made that could have been made previously in the field.</p>
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A note about
Reviewing the impacts of a
change on safety and
health

This is the primary function of the MOC. Thorough direction must be provided in the MOC procedure for conducting this review. Regulation requires evaluation of the impact of the change on safety and health. This means that some type of hazard analysis must be conducted and implies, at a minimum, utilization of some type of hazard review checklist. The review could also be satisfied by conducting a formal process hazard analysis. Two things merit consideration in this regard:

1. If the change is procedural only and does not involve change to process safety information, a Pre-Startup Safety review will not be required, hence the MOC will provide the only opportunity to evaluate the impact of the procedural change on safety and health. An evaluation method geared toward procedure evaluation should be considered to ensure an adequate review is performed.
2. If the change includes changes to PSI, a Pre-Startup Safety Review (PSSR) will be required which in turn requires confirmation that a process hazard analysis (PHA) has been performed. Performance of a PHA during the MOC could satisfy the MOC requirement for reviewing the safety and health impact of the change, as well as satisfy the PSSR requirement for ensuring the conduct of a PHA.

Although regulation combines 'safety and health', there is a need to distinguish between the two. Safety impacts relate generally to any adverse impact that a physical or procedural change can impart. Health impacts are specifically emphasized in regulation to ensure that the general safety impacts include adverse personnel health consequences that may result from any physical or procedural changes. The impacts of any change must specifically include any identified health impacts to ensure that proper steps are taken to mitigate adverse health impacts for personnel.

VII. Management of Change Program
Nevada Division of Environmental Protection
Chemical Accident Prevention Program
Data Form



Revision 2a, 05/21/09

<p><i>A note about</i> Reviewing safeguards or mitigation measures made as a result of evaluating the impacts of a change on safety and health</p>	<p>When evaluating the impacts of a change on safety and health, a hazard may be identified that requires some type of remediation (<i>implementation of a safeguard or mitigation measure</i>). While the intention of the remedial measure may resolve the identified hazard, the measure may be unwittingly introducing another hazard. <i>Implementation of remediation measures to safeguard or mitigate hazards identified through the MOC process must also be evaluated through the MOC process prior to implementing the change.</i></p>
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<p><i>A note about</i> Review, approval and authorization in management of change</p>	<p>Regulation requires that the MOC procedure provide criteria for review and approval and that 'requirements for authorization for the elements of the proposed change' be considered in the MOC procedure.</p> <p>This requirement implies that review, approval and authorization is needed for each of the following steps (indicating adequate completion):</p> <ol style="list-style-type: none">1. Technical basis adequacy and accuracy,2. Replacement-in-Kind determination,3. Need for procedural modification and development of those modifications,4. Evaluation of the health and safety impact of the change,5. Conduct of training and testing in the change, and6. Validation that all MOC elements have been satisfied prior to implementing the change in the field. <p>Regarding the individuals designated to review, approve and authorize each MOC step, the facility must consider what is expected to be accomplished with each specific review, approval and authorization task and ensure that the designated individuals have the appropriate knowledge for the task.</p> <p>While the MOC process typically utilizes multiple signatures to indicate adequate completion of the aforementioned items, note that it is critical to ensure that there is a primary signatory for each item. Without a designated party being held responsible for each step, there is no assurance that each particular step is receiving the appropriate scrutiny.</p>
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A note about
MOC interface with the
pre-startup safety review
process

The Pre-Startup Safety Review (PSSR) process is intended to serve as final verification that the design is reviewed, approved and authorized through both the MOC and process hazard analysis is what was installed in the field. If unmitigated hazards remain, or the installation does not match the design, steps must be taken to ensure that:

1. All unmitigated hazards are resolved with recommendations AND those recommendations are evaluated through the MOC procedure,
2. All process hazard analysis recommendations have been evaluated through the MOC procedure and are implemented,
3. The design, as evaluated in the process hazard analysis and through the MOC procedure, is installed in the field.

New processes are not necessarily exempt from MOC review. Recommendations that are implemented as the result of the PHA conducted on the new process need some type of evaluation to ensure hazards are not being unwittingly introduced. While the implementation of a PHA recommendation may not be a change to an existing process, the MOC procedure could be used to evaluate those recommendations.

Utilizing the MOC procedure to evaluate PHA recommendations would have the following benefits:

1. The evaluation would help ensure that the recommendation has a sound technical basis,
2. The evaluation would help ensure that any required procedural revisions are made.
3. The evaluation would help ensure that potential hazards resulting from the recommendation are identified and that appropriate additional safeguards or mitigation measures are implemented as appropriate.

Regardless of whether or not the MOC process is used, recommendations from a PHA must be subject to some type of analysis to ensure hazards are not being unwittingly introduced.



MANAGEMENT OF CHANGE PROGRAM – DATA FORM

Facility:	Process:	Date:	
MANAGEMENT OF CHANGE PROCEDURE (Note Current Version of the Management of Change Procedure (title, date, revision number)):			
MANAGEMENT OF CHANGES PERFORMED IN THE PREVIOUS 12 MONTHS (Utilize Additional Sheets as Needed):			
MOC ID #	Proposed Change	Approval Date ¹	Implement Date ²

Notes to Table:

1. Approval date indicates when all reviews complete and authorization is granted to make change.
2. Implement date indicates when the change is ready to be put in operation, or procedure is ready to be utilized in the field by fully trained personnel.

