Management of Change

LSU Unit Operations Laboratory

Rationale, requirements, procedures and Request-for-Change form for Management of Change
Harold J. Toups – 8/14/13
Management of Change

LSU Unit Operations Laboratory

Rationale
Important process safety concepts and skills are taught across the Chemical Engineering core curriculum here at LSU. This instruction covers a host of topics, from an understanding of fire and explosions to the way key process variables increase the propensity for runaway reactions to the role of industrial hygiene in the workplace. The importance of you becoming process safety savvy to the industrial manufacturing world that most of you will enter shortly cannot be overstated – the very life of those businesses and the lives of their employees, neighbors and customers depend on it.

In major manufacturing facilities, process safety has always been an important component, emphasized clearly by the regulations that govern these facilities, giving guidance on how to build, operate and maintain them with safety always in mind. A key piece of regulation is OSHA’s 1910.119 standard Process Safety Management (or PSM). The need for this standard rose out of serious plant mishaps in the 1980s and 90s. PSM consists of many elements (e.g., process hazard analysis, mechanical integrity, incident investigation, etc.) important to process safety, a significant one of which is the proper and safe management of the many changes that are made to process facilities.

The most natural home in the ChE core curriculum for exploration of Management of Change is in one of our laboratories, most particularly Unit Operations Laboratory, where oftentimes recommendations made in the course of reporting findings from an experimental program naturally call for change to either equipment, procedures, chemicals or control. Though UO Lab operations do not come under OSHA 1910.119, this is a good place to examine the notions contained therein.

OSHA 1910.119

“Purpose. This section contains requirements for preventing or minimizing the consequences of catastrophic releases of toxic, reactive, flammable, or explosive chemicals. These releases may result in toxic, fire or explosion hazards.”

Flixborough ‘84

“The bypass had been designed by personnel who were not experienced in high-pressure pipework, no plans or calculations had been produced; the pipe was not pressure-tested, was mounted on temporary scaffolding poles that allowed the pipe to twist under pressure and had not been reviewed by appropriate chartered engineers.” - Wiki
Requirement and Assessment Implications
To allow every student team to gain practice on the use of Management of Change (MOC) in an operational environment in Unit Operations Laboratory, each student team is required to execute one Management of Change request for one of their recommendations made during one of the three laboratory cycles within the semester. There is one constraint, however: this MOC requirement must be completed during a cycle in which your team is assigned to work with the Instructor of Record (Harold J. Toups).

We’ll discuss specific details of the required effort and its documentation in the next sections of this document but now’s a good time to mention how your work will be assessed. The assessment of your team’s effort on this one MOC will be rolled into the assessment of both the Discussion section of the Final Report (where you will briefly discuss the nature of and rationale for the relevant recommendation and its implications) and the Appendix section of the Final Report (where you will submit the completed Request-for-Change form).

Management of Change System and Procedures
Every organization that is charged with managing change must develop a process for doing so, consistent with the hazards and complexity of their processes and the number and kinds of changes that might be made. Such a system and set of procedures need not be overly complex, however. One should keep Albert Einstein’s adage in mind: “Make things as simple as possible but not simpler.”

In our case, we’re proposing the process laid out in Figure 1 for implementing Management of Change in the Unit Operations Laboratory. This process consists of a goodly number of steps but really amounts to the following: a) a request by an originator, with pertinent description of the change and a sufficient discussion of the technical basis to understand its impact, b) appropriate reviews by those both authoritative and knowledgeable in needed disciplines, and c) careful preparation, implementation and close-out during the execution phase, once permissions have been granted to proceed with the change.

In the Unit Operations Laboratory version of such a process, for the purposes of instruction, we will not proceed with actual implementation – obviating the execution of the right-hand side of the more complete process outlined in Figure 1.
Figure 1 - Management of Change System Procedure Work Flow Chart
Let’s walk through the nine (9) numbered steps on the left-hand side of Figure 1, point out the meaning of each and the implications for your management of change effort.

1. **Identify the need for a change**
   Your team will identify the need for change as you go through the process of generating recommendations from the experiences and findings that come out of your experimental program. At the end of your efforts in the four-week experimental and reporting cycle you will have recommendations for future work, of course; but it’s the recommendations for change to the experimental apparatus, procedures, documentation, chemicals or process control that are pertinent here. Surely, one reasonable and workable candidate for change will rise from your experiences and insights. Perhaps it will make sense to mention more than one such recommendation in your report, but you’ll only work one of those through the management of change process.

2. **Prepare a Request-for-Change Form**
   We’ll get to the form itself in a bit, but suffice it to say here’s where you start documenting your requested change. In the real world, the person initiating this request might be from the operations team or the maintenance crew or from engineering personnel. While the originator doesn’t necessarily have all the answers to all the questions that must be answered before a requested change is approved and implemented, the originator knows enough about what the change is and why he/she believes it is needed to begin the MOC process.

   At this point, complete both the **Description** (the nature of the change) section and the **Purpose** (Technical Basis for Change) section of the Request-for-Change form at this time.

   The originator ought to be able to describe the proposed change in some detail and elaborate on the purpose of the change; that is, the technical basis for the proposed change. Included in these sections should be sufficient technical details to inform the upcoming reviews.

   When completing these sections, be sure to include any facts or information that will telegraph to the upcoming reviews the need to deal with any or all of the following items: a) **introduction of hazardous or toxic materials** (particularly with effects on permissible exposure limits, reactivity, corrosivity, or thermal and chemical stability) as these might affect not only workers but also neighbors and customers; modifications to technology (e.g., flow, chemistry, inventory, process limits, etc.); modifications to equipment (e.g., materials of construction, electrical classification, relief systems, ventilation systems, safety systems, etc.); and modifications to key documentation (e.g., process diagrams, operating manuals, control system schematics, etc.).

   In some cases, the proposed change would be of a temporary nature, not intended to be a permanent change to the process, equipment or procedures. Such changes can often represent a
higher risk to safe operations, especially if fewer precautions are taken or notification and training are not formalized or the temporary change is not reversed at the appropriate time.

If the recommended change you propose will only be temporary, note this on the Request-for-Change form, explaining the reasoning and identifying any additional precautions that should be noted and taken.

3. Is the proposed change to be pursued?
   There might be a number of reasons why a requested change will not be pursued, even before more detailed process safety implications become apparent. The change might involve equipment, procedures or other items that are not within the province or authority of those who own or operate the process or the change might clearly require financial means beyond the scope of the business.

   For your work, we will generally consider the request to be a reasonable one – at least for the purposes of instruction – and process it as such. Unless, of course, your team suggests something like ‘LSU should relocate its many cooling towers because we think the incessant noise from the water flow is requiring us to turn up the volume to our iPod ear buds.’

4. Complete the RFC and return to originator
   This would only happen if your team chose very poorly (as in the example just cited).

5. Is it a change (per MOC definition)?
   Sometimes the originator of a Request-for-Change will misinterpret management of change to apply to what really would be replacement-in-kind. For example, a regulator starts to malfunction and needs to be replaced. In common parlance, one might suggest that ‘we need to change the regulator out, so we need to execute Management of Change.’ This would be a misunderstanding of Management of Change. Any replacement that satisfies the specifications spelled out by the process safety information (i.e., process, design, operating and maintenance specifications that have safety implications) for that process would constitute replacement-in-kind, not a change requiring the MOC process.

   Generally, replacement of a piece of equipment, or component thereof, with an identical one from the same manufacturer (i.e., model number, size, materials of construction, etc.) would not constitute a true change or a change requiring the use of the MOC system. However, replacement with similar equipment from a different manufacturer could very likely constitute change requiring Management of Change.

   This Initial Review makes sense before the process involves a host of other reviewers.
6. **Proceed outside the MOC system**
   For instructional purposes, if you in your report you will be recommending a materiel change (e.g., to equipment, to chemicals, etc.), choose one for which MOC will be required, not one which involves simply *replacement-in-kind* (e.g., replacing a worn-out septum on a GC with a new one).

7. **Is a multi-disciplinary team required?**
   On larger scale or more complex changes, a multi-disciplinary team is generally required. It is rare that any one single individual will have sufficient knowledge of hazards, materials of construction, documentation, process control system configuration and procedures to weigh in on all the items that might be involved in a complex or large-scale change. Still, there is need for such a **Classification Review** in most organizations, at which relevant parties look over the proposed change and weigh in on what kind of team will be needed to perform the slate of reviews that will be called for.

   In your team’s case, consider the multi-disciplinary review the best option – where your team members will put on all the needed ‘hats’ to conduct the needed reviews. We’ll keep them simple, so don’t worry. And no, you don’t have all the expertise to do these tasks perfectly – we simply want to make an attempt, to learn what’s involved, and to envision what kinds of questions must be answered.

8. **Conduct multi-disciplinary review**
   This is the form of **Hazard Review** that you will be doing. (See previous rationale.) As we’ve just alluded to, you will need to doff the hat of *originator(s)* and don the hats of the various reviewing authorities.

   Complete the remaining sections of the Request-for-Change form by acting as a knowledgeable and skilled reviewer by checking all applicable boxes and proffering the most salient comments relevant to each category. Below, we’ve listed some ideas on each of these categories.

   **Safety, Health and Environmental Review**
   The proposed change will undoubtedly introduce something new regarding process hazards or exposure routes to those hazards. The change might involve the use of a new chemical, the use of larger quantities of currently-used chemicals, extending the operating range of the process equipment, making use of parts from a different supplier, increasing (or decreasing) the size of lines or vessels, requiring operations or maintenance staff to perform a new task or a revised task, adding a new process line or removing an old one.

   Such changes might impact on process safety, hygiene or the environment – perhaps all three. For example, adding a new sample point to a unit might expose operations personnel to a high
pressure stream – a process safety issue. That same sample point might also expose operations personnel to a toxic chemical – a hygiene issue. Finally, that same sample point might add to the fugitive emissions characteristics of the plant, affecting the environment. In this case you would click each of the three check boxes in this section and mention the issues involved.

**Procedures to be revised**
Insofar as the proposed change would require the need to add or rewrite procedures for the process, those procedures requiring attention should be identified here by clicking all applicable check boxes and providing description comments to guide those revision processes.

**Training to be performed**
Insofar as the proposed change would require the need to provide additional training or refresher training to operations and/or maintenance personnel, this should be noted and described briefly.

**Process Safety Information and other Documentation to be revised**
Key process information may need to be updated as a result of the proposed change. Here, you would point out which of these will need modification, along with brief supporting comments.

**9. Conduct review by an individual**
If either of you were the All-Powerful Oz – or had been working in a rather small organization for a rather long time and had the needed experience and knowledge, this might be the right (or only) option.
Unit Operations Laboratory: Request-for-Change Form

<table>
<thead>
<tr>
<th>Unit:</th>
<th>Originator(s):</th>
<th>Date Requested:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Description:

Purpose (Technical Basis for Change)

Temporary Change ☐ Dates valid:
Why designate this as a temporary change and what additional precautions are needed, if any?

Safety, Health and Environmental Review

Process Safety ☐ Industrial Hygiene ☐ Environmental ☐
Reviewer comments:

Procedures to be revised (check all that apply)

Normal Operation ☐ Off-Normal (SU/SD) ☐ Maintenance ☐ Emergency Response ☐
Reviewer comments:

Training to be performed (check all that apply)

Operations ☐ Maintenance ☐
Reviewer comments:

Process Safety Information and other Documentation to be revised (check all that apply)

P&ID/PFD ☐ Operating Manual ☐ MSDS ☐ Control System ☐
Reviewer comments: