

HAZARD STUDY - 7: DEMOLITION / DE-COMMISSIONING / ABANDONMENT REVIEW

INTRODUCTION

Purpose

This study can be conducted before the final shutdown, but its objective is to identify issues that should be addressed during the demolition or de-commissioning process. It should address issues such as cleaning methods and standards, size reduction, recovery and recycling of working inventories, recycling of equipment, safe disposal of nonrecyclable materials/equipment, and location of potentially harmful/toxic materials in the equipment or soil. In addition, it should address the integrity of lifting devices/brackets, access routes, and the sequence of removal, bearing in mind that some equipment may be supporting other equipment.

Team

The following people (in addition to the HS7 Study Leader and Recorder) should attend the HS7:

a) MWH Treatment Representatives
Design Manager
Process Engineer
ICA / Electrical Engineer
Mechanical Engineer
Civil Engineer
Commissioning Engineer

b) Client Representatives
Process Engineer
ICA / Electrical Engineer
Mechanical Engineer
Civil Engineer
Process controllers/operators

In addition, an Environmental Specialist or representatives from the Supply Chain may join the team for part or all of the study of process activities.

Timing

The study of process and non-process activities can be started as soon as details of the plant that needs to be demolished or de-commissioned has been established. This is usually after Hazard Study 1 or Hazard Study 2. However, this may not be possible in certain circumstances, but it should be completed at the earliest opportunity once all the documentation is available. The Design Manager should arrange the time and location of the meeting once the required documentation is available.

Preparation

Information required for Hazard Study 7 should be in the SHED for the project.

- a) A description of the plant, layouts, P&IDs, and General Arrangements should be available.
- b) Reports from Periodic Hazard Studies
- c) List and details of modifications
- d) Results of workplace monitoring (noise, vapours, dust).
- e) Accidents and dangerous occurrence reports
- f) Environmental monitoring and incidents.
- g) Reports from safety inspections
- h) DSEAR Report and HAPs
- i) Waste Management Plan

Documentation

Hazard Study 7 Report should be stored in the Safety, Health and Environment Dossier (SHED). The De-Commissioning and Demolition Plan, including Risk Assessments and the RAMS for the demolition activities, should be developed based on the Hazard Study 7 Report and should consider the hazards identified in the HS7 Study.

Method

The Structured What-If Technique (SWIFT) methodology (as used on HS2) has been developed as a cause-driven study for providing highly effective hazards identification. SWIFT is a thorough, systematic, multidisciplinary, team-oriented analytical technique. The sections of the plant that are to be demolished or de-commissioned will be selected for study.

Once the section is defined and marked on the P&ID, the design intent, process conditions and other appropriate details should be discussed and entered into the spreadsheet/output from proprietary software. Except for the structured posing of "what if" questions, the discussion during a SWIFT review should be similar in all aspects to those encountered during a HAZOP study. All team members should participate and all should be permitted to express their opinions and concerns.

The study will be recorded using the SWIFT methodology.

The Hazard Study Leader should begin the discussion by stating the category of questions for discussion and then by either asking for ideas or offering an initial question.

The study team works systematically through sections of the flowsheet, identifying significant hazards associated with each stage of the process. The most significant hazardous events are often loss of containment.

For each new diagram or system, a brief explanation of the process and proposed operation is required, to ensure that each member of the team has an adequate understanding for their active, effective participation in the study.

Where there are several unit operations, the team can study them as a small number of separate 'blocks'. The Hazard Study Leader will provide guidance in choosing a suitable division into these 'blocks'. The study proceeds, considering one block at a time, using the guide words listed below.

The structure for questioning is provided by the following categories:

Draining / Purging
The team should consider whether trapped water, chemicals or oil in plant and machinery could be released to the environment. All tanks and pipes (above and below ground) to be flushed and drained, and no water, chemicals, acid or flammable material to be left in abandoned pipework.
Hazardous Chemicals and Materials
The question is intended to help identify hazardous chemicals and materials, i.e., asbestos, lead, diesel, PCBs, and chemicals remaining in storage tanks.
Connected Services
The team should consider connected services (above and below ground), i.e. supply of gas, water, sewage, telecommunications, and electricity.
Simultaneous operations
The team should consider the effects on the remaining plant when the section of the plant is demolished or de-commissioned and the effect on the treatment process, and whether treatment goals can be met or whether a hazardous condition could be created.
Stored Energy
The team should consider whether there is energy stored in components which might be released during the dismantling process.

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Electrical Hazards
The question is intended to consider whether there are any electrical hazards present, and the potential for electric shock and its effect on other operations.
Waste disposal
The team should consider how scrap materials and chemicals are stored and their safe disposal.
Environmental
The team should consider whether noise, dust and other material could be released during demolition/ de-commissioning/ dismantling operations.

REVIEW MEETINGS AND FOLLOW-UP

The study is not complete until all actions have been successfully concluded, so regular reviews of progress should be held.

DOCUMENTATION TO COMPLETE POST HS7

a) Project Safety, Health and Environmental Dossier (SHED)

The Safety, Health and Environment Dossier (SHED) need to be updated.

b) Hazard Study 7 Report.

The HS7 Report should be completed and incorporated into the Safety, Health and Environment Dossier (SHED).