European Commission

Number 2
2014

MAHB Major Accident Hazards Bureau
Security Technology Assessment Unit

SEVESO COMMON INSPECTION SERIES CRITERIA

The Permit-to-Work System

This publication of the European community on Common Inspection Criteria is intended to share knowledge about technical measures and enforcement practices related to major hazard control and implementation of the Seveso II Directive. The criteria were developed by Seveso inspectors to aid in dissemination of good enforcement and risk management practices for the control of major industrial hazards in Europe and elsewhere. It is foreseen that these criteria may not only be useful to inspectors but they may also offer inspiration to industry safety managers as well.

This particular issue highlights a number of issues that are critical for successfully reducing risk using permit-to-work systems . Note that this document is not intended as a technical standard nor as a summary or replacement of any existing standards on the matter.

Definition

The permit-to-work is a documented procedure that authorises certain people to carry out specific work within a specified time frame. It sets out the precautions required to complete the work safely, based on a risk assessment. It describes what work will be done and how it will be achieved.[1]

Purpose of the Permit to Work

The need for a permit to a work should be assessed for any work that may be conducted in an area where dangerous substances are present and for which no existing procedure has been established. Where proposed work is identified as having a high risk, strict controls are required.

All company employees or contractors should be authorised by a responsible company person (normally, the supervisor) for the execution of the work required with the issue of a permit-to-work. In this document both the functional role and risks of the installation are described along with the risks associated with the execution of the work itself. It can be defined and written either following a risk analysis performed by the HSE unit or (in the case of complex works) following a joint on-site examination, carried out by the supervisor and the staff responsible for the execution of the work.In general, the preventive safety measures to be taken during execution and when work is completed can be established and documented either following the completion of a risk analysis performed by the HSE unit or, in the case of complex works, following a joint on-site examination, conducted by the supervisor and the staff responsible for execution of work.

When a permit to work may be needed

An effective system of permits-to-work cannot be achieved exclusively with the provision of a permit for the authorisation to work in dangerous areas, but it is an essential part of the SMS which is realized through specific procedures, instructions and authorizations.

According to this principle the work shall be carried out against previously agreed safety procedures, a 'permit-to-work' system.

The adoption of a permit-to-work system for authorising, managing and documenting the execution of works and modifications, including testing, surveillance, inspection, maintenance, construction and/or assembly and finally

[1] Health and Safety Executive (United Kingdom). http://www.hse.gov.uk/coshh/basics/permits.htm

JRC93841 Copyright © European Union, 2014

Joint Research Centre

dismantling of parts or components within an operating plant can minimize the occupational and process safety risks potentially associated with these activities.

Works concerning construction, maintenance, modification, etc. should be carried out in a planned and controlled manner through:

- procedures or instructions including all information necessary to prevent a major accident and to ensure the safety of workers, in particular, preliminary inspection, cleaning operations, shutdown procedures, when necessary, and testing of associated safety systems. The effectiveness of these operations should then be fully verified prior to proceeding with the activity to ensure that all foreseeable risk has been removed;
- control procedures specifying, at least, the initial job authorization required, the preliminary verification of operability, and the final checks necessary before the equipment or operational unit is placed back into operation;
- procedures specifying what to do in case that an unsafe or abnormal situation arises and who to inform, and also what to do in an emergency including measures to be followed as outlined in the internal emergency plan;
- instructions for cleaning the equipment before the operation and how to take charge of the equipment from the unit responsible for its control under normal operating conditions;
- a mechanism (e.g., daily observation and feedback) for verifying that the safety requirements are being followed and, where required, ongoing or spotcheck monitoring of working conditions and the performance of the employee during the execution of the activity (i.e., in confined spaces);
- procedures to be followed to perform the non-routine activities (repair, replacement, inspection, etc.), including any procedure for uninstalling/re-installing the component;
- specific criteria for inspections, tests, or whatever else is necessary to verify that the equipment is in perfect order prior to returning it to service;
- instructions explaining the sequence of operations to be followed for re-commissioning of equipment, including pre-start-up, inspections and testing, e.g., verifying the absence of leaks, alignment of rotating parts, removal of trips and locks, etc.;
- procedures for formal delivery of the equipment to the unit responsible for its control under normal operating conditions;
- written authorisation specifying among other responsibilities, the means, timing, interfaces with other operations, operating limits, precautions, and signals.

Application and types of permits to work

The permit should be applied in all work areas in which these activities are carried out by internal personnel or contractors, except, generally:

- normal operations already subjected to specific procedures;
- works carried out in authorised workshops for which it is assumed that all the necessary precautions have been taken to carry out maintenance and repair activities at the workbench.

From a general point of view one can identify the following examples of permits-to-work:

- work in which a flame or spark is prohibited;
- hot" work, e.g., work involving the use of flame, heat, gases, flammable liquids or materials;
- work in confined spaces;
- working at heights;
- construction and modifications, including excavation;
- maintenance works;
- work on electrical installations, utilities and other equipment (live or dead environments);

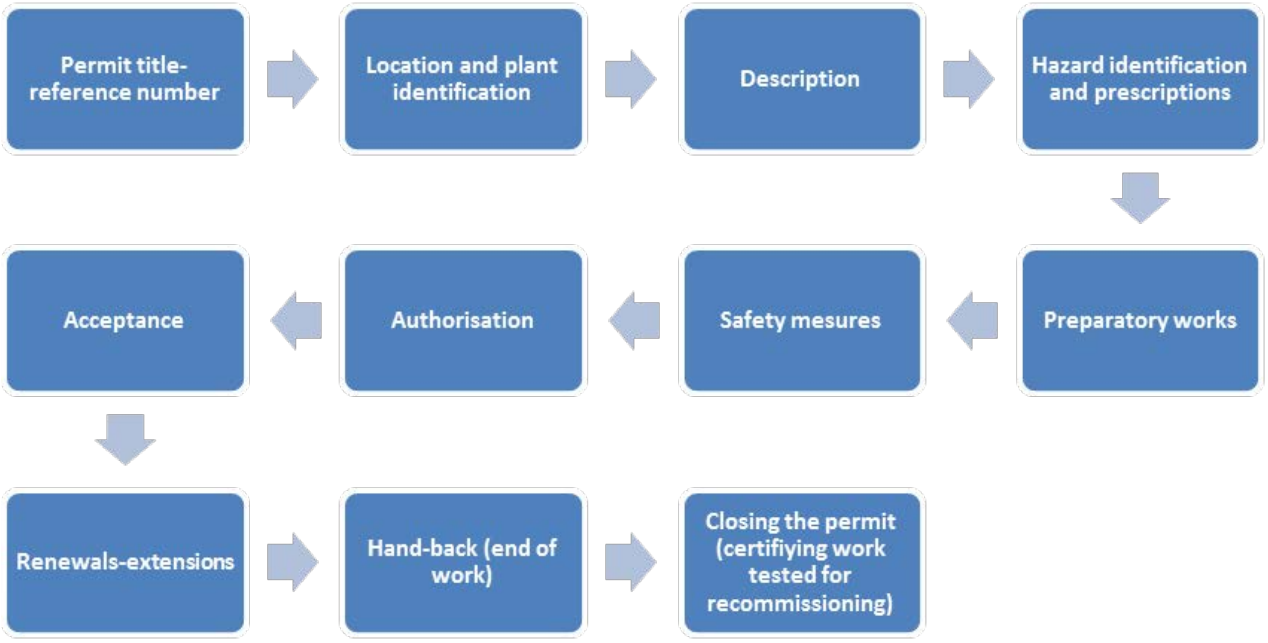

Fig 1 Example of a flow chart for a structure of a permit-to-work

- generic work (any work that does not fall within the previous categories of specific risks but, however, requires the safe management of works carried out by internal or external personnel).

Contents of the permit-to-work

To carry out non-routine activities, work orders, permits-to-work and other instructions (in agreement with what is described in paragraph "permit-to-work system") should specify:

- the interested parties, the type of permit, the work area;
- specifications of the work required and the time frame for execution. Actions that are specifically NOT authorized should also be specified. This latter measure is particularly important for avoiding ad hoc changes that could increase accident risks during temporary shut down or maintenance work.
- risks associated with the activity, including hazardous substances present and their properties
- important characteristics of the area in which the work is located interfaces with other operations, other works covered by other permit-to-work and operating limits necessary for safe and efficient execution of the work;
- all those activities that need to be concluded before the start of the work described in the permit to work;
- measures in place to control the risks and alarms or other warning signs that could indicate a potentially unsafe situation;
- safety systems and procedures to protect workers from hazards such as disconnection, isolation and the preparation of locks and trips (Lockout-Tagout);
- the personal protective equipment to be worn;
- the confirmation of the supervisor indicating the possibility of starting the work under the conditions specified in the permit-to-work;
- the acknowledgment and acceptance of the performing unit (personnel or contractors) of the conditions and requirements specified in the permit-to-work;

- if there is an extension of the validity of the permit, there should be a special space for renewals. For renewal should be foreseen further authorization and acceptance;
- formal confirmation that the maintenance work has been completed according to specification, including immediate communication to the relevant supervisor and/or shift manager that work has been completed;
- confirmation by the supervisor that the work has been correctly executed and tested, closed the permit and authorized the recommissioning.

The communication of these requirements and the effectiveness of the operations stipulated in the permit should then be fully verified prior to proceeding with the activity to ensure that all foreseeable risk has been removed.

Information, training and qualification

The following principles should also be embedded in the safety management system:

- All personnel who are in charge of critical operations for safety, including maintenance activities, (internal workers or contractors and sub-contractor employees, or in general whoever supplies products or services) should receive adequate training and information about the risks, the correct procedures to be followed, and the permit to work required to perform them.
- In case of special activities, for which the national legislation requires specific qualifications (e.g., electrical work, maintenance of ATEX equipment, works in confined spaces), the operator should set up specific procedures to take into account those instructions both for their employees (through a specific qualification) and contractor employees (verifying the qualifications of the external personnel).
- ¢K2ăŜ ₪ŜăLJ2yãλōfŜ ₮2₪ λăădzλyƎ ø2₪ٿ LJŜ₪YλűăăK2dzfŘ ōŜ λyØ2fØŜŘ λY₪ăٿ l·yl·fèăλă l·yŘ l·ŎŎλŘŜyű λyØŜăűλƎl·űλ2Y λY 2₪ŘŜ₪ű2 Ǝl·λYűKŜ l·LJLJ₪2LJ₪λl·ûŜ ₪ăٿ l·ø l·₪ŜySăă l·yŘ ٿy2øfŜŘƎŜ 2₮ űKŜ ăLJŜŎλ₮λŎ Kl·Îl·₪Ră λyKŜ₪Syű λY űKŜ l·ŎűλØλűλŜă űKl·ú ûKŜè l·₪Ŝ ₪Ŝljdzλ₪ŜŘ ű2 l·dzűK2₪λÎŜ¢ !ă øλűK 2űKŜ₪ 2LJŜ₪l·ûλ2yl·f l·ăLJŜŎûăΣ ŜYLJf2èŜŜă ăK2dzfŘ ōŜ λyØ2fØŜŘ λY Ŝăúl·ōfłăKλyƎ LJ₪2ŎŜŘdz₪Ŝă ₮2₪ ăl·₮Ŝ ø2₪ٿλyƎ¢

- There should be explicit procedures for supervision, monitoring and auditing of contractors and suppliers to verify that the external company performs the work safely and in compliance with established requirements including a job performance evaluation against specific criteria based on the job requirements.

Contact

This bulletin is a product of the EU Technical Working Group on Seveso Inspections. For more information related to this bulletin or other products and activities of the Technical Working Group, please contact:

Case studies illustrating the importance of permit to Work Systems

Source: UK Health and Safety Executive (http://www.hse.gov.uk/techmeaspermit.htm) and Wikipedia

Hickson Welch Ltd Fire (22/9/1992) Five persons were killed after a severe fire erupted in a batch processing plant following an attempt to clean 30 years of sludge from a vessel without a permit to work, or any prior analysis of the risks and associated safety precautions.

Pasadena - Phillips 66 (23/10/1989) Failure to follow isolation procedures during routine maintenance of a reactor in the polyethylene plant led to the release of a flammable vapour cloud that eventually ignited, launching a devastating series of explosions. The incident resulted in 23 deaths and 314 injured.

San Francisco Natural Gas Pipeline Puncture (25/8/1981) A 16-inch natural gas pipeline was punctured by an excavation contractor who, in violation of permit conditions, failed to verify the location of underground utilities. The gas did not ignite and was naturally dispersed. The PCB-mist spread over a busydistrict of the city, requiring the evacuation of 30,000 people.

Maureen.Wood@jrc.ec.europa.eu
Security Technology Assessment Unit
Major Accident Hazards Bureau
European Commission Joint Research Centre
Institute for the Protection and Security of the Citizen Via E. Fermi, 2749
21027 Ispra (VA) Italy

http://minerva. jrc.ec.europa.eu