

PETRONAS TECHNICAL STANDARDS

HEALTH, SAFETY AND ENVIRONMENT

GUIDELINE

PRE-ACTIVITY SAFETY REVIEW

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This revision of PTS **60.2208 – Pre-Activity Safety Review (October 2009, Revision 0)** has been updated to incorporate PETRONAS Lessons Learnt, Best Practice and new information issued by relevant industry code and standards. All updates in the document are highlighted in *italic* font.

The previous version of this PTS **60.2208 (September 2006)** will be removed from PTS binder / e-repository from herein onwards.

The custodian of this PTS is: Manager - HSE MS, Standards & Regulations, GHSED.

Please direct any questions regarding this PTS to the above-mentioned.

Document Approval

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PREFACE

PETRONAS Technical Standards (PTS) publications reflect the views, at the time of publication, of PETRONAS OPU/Divisions.

They are based on the experience acquired during the involvement with the design, construction, operation and maintenance of processing units and facilities. Where appropriate they are based on, or reference is made to, national and international standards and codes of practice.

The objective is to set the recommended standard for good technical practice to be applied by PETRONAS' OPU/Divisions in oil and gas production facilities, refineries, gas processing plants, chemical plants, marketing facilities or any other such facility, and thereby to achieve maximum technical and economic benefit from standardization.

The information set forth in these publications is provided to users for their consideration and decision to implement. This is of particular importance where PTS may not cover every requirement or diversity of condition at each locality. The system of PTS is expected to be sufficiently flexible to allow individual operating units to adapt the information set forth in PTS to their own environment and requirements.

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1.0 INTRODUCTION

1.1 Objectives

This Pre-Activity Safety Review PTS has been written to provide the guidance and tools necessary to develop and operate a system for conducting pre-activity safety reviews with respect to business, operational, and HSE matters in a PETRONAS HCU/OPU at the corporate and business activity levels, following and aligning with the principles described in the PETRONAS Health, Safety, and Environmental Management Systems Manual (HSE MS Manual, PTS 60.0101), as well as fully incorporating the requirements of OSHA – PSM, 1910.119, the Pre-Startup Safety Review element.

This PTS provides:

- a reference of first resort for line managers and senior staff needing guidance in the essential Pre-Activity Safety Review (PASR) requirements of any area of PETRONAS operations.
- a route map and linkage to more detailed references and cross-references with guidance on their application.

Structure and Content

Refer to the Table of Contents for an overview of how this PTS is structured.

Format

This PTS is arranged in either hardcopy or softcopy format, which are available on the PETRONAS intranet for down-loading and subsequent reference and usage.

User Base

Pre-Activity Safety Review PTS users are expected to be HCU/OPUs and selected contractors. The PTS will either serve as a reference for others to assist in the development of 'in-house' specific reference documents, or will be used as a first-line reference in the case of smaller organizations.

1.2 Using the Pre-Activity Safety Review PTS

Language

In this document the recommendations for a course of action are made with varying degrees of emphasis. As a rule:

'may' indicates a possible course of action

'should' indicates a preferred course of action.

'shall' indicates a course of action with a required, mandatory status within the HCU/OPUs. The English language equivalent or interchangeable term of “shall” is ‘must.’

In this PTS document the collective expressions of PETRONAS are sometimes used for convenience in contexts where reference is made to the companies of the HCU/OPU in general. These expressions are used where no useful purpose is served by identifying the particular company or companies.

Application

Should any significant deviations be made from the guideline recommendations in this PTS document then users are required to inform PETRONAS of the nature and justification for these if it is intended that the deviations are to be permanent.

Feedback

This PTS document is not intended as a static set of rules, but a growing collection of HSE expertise. Consequently, users are invited to comment on the PTS to PETRONAS and to suggest changes and additional material which they consider would be useful for inclusion in future revisions.

1.3 Relationship with Other Systems

This current version of the Management of Change PTS has been designed and written so as to link back to the higher level document, the PETRONAS Health, Safety, and Environmental Management Systems Manual (HSE MS Manual, **PTS 60.0101**), as well as to comply with the requirements for OSHA Process Safety Management (PSM).

Furthermore, this Pre-Activity Safety Review PTS has been developed to be an integral part and tool to assist in managing change within the overall PETRONAS HSE MS. Figure 1 below illustrates the elements of the PETRONAS HSE MS and their interactions.

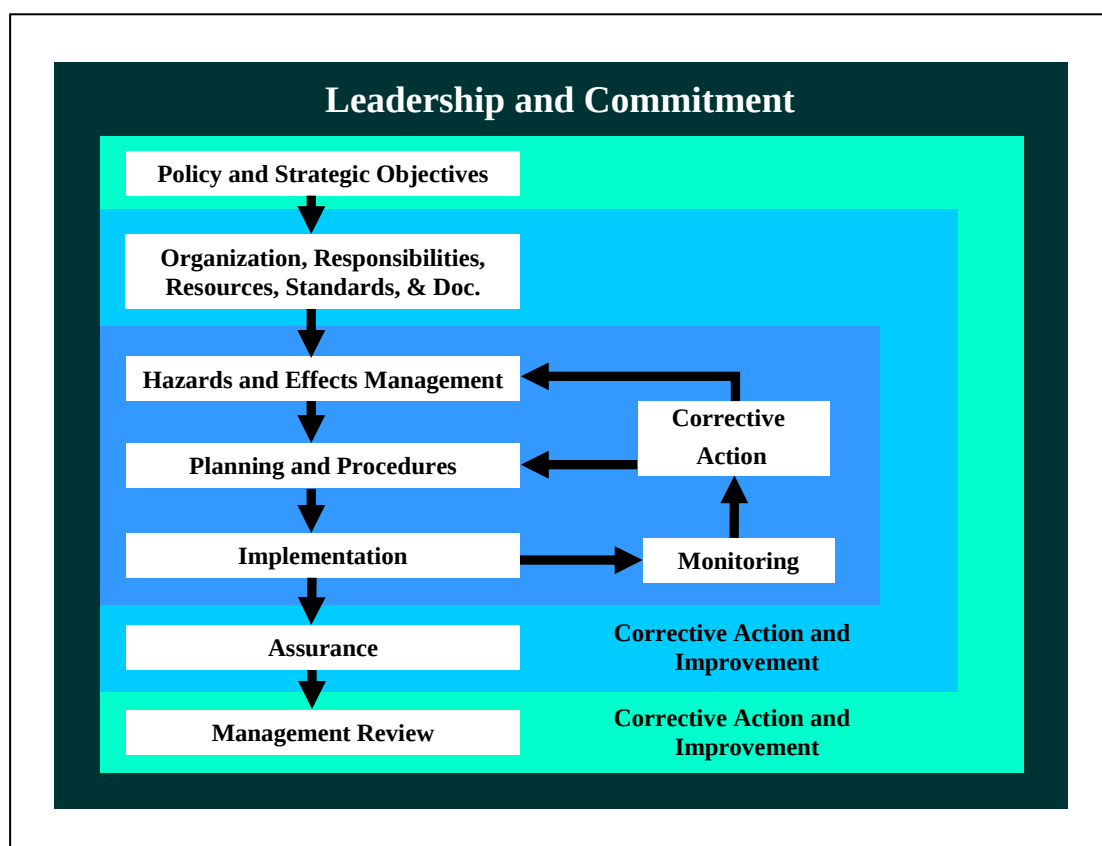


Figure 1: The PETRONAS HSE MS

The Pre-Activity Safety Review (PASR) activity easily fits into the overall PETRONAS HSE MS, and includes, but is not limited to, the following examples:

Leadership and Commitment: PETRONAS Management commits and expects all managers to proactively lead, establish, implement, and maintain Pre-Activity Safety Review programs and initiatives in their respective HCU/OPU's.

Organization, Responsibilities, Resources, Standards, and Documentation: The roles and responsibilities for establishing and maintaining a Pre-Activity Safety Review system and to ensure that it is effective, shall be clearly defined within an HCU/OPU's existing organizational structure. This is to include designation of responsible personnel / Custodians to manage all aspects of the PASR system, allocate sufficient resources to the system, develop standards to ensure suitable, adequate, and effective performance of the Pre-Activity Safety Review system on site, and establish both Document and Records Control Management systems to handle Pre-Activity Safety Review-related documentation.

Hazards and Effects Management (HEMP): Pre-Activity Safety Reviews shall be suitably, adequately, and effectively integrated into the Hazards and Effects Management system, and vice-versa. This commonly and minimally would require that all Pre-Activity Safety Reviews incorporate a relevant and robust risk assessment process prior to any covered activity commencing.

Planning and Procedures: All business / HSE covered activities should consider the need for a Pre-Activity Safety Review. Documented procedures shall be in place for conducting Pre-Activity Safety Reviews.

Implementation and Monitoring: Evidence of the suitable, adequate, and effective implementation and monitoring of the Pre-Activity Safety Review system shall be available at the HCU/OPU / site. Where other systems are implemented, and require change, a Pre-Activity Safety Review may need to be applied.

Assurance: From time to time, and based on planned schedules, the Pre-Activity Safety Review system shall be subject to PETRONAS Assurance activities.

Management Review: The suitability, adequacy, and effectiveness of the HCU/OPU's Pre-Activity Safety Review system shall be periodically reviewed by Senior / Upper Management of the HCU/OPU as part of their formal and periodic Management Review processes at site.

2.0 PRE-ACTIVITY SAFETY REVIEW

2.1 Overview

This section deals with Pre-Activity Safety Reviews and presents a strategy for their implementation so as to ensure that planned activities are sufficiently reviewed before commencing operations in order to prevent adverse HSE consequences that could affect other business aspects and success of the organization.

Many incidents include direct and indirect causes with origins to inadequate identification and review of hazards and loss exposures. The cause-and-effect relationship associated with inadequate identification and review of hazards and loss exposures in any element of the management system, if not anticipated and reviewed before their commencement, could directly result in serious losses being sustained.

2.1.1 Aim

The goal of any Pre-Activity Safety Review process is to provide a coherent, systematic, and as simple a strategy as possible for all end-users to implement in order to ensure that:

- all prior identified hazards and loss exposures associated with a planned activity's implementation have been addressed to close-out before commencement of the planned activity, and
- that other potential unidentified hazards and loss exposures are identified and addressed to close-out before commencement of the planned activity.

In short, the planned activity is thoroughly reviewed before its commencement so as to produce its intended benefits without adverse side-effects.

For PETRONAS HCU/OPUs, this requires ensuring that proper sequences, types, and levels of pre-activity safety review are consistently applied to prevent adverse HSE effects to the HCU/OPU.

Well implemented, PASR ensures that the health, safety, environment, and reputation of the HCU/OPU and its personnel is not compromised by inadequate identification, review, and evaluation of hazards and loss exposures prior to a planned activity's commencement, and that the intended benefits of a planned activity are fully realized. Appendix 1 illustrates the basic PASR process.

2.1.2 Expectations

HCU/OPU management shall ensure that the following expectations, as a minimum, are delivered whenever there is a need for Pre-Activity Safety Review (s) in the HCU/OPU:

All changes – including organisational and procedural change – shall be subject to a formal Management of Change process. For this reason, invocation of the Management of Change procedure is required (refer to PTS 60.xxx, Management of Change). However, as a “last line of defence,” any approved change shall also be subject to a Pre-Activity Safety Review(s), since such reviews provide a check to the MOC process. Depending on the nature and complexity of the change, an appropriate type of review tool must be chosen. Example review tools may include:

- Job Safety Analysis (JSA)
- What-If? / Structured What-If? Techniques and Checklists
- Site Specific / Customized Checklists
- HAZOP / Mini-HAZOP
- SWOT – Strengths, Weaknesses, Opportunities, Threats Technique
- Simple Risk Assessment / Brainstorming.

The Hazards and Effects Management Process (HEMP), PTS 60.0401, should also be referred to as this will guide and supplement the overall review approach to assessing the change just prior to its commencement.

Major restarts of a plant shall be subject to a Pre-Activity Safety Review (PASR). Prior to the commencement of a major re-start of a plant, emergency start-ups, etc., the HCU/OPU shall ensure that the appropriate level of Pre-Activity Safety Review is initiated, completed, and endorsed by HCU/OPU Senior management (or a delegated, relevant authority) for re-start. Items / hazards identified from the PASR shall be addressed to close-out prior to the commencement of the re-start. Example Pre-Activity Safety Review processes may include:

The hand-over process of major projects and maintenance shall apply a suitable safety review and punch list process. HCU/OPU Senior management shall ensure that appropriate hand-over procedures are established, implemented, and maintained. Hand-over shall include the requirement for an appropriate Pre-Activity Safety Review with a punch list process, and items / hazards identified from this process shall be addressed to close-out prior to formal hand-over. Handover processes shall include, as a minimum, both shut-down and start-up activities.

Hazards identified by the above, previous processes shall be recorded and addressed prior to the execution of the activity as action items.

Endorsement by the proper level of authority shall apply to both during and after Pre-Activity Safety Reviews are completed. It is important that a process of ownership apply throughout the entire Pre-Activity Safety Review process. Depending on the nature of the Pre-Activity Safety Review, this process may include a few, several, or many levels requiring authorization to continue on to the next stage of the review. Such ownership also helps to ensure that proper follow-up is taking place immediately at each stage before the review can proceed to the next stage.

HCU/OPU management shall define the levels of management required to approve and endorse the review(s) as it progresses. The over-riding principle is that the more complex and extensive the review, the higher the level of HCU/OPU management that shall be involved as Owners of the process. Additionally, one overall Owner shall be appointed to coordinate and guide the entire review process for each Pre-Activity Safety Review case.

Pre-Activity Safety Reviews shall ensure that any affected documentation change is reflected on all relevant documents. Reviews do not happen in isolation. The review Owner(s) must be aware of the system linkages that the review may affect.

All process safety-related information and affected operating procedures shall be appropriately reviewed, revised, and updated as necessary if the review affects such information, and prior to the activity's commencement.

It is the responsibility of the Pre-Activity Safety Review Owner(s) to ensure that process safety information is included as part of the review process, as a potential system element that may be affected.

How documentation may be affected as a result of a Pre-Activity Safety Review process is detailed in the section "Links with Other System Activities."

The Pre-Activity Safety Review system shall ensure that all necessary communication and / or training for affected personnel are completed prior to commencement of the activity. It is highly likely that any activity will affect more than just the end-user, Review Owner(s), Custodian(s), and/or his / her team. Before an activity is approved for commencement, the Owner(s) shall ensure that all affected personnel are identified for training and communication needs.

Those who may need training and to be communicated to include:

- Employees working directly with, and affected by, the change: Operators, technicians, maintenance personnel, operations personnel, etc.
- Employees indirectly affected by the change: Personnel assisting the above, such as Human Resources, Procurement, Training, Engineering, Medical, ERP Team members, etc.
- Relevant Management levels
- Contractors
- Visitors
- Suppliers
- Neighbouring installations and communities
- Other stakeholders.

The Pre-Activity Safety Review process shall be continually monitored, action tracked, and improved – both on an individual review level as well as on the system compliance level. HCU/OPU Management, in their ongoing commitment to continual improvement, shall also ensure that their site Pre-Activity Safety Review system includes monitoring, action tracking, and assurance activities.

Monitoring and action tracking activities should seek to ensure that each Pre-Activity Safety Review process is monitored for implementation throughout its life-cycle.

This includes:

- Monitoring the suitability, adequacy, and effectiveness of each Pre-Activity Safety Review process,
- Monitoring the affected working environment during implementation of the Pre-Activity Safety Review,
- Monitoring the affected working environment, for a defined and reasonable amount of time, after the Pre-Activity Safety Review has been completed for any possible side effects or side benefits,
- Any resulting corrective and/or preventive actions identified and required to be taken as a result of monitoring activities shall be entered into the HCU/OPU action tracking system for timely follow-up and close-out.

- Driving the Pre-Activity Safety Review to timely completion.

Assurance activities should be directed towards assessing the entire system of Pre-Activity Safety Reviews at the HCU/OPU.

This includes:

- Identifying strengths of the system, learning from such success, and applying the success to other areas requiring improvement,
- Identifying weaknesses of the system, learning from such weaknesses, improving the weak areas of the system, and ensuring that the same weaknesses don't arise in other areas of the Pre-Activity Safety Review system.

2.1.3 Links with Other System Activities

The following HSE MS activities will normally have a direct link to the Pre-Activity Safety Review activity. It is the responsibility of the Pre-Activity Safety Review Custodian and his / her team to ensure that all suitable links are identified for their relevance on a case-by-case basis, and if affected, appropriate control measures are identified, implemented, and monitored.

Use of systematic checklists for each Pre-Activity Safety Review can help ensure this process is robust and complete.

Design Integrity (DI) – Review findings related to design of new equipment and/or existing plant and processes should observe the requirements of Design Integrity. Similarly, a new design / new asset that affects an existing installation may require a Pre-Activity Safety Review prior to commissioning / start-up. Pre-Activity Safety Reviews help ensure that construction and equipment is in accordance with design specifications.

Mechanical Integrity (MI) – Under Pre-Activity Safety Reviews, the review shall be conducted so that hazards are identified which may adversely affect the mechanical integrity of the equipment and the plant. Where new equipment, or new way(s) of maintaining equipment, is involved, the related Mechanical Integrity documentation shall be updated.

Operational Procedures and Practices (OP) – Pre-Activity Safety Reviews may identify a need to revise an Operating Procedure(s). Revisions to an Operating Procedure(s) are also subject to an element of MOC called a Procedure Change. Pre-Activity Safety Reviews help ensure that safety, operating, maintenance, and emergency procedures are in place and are adequate.

Process Safety Information (PSI) – Pre-Activity Safety Reviews shall ensure that all affected Process Safety Information documentation and records are up-to-date prior to commencement of the activity. Evidence of the updates made to the Process Safety Information shall be clear based on site document control procedures with respect to revision numbering, dating, traceability, etc. Pre-Activity Safety Reviews are required when the modification is significant enough to require a change in the process safety information for new facilities and for modified facilities. Conversely, accurate Process Safety Information is a critical input to the Pre-Activity Safety Review process.

Process Hazard Analysis (PHA) – Tools for hazard identification and risk assessment shall be employed for Pre-Activity Safety Reviews. Additionally, for new facilities, Pre-Activity Safety Reviews help ensure a process hazard analysis has been performed and recommendations have been resolved or implemented before startup; and modified facilities meet the requirements contained in management of

change.

Training (TR) – Review findings and actions taken as a result to equipment, system, organization, procedures, and methods, shall be identified, communicated, and/or and trained to all affected personnel. Pre-Activity Safety Reviews help ensure training of each employee involved in operating a process / activity has been completed.

Emergency Planning and Response (EPR) – Emergency plans, procedures, and other resources may require updating as a result of the Pre-Activity Safety Review.

Hazards and Effects Management Process (HEMP) – Pre-Activity Safety Review findings may prompt the updating of HCU/OPU HEMP Registers, since these reviews may also identify hazards and risks that were previously overlooked or did not exist..

Assurance – Pre-Activity Safety Review Assurance activities may generate findings which trigger recommendations for change to the review system, which shall be managed by MOC.

Incident Investigation – Production shutdowns as a result of major or high potential accident / incidents should be subject to a Pre-Activity Safety Review prior to start-up of the facility. Investigation findings and their remedial action plans should also be subject to a Pre-Activity Safety Review.

Contractor Management System – Contractors themselves may participate in Pre-Activity Safety Reviews, and their active input should be encouraged by HCU/OPU Management. Conversely, the site Pre-Activity Safety Review system may affect contractor work activities.

Management of Change (MOC) – Management of change processes may require a Pre-Activity Safety Review as part of the change cycle. A Pre-Activity Safety Review might also generate findings which trigger recommendations for change, which shall be managed by MOC.

2.1.4 Basis and Compatibility

This PTS:

- 1) Is based on PTS 60.0101, HSE MS Manual, which provides “global” HSE management system guidance for PETRONAS companies,
- 2) Complies with local Legal Requirements where the HCU/OPU operates, such as CIMA regulations, Malaysian Labor Law, etc.
- 3) Compatible with ISO 14001 : 2004 Standard for Environmental Management Systems and the OHSAS 18001 : 1999 Specification for Occupational Health and Safety Management Systems
- 4) Incorporates other internationally accepted “best management practices.”

3.0 THE PRE-ACTIVITY SAFETY REVIEW PROCESS

3.1 Application / Timing of Application

Within an HCU/OPU, consideration and holistic thinking must be given as to what may prompt or entail a Pre-Activity Safety Review.

HCU/OPU Management shall define when Pre-Activity Safety Reviews are to take place and for which type of activity. The techniques to be used for such reviews shall also be defined, and supported by appropriate procedures.

As a minimum, Pre-Activity Safety Reviews shall take place for the following activities:

- for new facilities,
- for modified facilities when the modification is significant enough to require a change in the process safety information (PSI),
- for existing processes that have been shutdown for turnaround,
- for Pre-shut Down activities
- for any incident investigation recommendations to see what impacts they may have on the process before beginning a startup,
- for compliance assurance activities, to see what impacts they may have on the process before beginning a startup
- for PHA recommendations to see what impacts they may have on the process before beginning a startup,
- for hand-over processes of projects, and operations to maintenance and vice-versa, so as to confirm punchlists are closed out, etc.
- as an adjunct to any Management of Change (MOC) case which is linked to a new or modified facility, and where the Change Cycle has defined a Pre-Activity Safety Review(s) as a milestone(s) activity,
- for Major activity(ies) where the activity(ies) is not process-based, but organizational- and/or procedural-based, yet may still have adverse HSE implications for the HCU/OPU, such as large reductions in manpower and/or use of invalidated procedures, etc.
- for Start-ups required after emergency / urgent shut-down(s) and plant trips.

3.2 Methods (Including the Use of Checklists)

HCU/OPU Management shall define which method(s) or technique(s) shall apply to each type of review. HCU/OPU Management shall have available a selection of techniques to be used for Pre-Activity Safety Reviews, clearly showing which applies where and when per type of activity.

In general, the use of a standard checklist may usually suffice for new or modified facility-type reviews, but a variety of techniques is encouraged to cover situations mentioned in the "Application / Timing of Application" section above.

A sample checklist, useful for a new or modified facility-type review is given in Appendix 2. This checklist can also be customized by the HCU/OPU to reflect their "reality on the ground."

and to serve as a basis for the other types of activities meriting a review listed above in the “Application / Timing of Application” section.

Another, more generic checklist can be found in Appendix 3. This checklist can serve as a basis for the HCU/OPU to customize their own checklists, taking categories as applicable to their local needs, and to cover many activities which may not be directly tied to new or modified facilities, but yet may still deserve a Pre-Activity Safety Review as they may adversely cause adverse HSE effects to the HCU/OPU.

Appendix 4 contains a specific checklist for the HSE discipline, which can be used to supplement or add to other checklists used in the Pre-Activity Safety Review.

3.3 Acceptance Criteria

Depending on the number of review findings, HCU/OPU management shall determine and define their local acceptance criteria for when commencement of the activity can proceed. The logic is that in many cases, it may not be practical from a risk – benefit – cost point of view to wait to close-out all review findings from a Pre-Activity Safety Review, while in other cases it may be critical to do so.

HCU/OPU Management therefore needs to prioritize review findings. This includes defining the level(s) of authority required and the conditions to be met to formally approve commencement of an activity(ies), particularly in situations where Pre-Activity Safety Review findings / action items are still outstanding.

For example, an HCU/OPU should establish and maintain a system to classify each Pre-Activity Safety Review finding as to its hazard potential, in order to prioritize follow-up and help determine when the planned activity can proceed. Logically, review findings classified as High-potential should not be allowed to proceed until they are rectified, whereas reviewed activities with Medium- or Low-potential findings may be allowed to proceed, as long as certain existing or additional controls are put in place and meet with HCU/OPU management approval or endorsement. Determining and classifying a review finding as High-, Medium-, or Low-, can be done using the standard PETRONAS Risk Matrix (refer to PTS 60.133), or another site-developed hazard classification system.

3.4 Roles, Responsibilities and Activities

HCU/OPU Management shall define the roles and responsibilities required to conduct Pre-Activity Safety Reviews. Roles include, but may not be limited to the PASR Custodian, PASR Owner, PASR Team Member(s), etc.

Before conducting a Pre-Activity Safety Review, these issues should be clarified:

1. **Purpose and ultimate use of the Pre-Activity Safety Review:** Why are we doing the Pre-Activity Safety Review? For whose use will it be of value? Who are we trying to satisfy?
2. **Definition of the system(s) to be analyzed:** Determine the scope of the Pre-Activity Safety Review. What will and will not be assessed?
3. **Principal concern categories:** Break down the Pre-Activity Safety Review scope into manageable categories.
4. **Known assumptions and constraints:** What might affect the outcome of the review (i.e., issues such as management culture and company HSE vs. production priorities), and constraints such as resources, budgets, time, personnel, etc.