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Guidelines for Competency Management Systems for COMAH Sites

Document History

This document is a controlled document maintained by Cogent. Future revisions will be recorded below with revision details and date of revision.

Version No	Revision Details	Date
1a	First Draft for refinery sites	June 2011
1b	refinery references removed and Gold Standard job roles for chemicals added	November 2011
1c	Paragraph added to page 3 on the provenance of these guidelines	December 2011
1d	Amendments made to remove additional refinery references	December 2011
1	Final versions approved for publication	July 2012

Drafts are version: 1a, 1b, 1c etc.
Final document is version: 1

Amendments to Version 1 are 2a, 2b, 2c etc

In promoting and leading on key sector process safety initiatives, Cogent originally worked with their Downstream Advisory Council competence assurance working group to produce 'Guidelines for Competency Management for Downstream and Petroleum sites'. These were signed off by the Downstream Advisory Council in March 2011, have been endorsed by the UK Petroleum Industry Association, and were published in June 2011. Subsequently the chemical sector, via the Chemical Advisory Council, requested that a general COMAH version of the Guidelines be developed.

It is not the intention of this document to specify how Competency Management Systems should be developed, nor replace any existing corporate policies on competence management. The intent of this document is to provide a reference for those organisations developing or wishing to review competency management systems.

There are no limitations on further distribution of this guideline to other organisations outside of Cogent, provided that:

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5. It is understood that no warranty is given in relation to the accuracy or completeness of information contained in the document except that it is believed to be substantially correct at the time of publication.

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Foreword

These new *Guidelines for Competency Management Systems for COMAH sites* have been the subject of extensive consultation and designed with input from industry experts who have many years of experience working in the sector.

Whatever the nature of the organisation, the competence of its people is key to achieving business aims. In process industries, a good quality, effective competency management system is also absolutely critical to ensuring a strong safety performance.

The need for organisation-wide processes for both developing and monitoring the competence of staff is paramount within both the sector and its supply chain. These guidelines have been designed to ensure such processes leave no stone unturned, and that competency management is enshrined across the entire workforce.

The guidelines are also designed to ensure that your competency management system not only improves staff motivation and performance, but critically reduce risks and the potential for human error.

The benefits of an effective competency management system include:

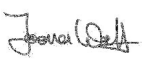
- improved staff motivation and performance on the job
- an organisational framework for staff development
- reduction of incidents and accidents
- greater efficiency
- a common framework which reduces administration and duplication across the organisation

The guidelines are applicable to all sizes of organisation, from non COMAH smaller sites – through to large top-tier COMAH sites.

A sound competency management system aligns organisational needs with the development needs of individuals within the organisation. It will demonstrate that your employees and contractors are competent to carry out the tasks they are required to perform, and that they are continually developing, alongside the introduction of new technology and regulation.

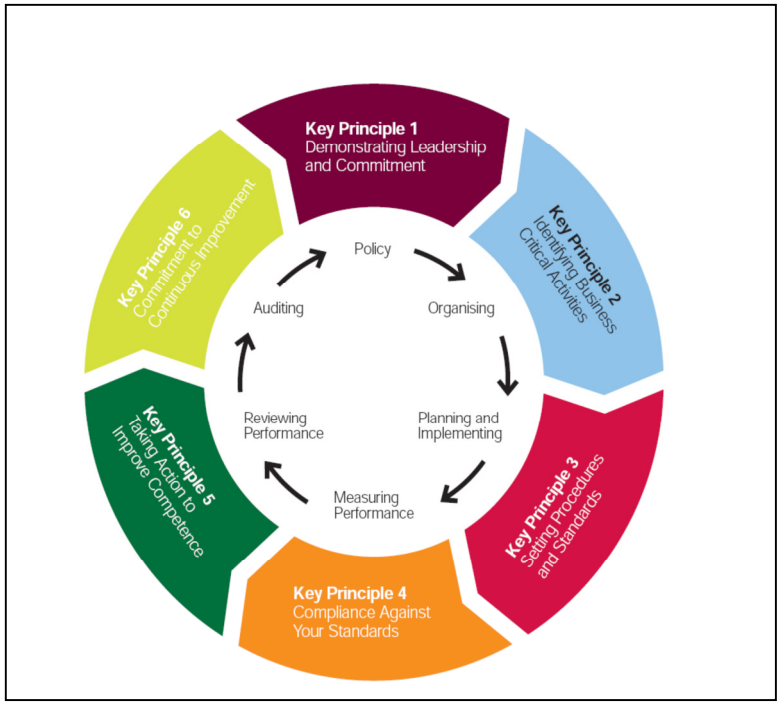
Finally, the guidelines are designed to work hand-in-hand with Cogent's Gold Standard competency framework. This provides continuing professional development routes for a range of job roles across the sector and supports critical organisation-wide competence.

Together, these tools provide best practice in competency management, and are fully endorsed by the industry.



Joanna Woolf
CEO, Cogent SSC

Introduction



The Six Principles of Competence Assurance

Competence assurance is realised through a competence management process that aligns to six key principles:

1) Demonstrating leadership and commitment
2) Identifying business critical activities pertaining to the control of major accident hazards
3) Setting procedures and standards
4) Compliance against your standards
5) Taking actions to improve competence
6) Commitment to continuous improvement

The purpose of a competence management system is to control, in a logical and integratedmanner, a cycle of activities that will assure competent performance. The aim is to ensure thatindividuals are clear about the performance expected of them, that they have received appropriatetraining, development assessment and re-assessment; and that they maintain or improve their competence over time.

Whilst these guidelines emphasise the importance of adopting a risk based approach to ensure that the competence management system focuses on safety critical tasks, they can also be applied to the entire workforce and all roles.

These guidelinesfor competency management systems for COMAH sites are broken down into 6 sections:

1. Define the Scope of the Competence Management System
2. Design the Competence Management System
3. Implement the Competence Management System
4. Assess and maintain Competence Management System
5. Verify and audit the Competence Management System
6. Apply the guidelines to the contractor workforce

Sections 1 and 2 consider the scope and design of the Competence ManagementSystem and the need to describe the purpose of the system.

Sections 3 and 4 consider the implementation of the system, how it is used, tools that work, including key performance indicators that might be used to evidence the competence of the workforce.

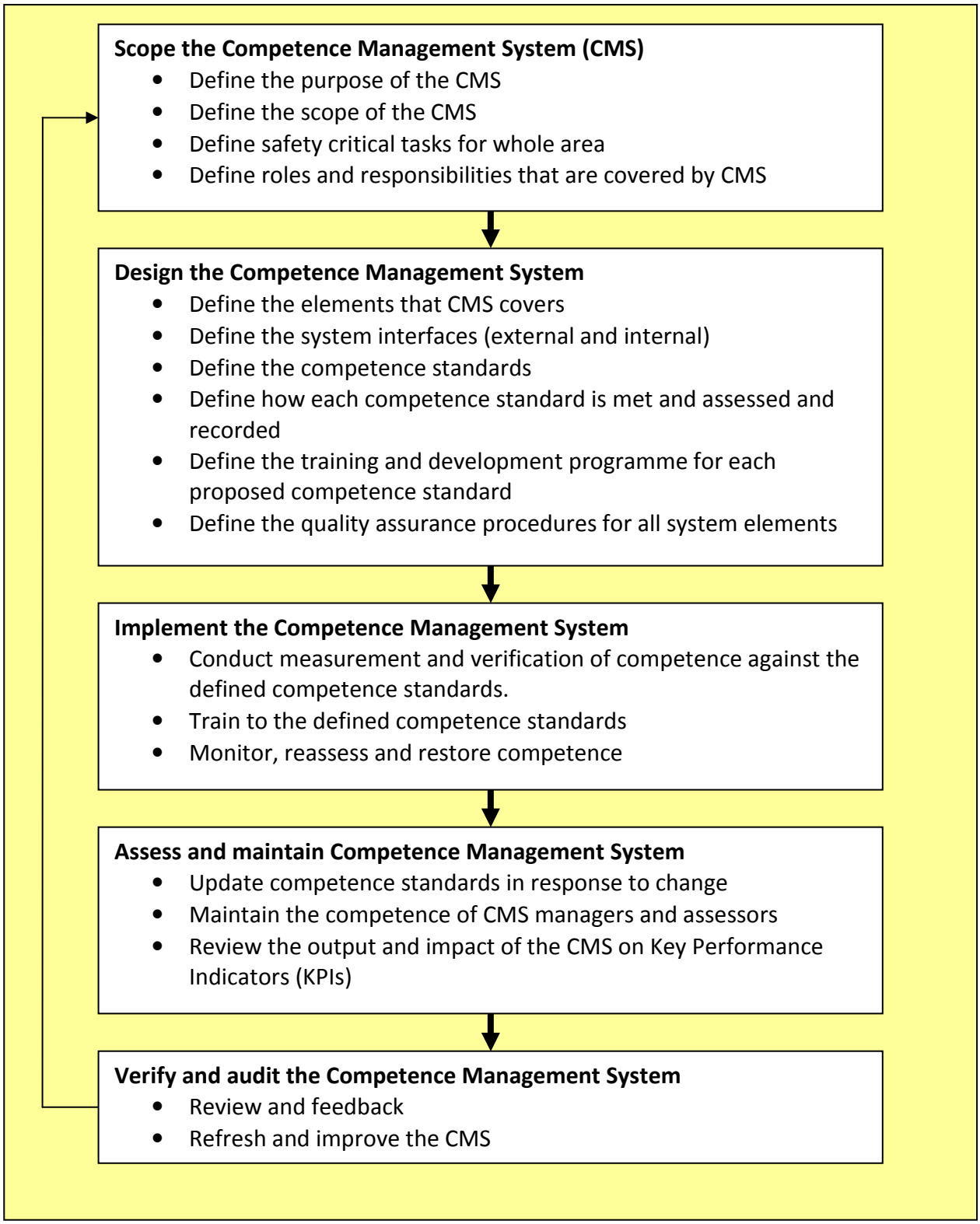
Section 5 considers the assurance of the Competence ManagementSystem, is it robust, does it stand up to scrutiny, is it being used correctly and is it delivering the required process safety outcomes.

Section 6 considers the application of these guidelines to the contractor workforce as a means of supporting the assurance of contractor competence and the implications for procurement of contractors and third party suppliers.

Key points and examples from industry are provided throughout the document to further illustrate how these guidelines might be put into practice.

The intention is that by following these guidelines for competency management systems you will be better able to:

Demonstrate that you are confident your staff and contractor staff are competent to carry out the tasks that they are required to perform.


Scope the Competence Management System (CMS)
Define the purpose of the CMS
Define the scope of the CMS
Define safety critical tasks for whole area
Define roles and responsibilities that are covered by CMS
Design the Competence Management System
Define the elements that CMS covers
Define the system interfaces (external and internal)
Define the competence standards
Define how each competence standard is met and assessed and recorded
Define the training and development programme for each proposed competence standard
Define the quality assurance procedures for all system elements
Implement the Competence Management System
Conduct measurement and verification of competence against the defined competence standards.
Train to the defined competence standards
Monitor, reassess and restore competence
Assess and maintain Competence Management System
Update competence standards in response to change
Maintain the competence of CMS managers and assessors
Review the output and impact of the CMS on Key Performance Indicators (KPIs)
Verify and audit the Competence Management System
Review and feedback
Refresh and improve the CMS

1. Define the Scope of the Competence Management System

1.1 Define the purpose of the CMS

1.1.1 Any Competence Management System should assure the organisation, individual employees andexternal bodies, that the workforce is demonstrating ongoing competence in any role, across all disciplines.

Example of a statement of purpose
The purpose of the CMS is to:

- Assure the company, individuals and where appropriate external bodies that the workforce is competent now and for the future.
- Prioritise regulatory requirements, process safety, occupational health and safety, and environmental requirements in the workplace.
- Comply with statutory requirements for a competent workforce.
- Comply with corporate management system procedures.
- Support individuals in developing and demonstrating the skills, knowledge, behaviours and experience required for doing their jobs.
- Demonstrate fair and consistent methods and measures to verify competence aligned to the agreed job description and the particular requirements of each individual.
- Support company systems and models in managing performance safely and effectively from an individual, management and organisational perspective.
- Align, wherever possible, to nationally recognised qualifications and standards or their equivalent and encompass assessment procedures.
- Identify training requirements for individuals, teams and the organisation to meet and support competence requirements.
- Identify accountabilities and responsibilities for management and personnel.
- Accommodate change and support the management of change.
- Maintain suitable and auditable records.

1.2 Define the scope of the CMS

1.2.1 Establish a steering group to set the policy and have a direct responsibility within the CMS for key elements of the system. The steering group should involve representatives from all appropriate levels within the organisation.

1.2.2 Consider the whole organisation and prioritise safety critical and Competent Authority regulatory requirements in the workplace.

The scope of the CMS should:

- Provide a structured and systematic approach to competency, training and procedures.
- Demonstrate assurance of the continuing ability of individuals and teams to perform reliably to a set standard safety critical tasks that impact on Major Accident Hazards.
- Demonstrate a link between competency management and the COMAH safety report.

Example of a CMS policy statement for a COMAH site

The objectives of the CMS are:

- To ensure that all personnel who directly or indirectly influence process safety performance, including managers and executives, have the necessary range and level of competencies. This includes activities, responsibilities and decisions associated with major hazard related work and relevant to the control of process safety hazards.
- To assure competence within HSEQ Management Systems covering Major Accident Hazard (MAH) Safety, Occupational Health and Safety, Environment and Quality.
- To deliver a consistent approach and minimise duplication and conflict.
- To develop and strengthen individual, department and organisational capability.

1.3 Define safety critical tasks for the whole area

1.3.1 Safety critical tasks are those where sub-standard performance could contribute to a major accident hazard.

1.3.2 Create a safety critical task list for all areas of the operation.

1.3.3 Consider normal, abnormal and emergency operations.

- *For identifying safety critical tasks refer to COMAH reports and HSE guidance*
- *Use HAZID and quantitative risk analysis to confirm potential major contributors to a major accident hazard.*
- *Use a generic task approach rather than an individual task approach.*
- *Identify safety critical tasks by consultation with relevant local management eg area supervision, training and process safety engineer.*
- *"Bow-Tie" diagrams can be used to identify control and mitigating measures.*
- *Consider corporate guidance and experience of past failures.*
- *For more detailed guidance on task analysis see section 9.0 Further Reading.*

1.4 Define roles and responsibilities that are covered by CMS

1.4.1 Identify roles that include the safety critical tasks that have been identified for the whole area.

1.4.2 Include non-operational roles eg procurement and senior management.

1.4.3 Identify which people have safety critical tasks attached to them.

1.4.4 Acritical task/role matrix can be used to define the roles at a management and senior management level that should fall within the scope of the CMS.

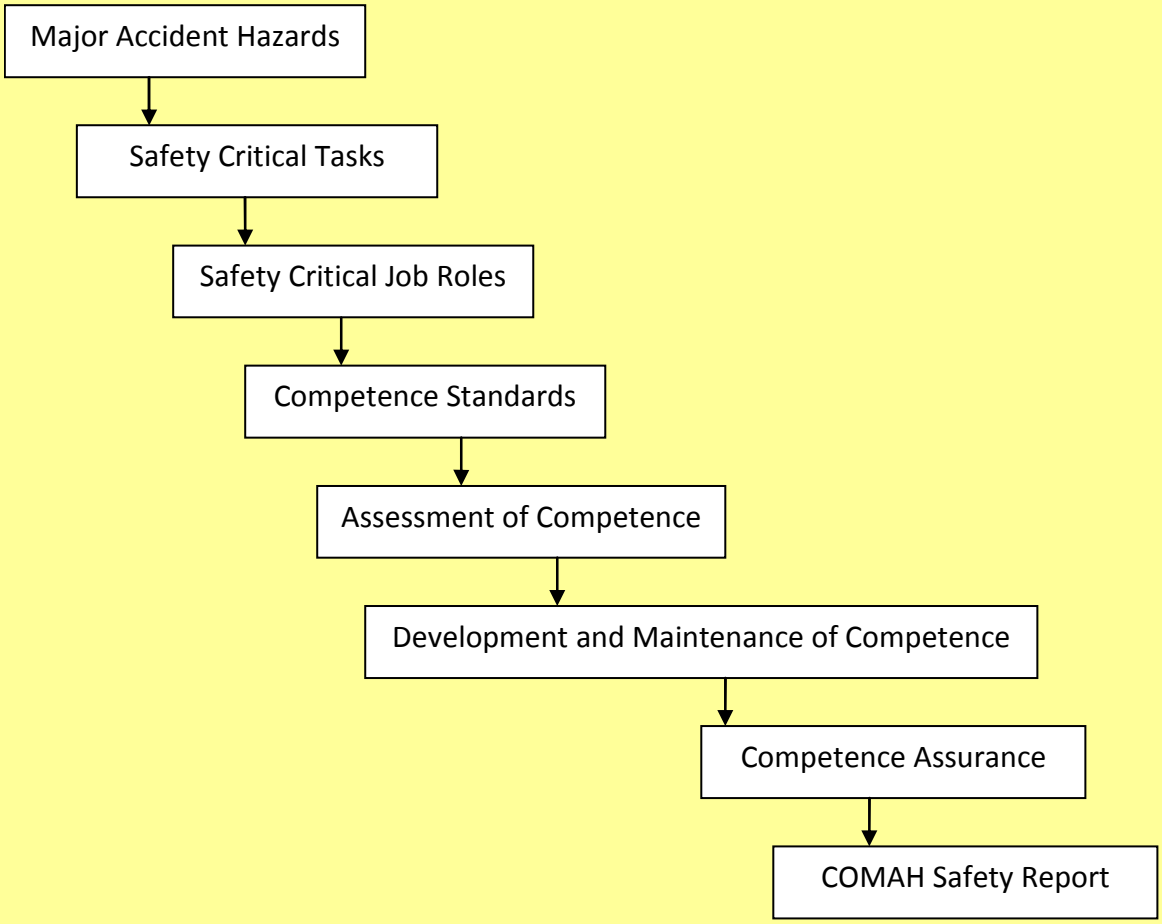
- *Use a critical task/role matrix to capture the safety critical roles and thus define the scope of the CMS.*
- *Working groups with representatives from all departments are useful for identifying both operational and non-operational safety critical roles.*
- *Consider including representatives from process safety, operations, HR.*

Example of a checklist for scoping the Competency Management System

1 Start with job/role/tasks not individuals
2 Do not re-write procedures
3 Use workshops to brainstorm with your company subject matter experts
4 Identify safety critical tasks
5 Define the safety critical roles
6 Define the competence standards
7 Compile job descriptions
8 Consider the impact on recruitment, selection, HR, appraisal
9 Map CMS process to existing management procedures and identify gaps
10 Document the systems and processes that contribute to competency management.

Linking competency management to the COMAH safety report

Consider how CMS can be used to inform the COMAH safety report and the demonstration of competence that the competent authority requires.



For further information see:

- "Human Factors & COMAH: A Gap Analysis Tool" www.hse.gov.uk/humanfactors/resources/gap-analysis-tool.pdf
- "A Human Factors Roadmap for the Management of Major Accident Hazards" www.hse.gov.uk/humanfactors/resources/hf-roadmap.pdf

2. Design the Competence Management System

2.1 Define the elements that CMS covers

2.1.1 Elements that CMS should cover

- The procedures, methods and work instructions for operating the CMS
- The competence standards and assessment criteria
- The training, development and assessment requirements
- The competencies and responsibilities of those managing and operating the system.

2.2 Define the system interfaces (external and internal)

2.2.1 Ensure all relevant corporate and local standards and policies are supportive of the CMS.

2.2.2 External interfaces may include external audit and benchmarks such as British Standards.

2.2.3 Internal interfaces may include internal audit and other relevant Quality Assurance procedures.

2.2.4 The CMS may be aligned to capability and fitness for duty and other HR company policies.

2.3 Define the competence standards

2.3.1 Analyse the safety critical tasks to determine the practical, technical and behavioural skills, the organisational and legislative knowledge and the level of expertise required to perform the task competently.

2.3.2 For each safety critical role refer to national occupational standards as the basis for the competence standards and tailor with additional site and process/job specific standards to ensure they meet the risk profile of the site in particular with respect to the safety critical tasks and the control of major accident hazards.

2.3.3 Company policy may dictate high level standards whilst the local management system defines local procedures and site standards.

2.3.5 Create a framework of competences standards (for example see Cogent Gold Standard Framework) for all safety critical roles that can be used for:

- workforce selection including contractors and other third parties,
- training of new recruits,
- development of the workforce,
- assessment and re-assessment of the workforce**.**

2.3.6 Determine accountability for different aspects of the CMS design eg HR department and local line management to generate job descriptions.

- *Consider what you expect the person to be able to do in order to control risk consistently. What does competent performance of the task look like rather than what steps need to be taken to complete the task.Focus on the competence to perform a safety critical task not general education and development.*

- *Frame the competence standard with reference to the safety critical context which will allow the definition of the level of competence required eg novice – expert.*

- *Use Job Descriptions to define the minimum skills, knowledge and experience required to successfully perform the roles that contain safety critical tasks.Allow individuals access to a description for their job.*

- *Define the standards for the safety critical tasks for managers whose main contribution to health and safety is decision making about financial/commercial matters.For example procurement of materials, machinery, equipment and purchasing of services from third parties, such as contractors.*

- *Define the competence standard for the managers and operators of the CMS including assessors and trainers (internal and external).*

- *Cogent nationally recognised Gold Standards may be used as the basis for the competence standards for specific roles.An example of a competencies/role matrix based on Cogent Gold Standards is in Appendix 8.4*

- *The Gold Standard may be tailored to reflect additional site and process/job specific competencies related to specific safety systems and hazards.*

Example of definitions of levels of competence

Supervised Practitioner
A Supervised Practitioner has sufficient knowledge and understanding of best practice, within the organisation or within the relevant industry sector, to be able to work on the tasks associated with the overall function without placing an excessive burden on the Practitioner or Expert which might compromise HSEQ performance. It will be the responsibility of a Practitioner or an Expert to check the work of the Supervised Practitioner.

Practitioner
A Practitioner has sufficient knowledge and understanding of best practice, and sufficient demonstrated experience, to be able to work on tasks associated with the overall function without the need for detailed supervision.

A Practitioner will maintain their knowledge and be aware of the current developments in the context in which they work. The Practitioner may be required to perform detailed checks on the work carried out by a Supervised Practitioner.

Expert
An Expert will have sufficient understanding of the basis for current working practices and sufficient demonstrated managerial skills, to be able to undertake overall responsibility for the performance of a function. An Expert will be familiar with the ways in which systems have failed in the past.

An Expert will keep abreast of technologies, architectures, application solutions, standards, and regulatory requirements, particularly in rapidly evolving fields such as process safety-related systems. An Expert will have sufficient breadth of experience, knowledge and deep understanding to be able to work in novel situations.

An Expert is able to deal with multiple problems under pressure without jeopardising HSEQ performance.

2.4 Define how each competence standard is met, assessed and recorded

2.4.1 For each job role the assessment plan for each competencyshould specify:

- Nature of assessment
- Type of assessment
- What will be assessed
- When the assessment will take place
- The expected duration
- All parties who will be involved in the assessment process
- The frequency of re-assessments.

2.4.2 Use Assessment methods appropriate to the activity. These methods might involve a combination of the following:

- Direct observation
- Indirect information gathering
- Incident simulation
- Written and verbal questions
- Open questions
- Multiple choice questions

2.4.3 Build assessment into the daily role of the individual as much as possible. This allows natural production of evidence that assists in demonstrating competence.

2.4.4 Method of assessment, testing method and pass criteria should be proportional to hazard/nature of the activity.

2.4.5 Assessment and re-assessment should confirm that knowledge secured through training and learning is related to the actual environment in which the individual works.

2.4.6 Maintain a record verifying an individual's competence against the set standards.

2.4.7 Maintain recording systems of training, refresher training, assessments and re-assessments that can be audited internally and externally.

- *Competence Assessment should include assessment against measurable and testable criteria for the 5 strands of each competence standard:*
  - *Knowledge*
  - *Skills*
  - *Experience*
  - *Personal behaviour*
  - *Understanding*

- *Criteria should state the **minimum** requirements in assessment and demonstration of competence.*

- *Assessment Tools may include:*
  - *Training needs analysis*
  - *Personal skills profiling*
  - *Job training manuals identifying underpinning knowledge needed*

- *Ensure that scenarios link back to Major Accident Hazards and safety critical tasks particularly those related to emergency response.*

- *Competence assessment should cover all procedures and processes that are specific to the safety critical task.*

Example of assessment methods matched to competence type

Type of competence	Type of assessment methods	Examples
Physical and sensory motor skills (visual, auditory, touch, etc.).	Practical 'show me' tests. Simulated tasks / mock ups. Peer review of quality of work. Evidence of prior experience.	NVQ based assessment. Driving skill road tests. Workshop based test of welding ability on a mocked up item of equipment.
Ability to carry out a prescribed procedure of work.	Simulated exercises. Pen and paper tests. Talk-throughs. Shadowed work. Peer assessed decision-making. Post task debriefing – verbal talkthrough of decisions.	Classroom verbal test of candidate's recollection of a procedure of work. Talking through the correct procedure of isolating a hydrocarbon pump using a Piping and Instrumentation Diagram. Observation of a fitter following the procedure for installing a seal on a hydrocarbon pump, checking its operability and advising operations that it is safe to restart.
Cognitive skills.	Simulated exercises. Pen and paper tests. Talk-through. Peer assessed decision-making. Post task debriefing – verbal talk through of decisions. Peer observation and feedback. Psychometric tests. Shadowed work.	Performance of a sample of tasks on a control room simulator. Talking through the interpretation of a set of alarms.
Knowledge of equipment, plant and processes.	Talk-through. Verbal knowledge tests by experts. Post task debriefing – verbal talk through of decisions.	Verbal or written examination of individual's knowledge of safety function, of various items of equipment, including formal qualification / tests. Explanation of how a chemical reaction may go exothermic due to process deviations.
Interpersonal skills.	Peer observation and feedback. Group exercises. Self-assessment questionnaires and psychometric tests. Shadowed work.	Observation of behaviour using behavioural markers in real or simulated activities. Self-completion of psychometric questionnaires.
Team management skills.	Peer observation in real or simulated tasks. Self-assessment questionnaires and psychometric tests.	Observation of behaviour using behavioural markers in real or simulated activities. Self-completion of psychometric questionnaires.
Safety attitudes and behaviour.	Peer observation in real or simulated tasks. Verbal tests.	Observation of behaviour using behavioural markers in real or simulated activities. Statement about the appropriate way of responding to conflicting operational / safety requirements. Verbal examination of supervisors understanding of how their behaviour influences safety climate.

2.5 Define the training and development programme for each proposed competence standard

2.5.1 Job competencies can be met through qualifications or training programmes that have been mapped to national standards.

2.5.2 Local competence standards can be met through internal training.

2.5.3 Achievement of these qualifications or training can contribute to the demonstration of the required competence.

2.5.4 Consider the continuous development needs of personnel to ensure that they are informed and keep up to date with changes in applicable regulations, procedures and systems.

2.6 Define the quality assurance procedures for all system elements

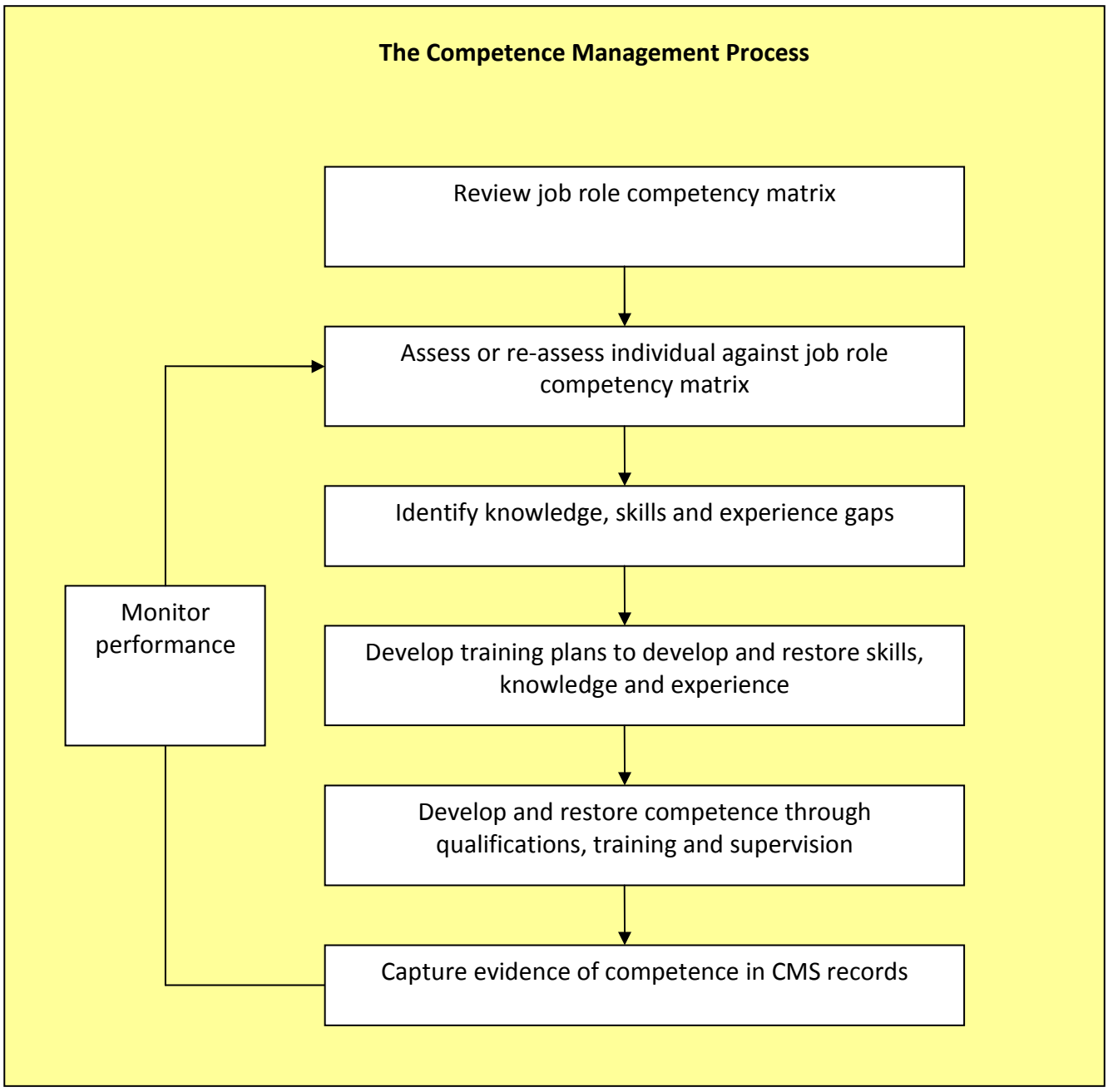
2.6.1 Assessment should be carried out by an individual who has an understanding of assessment techniques and has been proved technically competent in the area being assessed.

2.6.2 The Assessor records successful assessments in an individual's assessment record / progress chart. Feedback from the assessments should clearly state what activities were not carried out to the required standard and should be logged in the individual's assessment record, so that an appropriate training and reassessment plan can be agreed.

2.6.3 Use an Internal Verifier to audit the assessment decisions of the Assessor. This will ensure compliance and consistency across a site.

- *Individuals could hold an A1 Assessor award or be trained to an equivalent standard.*
- *The Internal Verifier could hold the V1 Internal Verifier award or be trained to an equivalent standard.*
- *Develop the required assessment process and produce a library of assessment paperwork and guidelines.*
- *Map the assessment information that is within scope of the CMS may be held across a number of internal systems.*

3. Implement the Competence ManagementSystem



3.1 Conduct measurement and verification of competence against the defined competence standards

3.1.1 Carry out assessments of **all staff who undertake safety critical tasks** against the competence standards for a job role **before** the individual is deemed competent to carry out the role unsupervised.

3.1.2 For existing staff already carrying out the role the assessment should aim to prove continued competence.

3.1.3 Identify gaps where an individual does not possess the skills and knowledge indicated on the job description/competency matrix in order to define the individual's development needs.

3.1.4 Verification of competence against the competence standards for a job role should be specific to the workingcontext and circumstance.

3.1.5 Ensure assessors are experienced, knowledgeable and with sufficient practicalunderstanding to be credible to the workforce.

Examples of methods for monitoring competence
A hierarchy of assessment might use a combination of:

- *formal or informal 1:1's with a question and answer session between line manager and employee,*
- *formal performance reviews*
- *formal task observations*
- *informal task observations as part of day-to-day supervision,*
- *informal task observations as part of a development programme,*
- *completion of records,*
- *review of workbooks/training books/portfolios,*
- *simulator exercises to observe specific tasks,*
- *written tests,*
- *verbal test,*
- *review of events post an accident/incident investigation.*

3.2 Train to the defined competence standards

3.2.1 Use a variety of appropriate methods to update the competence of individuals.

- *Use national competency based qualifications that are underpinned by Cogent, ECITB or other appropriate industry national occupational standards; or training programmes that have been mapped to the competence standards to address skills and knowledge gaps.*

- *Use accredited external training providers to achieve relevant national qualifications, or where appropriate develop internal training relevant to the operational requirements.*

- *Use simple communication tools such as toolbox talks, safe/unsafe act discussions and campaigns to address knowledge gaps.*

3.3 Monitor, reassess and maintain competence

3.3.1 Use a formalised and structured programmewhich concentrates on the assessment and re-assessment of competence when carrying out safety critical tasks.

3.3.2 Include scheduled full and partial observations and assessments and non-scheduled spot observations and assessments.

3.3.3 Infrequent events or emergencies should also be used as an opportunity to monitor an inexperienced individual's performance.

3.3.4 Define a reassessment frequency policy that reflects criticality of the task and exposure to events and gives consideration to regulation and response to incidents and changes.

3.3.5 Control processes should be maintained to ensure that members of staff are only asked to undertake major accident hazard critical work for which they are competent.

- *To improve the consistency of assessments consider establishing a protocol for assessors that includes assessment guidance.*

- *Sign-off by team and asset leaders can be used to improve the quality of on the job assessments.*

- *Re-assessment of performance in abnormal operations, emergencies or an infrequent event can be tackled by use of scenarios and simulation.*

- *Recognise competence assessment as a personal development tool in order to gain commitment to the process from experienced staff.*

Example of the use of a Team Competency Matrix

The Team Competency Matrix provides an overview of the team competencies and training requirements. It shows the required and current level of skill for the team. It provides a framework that will enable the business to define minimum competence and the flexibility and cover required for the team to function effectively. Team Competency Matrices are used in teams where individuals are required to collectively possess a set of skills and knowledge to enable a degree of cover, flexibility and assure team competence.

- *Use a team competency system to identify the knowledge, skills, experience, personal behaviours, and understanding required for all roles in the organisation.*
- *Describes the competency set that is required for each team based on the safety critical task that the team will be performing.*
- *All Operators from one shift appear on the one Competency Matrix which is owned by the team supervisor.*
- *The team matrices provide an overview of the team competencies and training requirements. It shows the required and current level of skill for any team plus all the individuals within that team.*
- *Job Tasks are detailed on an individual Job Progress Chart showing all knowledge, demonstrable competencies to be completed to assure competence in the role.*
- *Job tasks are mapped to vocational qualification standards so operator gains relevant qualification for training and being assessed in the role.*
- *Demonstrate individual competence through the team matrices, with supporting evidence in the progress charts / job assessment and training.*
- *It provides an assurance of team's competence and flexibility.*
- *Team leaders monitor team competency matrices to measure their team's level of competence against the standards/requirements of the job.*
- *Team leaders are responsible for the maintenance of the CM systems for their teams and their development.*
- *Training plan developed centrally, based on the output of the team matrices.*
- *The Team Competency Matrix is used on an annual basis as part of the appraisal conversation or when individuals move to a new role.*

4. Assess and maintain Competence ManagementSystem

4.1 Update competence standards in response to change

4.1.1 Consider the Management of Change procedure and its interface to the CMS.

4.1.2 Update re-assessment and additional training and development requirements that may be initiated due to an organisational or management of change, engineering controls for safety and health, loss or accident and incident investigation.

4.1.3 Review job descriptions regularly to ensure continuing suitability for the job.

4.1.4 Use evidence from task observations for safety critical tasks to improve the competency matrix.

4.1.5 Use internal incident reports and incident reports from external sources to identify areas for improvement and update/improve the competency matrix.

4.1.6 Use audit results to identify areas for improvement.

4.1.7 Liaise with regulatory authorities and refresh competence standards to ensure continued compliancewith regulations and Competent Authority guidance.

4.1.8 Review competency standards to ensure they are adequate in relation to nationally recognised standards such as Cogent or ECITB or other appropriate National Occupational Standards.

4.2 Maintain the competence of CMS managers and assessors

4.2.1 Consider the process for the selectionand the ongoing assurance of the competence of internal and external trainers and assessors

4.2.2 Maintain the knowledge base and skills set of trainers and assessors in line with any changes to the organisation's assets, processes and procedures.

4.3 Review the output and impact of the CMS on Key Performance Indicators (KPIs)

4.3.1 The CMS steering group should define the policy with respect to the competence management system and then demonstrate how well it is being implemented.

4.3.2 Conduct self verification of system and internal audit.This may include active monitoring to ensure compliance with training instructions and safe working practices.

4.3.3 Use reactive monitoring to identify and report on incidents to check controls are in place, identify weakness and learn from mistakes.

4.3.4 Use leading and lagging KPI's to provide an indication of the CMS effectiveness.

- *Review competence standards in the light of the impact of small and large changes on critical task analysis and risk assessment.*

- *Where used safety culture surveys in COMAH sites can identify areas for improvement.*

- *If holding the evidence of "proof of competence" in one place is not possible, consider mapping the evidence base across a number of different management systems.*

- *KPIs could include :*
  - *Number of competence assessments carried out against plan*
  - *Number of task observations with non-compliance*
  - *Progress towards training/competence objectives*
  - *Number of incident reports that reference competence as the root cause.*

- *An annual review of CMS could include the following points:*
  - *How well is the system working?*
  - *Does CMS continue to meet its objectives?*
  - *Are all aspects of the CMS being performed as they should be?*
  - *Is the system adequate and can improvement be adopted?*
  - *Is the CMS policy adapted to the present and expected future environment?*
  - *Are there suitable and sufficient resources to run the CMS?*

5. Verify and audit the Competence Management System

5.1 Review and feedback

5.1.1 Conduct audits identifying gaps in the CMS. The audit of CMS should be part of the quality management system or an equivalent internal process.

5.1.2 Verification should cover the systematic monitoring of the assessment process in terms of how well the assessments are carried out, and how the assessment process is applied.

5.1.3 Verification should be directed towards determining compliance with the agreed standards, rules and procedures.

5.1.3 Audit should check the records and the competence of the individual's managing the CMS.

5.2 Refresh and improve CMS

5.2.1 Based on audit feedback make the necessary changes to ensurea fit for purpose and accurate system.

5.2.2 The Competence Management System should be regarded as a continuously improving process.

Audit protocol

- *Is there a CMS self assurance process/audit procedure?*
- *What is the frequency of CMS audits?*
- *Is the audit schedule risk based, does it target specific areas of known weakness with greater frequency?*
- *Is competency in CMS management and operation assessed as part of the audit?*
- *Is there an approved list of auditors?*
- *Is there a formal system of recording audit findings?*
- *Are 'high risk' findings prioritised and are these raised with senior management?*
- *Is there a process within the audit to identify overdue inspections?*
- *Is there a process to ensure that all audit actions are assigned timescales for completion and owners?*
- *Is there a process to ensure that all audit actions are closed and overdue actions tracked and expedited?*

Auditing CMS process steps

- *Do CMS assessments follow the correct process steps/procedure to a good quality and in the correct order?*
- *Are clear roles and responsibilities established within the CMS process?*
- *Are all relevant competent parties involved in the planning, implementation and assessment of the CMS*
- *Is there evidence that feedback from technical experts, best practice, learning and observations from implementation and assessment teams are incorporated into the CMS process?*
- *Has training completed as part of the CMS process been reviewed and signed off at the appropriate authority level, and any comments or remedial actions performed and re-assessed?*
- *Has all relevant documentation to the CMS process been retained as necessary?*

Site inspection during audit

- *Do audits include the following:*
    - *Interviewing site personnel*
    - *Review of documentation*
    - *Field verification of tasks*
    - *Completion of CMS action items*
    - *Audit report feedback to relevant personnel.*

6. Apply the guidelines to the contractor workforce

6.1 Categorise Contractors

6.1.1 To help identify where responsibility for application of competency management systems should apply, contractors may be categorised as either an individual, or as part of a team.

6.1.2 When procuring contract services, either in the form of people or equipment, consider categorising the service as either Type 1 or Type 2 to help when identifying responsibilities for generic and site specific competence management.
A Type 1 contractoris an individual under the supervision of the client, whereas a Type 2 contractor isan individual under the supervision of the contractor company.
(Refer to full definitions, section 7)

6.1.3 Define responsibility criteria for categorising contractors in consultation with representatives from other departments such as HR, procurement, operations, process safety and training.

Responsibility criteria for categorising contractors		
	Type 1 contractor*	**Type 2 contractor****
Verification of individual or team generic technical competencies	Client company's procurement	Client company's procurement
Local site induction	Client company	Client company
Training of individuals in local safe systems of work	Client company	Client company
Maintain training records	Client company	Contractor company
Direct Supervision to client's procedures, policies and standards	Client company	Contractor company
Competence Assurance	Client company CMS	Contractor company CMS
Assessment and audit of CMS	Client company	Client company

*(Local site nomenclature will differ for example, * may also be referred to as agency contractor; **may also be referred to as term contractor)*

6.2 Assure competency of contractors

6.2.1 Type 1 contractors are within the scope of the Client company CMS and should be managed in the same way as Client company staff**.**
(Refer to Section 3 - Implement the Competency Management System).

6.2.2 Type 2 contractors may beout of scope for the Client company's CMS and therefore should be managed through the Contractor company's CMS in a manner consistent with these guidelines.

6.2.3 Type 2 contractors and sub-contractors should be expected to have equivalent standards of competence as the Client company staff, for the major accident hazard critical aspects of their role.

6.2.4 The Contractor companyshould identify which members of its team have safety critical tasks attached to them.

6.2.5 The Contractor company'sCMS should assure the competence of individuals assigned to a contract before the job commences.

6.2.6 The Contractorcompany is responsible for the competency management of itssub-contractors.

6.3 Audit of Contractor Company CMS

6.3.1 As part of ongoing contractor reviews and on completion of the contract,the Contractor company's CMS should be audited and records sampled as part of the review and evaluation of the performance of the contract by theClient company.

6.3.2 Audit of the contractor company's CMS should ensure that control processes are in place to ensure that contractors and sub-contractors are only asked to undertake major accident hazard critical work for which they are competent.

6.3.3 Verification of competence against the competence standards for a job role specific to the operational context and circumstance should be demonstrable through the Contractor company's competency management system.

6.3.2 A Contractor company should be able to demonstrate that its CMS follows these guidelinesfor competency management systems.

6.4 Procurement of contractors

6.4.1 A valid and accurate requirement specification that includes competence standards, particularly for safety critical tasks should be prepared for a job or service.

6.4.2 The technical authority or other deemed competent persons should contribute to the requirement specification to ensure all aspects of process safety including competence have been considered.

6.4.3 Tenders should specify any required specialist qualifications, local site knowledge and evidence from aContractor company'sCMS.

6.4.4 For procurement of specialist services or specialist equipment that impact on COMAH, for example safety instrumented systems, the requirements specification should include the competence of designers, system builders and installers and that this can be assured through the supplier's management systems.

6.4.5 Procurement should verify any certification; evidence of compliance with regulations; records of previous experience, particularly in relation to third party suppliers. If procurement is not competent to assess this documentation the relevant technical authority should be consulted.

6.4.6 Contracts should specify that a Contractor company's CMS will be audited and assessed by the Client company.

6.4.7 Where procurement uses an approved contractor list, consideration should be given to ensuring that the approved contractors are continuing to maintain and assure the competence of their workforce after their initial selection for the approved list. Audit and assessment of the Contractor company'sCMS may be used for this.

6.4.8 The company should behave as an intelligent customer when procuring contracted services, either in the form of people or equipment that may impact on the control of major accident hazards.

7. Glossary

Term	Definition
Assessment	The process of collecting and judging evidence of a person's performance against a standard to determine whether the person has demonstrated competence, this could include verbal, written and/or practical observation. Assessment should be based on performance in the workplace, wherever possible.
Assessor	A person who carries out an assessment by judging the candidate's evidence against the standard and decides whether the candidate has demonstrated competence.
Audit	A structured process of collecting independent information on efficiency, effectiveness and reliability and making recommendations for any corrective actions.
Bow-Tie Diagram	A bow-tie diagram is a means of representing the causes and consequences of a hazardous occurrence, together with the elements in place to prevent or mitigate the event. The 'knot' in the middle of the bow-tie represents the hazardous event itself. Such an event might be 'Loss of containment' or 'Storage tank overfill' etc.
Client Company	Client company is the company that lets a contract with a contracting company for work to be carried out.
COMAH	The Control of Major Accident Hazards (COMAH) Regulations ensure that businesses: Take all necessary measures to prevent major accidents involving dangerous substances; limit the consequences to people and the environment of any major accidents which do occur.
Competence	Competence means the ability to perform activities to the standards expected in employment: it is a combination of practical and thinking skills, experience and knowledge plus personal behaviours and understanding.
Competence Assurance	For competence to be assured, the criteria for success need to be established. A competence management system should state the required standard of performance and how individuals will be monitored against the standard.
Competence Management	Competencemanagement is the process of getting staff to be competent, followed by competence assessment and reassessment, and maintaining staff competence.
Competence Management System	Competence management system means a process to develop and maintain staff competence that includes risk assessments of activities, selecting suitable standards and using processes and methods to carry out competence management, maintaining records, carrying out verification, audits and reviews of the system and feeding back recommendations to improve the system.
Competency	Competency describes the knowledge or skills that a person requires to be able to perform a task.

Consolidation Period	The ability to follow a procedure is not a demonstration of competence. The knowledge gained through training needs to be applied on the job to develop the skills and understanding required to complete the task safely and successfully. During the consolidation period, newly trained people will need extra support from good procedures, job aids and supervision.
Contractor	Contractor in this guidance means an individual employed by a Contractor company that has a contract with the client company to carry out work. It includes any person who works for and may report to the management of the client company, but is not a member of staff of that client company, and includes agency staff and the self-employed. *Type 1contractor* is used in this guidance to mean an individual who is managed as part of the client company workforce and is subject to direct supervision by the client company. Local nomenclature that may be used includes agency staff, term contractor. *Type 2 contractor* is used in this guidance to mean an individual who is managed by the Contractor company and is subject to direct supervision by the Contractor company. Local nomenclature that may be used includes transients, T&I, outage, shutdown contractors.
Contractor Company	Contractor company means the organisation that takes a contract from a Client company to deliver services against a requirements specification drawn up by the client company.
Development	Development means improving the performance of a person especially following and in conjunction with training, so that the person gains sufficient practical experience to become competent.
Intelligent Customer	In high-hazard industries policies regarding use of contractors or outsourcing need to be clear. If safety-critical work is to be contracted out then the company should ensure that it remains an 'intelligent customer'. In other words, it should retain adequate technical competence to judge whether, and ensure that, work is done to the required quality and safety.
Internal Verifier	The role of the Internal Verifier is to monitor the work of all assessors involved with assessing competence, ensuring accuracy and consistency of activities and decisions.
Job Description	Job description describes a job in terms of objectives and responsibilities; specific safety responsibilities may be included in a safety responsibility statement.
Key Performance Indicators	Key performance indicators are a group of statistics that summarise achievements which together indicate an overall level of performance of a process or system etc and show the change in performance over time.

Lagging indicators	Lagging indicators are a form of reactive monitoring requiring the reporting or investigation of specific incidents and events to discover weaknesses in that system. These incidents represent a failure of a significant control system that guards against or limits the consequences of a major incident.
Leading indicators	Leading indicators are a form of active monitoring focused on a few critical risk control systems to ensure their continued effectiveness. They require a routine systematic check that key actions or activities are undertaken as intended. They can be considered as measures of process or inputs essential to deliver the desired safety outcome.
Monitoring	Monitoring means observing the performance of someone working; it can be formal (eg planned in advance), informal (eg 'managing by walking about') and unannounced (eg planned monitoring, but the place, date and time not announced beforehand).
National Occupational Standard	National occupational standard is an occupational standard that has been developed byemployers working with the Sector Skills Council for that industry (eg Cogent for science based industries) and accredited by a regulatory authority: QCA in England, DELLS in Wales, CCEA in Northern Ireland and SQA in Scotland.
Operator	Process technicians working in field operations and control room.
Procedure	Proceduresare used to support the humans engaged on safety critical tasks. The process of task analysis produces detailed task descriptions which can be readily converted into formal procedures. Different types of procedure provide control for the different types of human failure. Detailed procedures can provide a control for gaps in knowledge which lead to mistakes. Simplified procedures and job aids such as checklists provide controls for slips and lapses. It is important that the usability and use of procedures is monitored. Procedures can be written to cover operating procedures/maintenance procedures/analytical methods for quality control. An example of a procedure is: Maintaining a pump.
Process	An example of a process is: Handover at the end of a shift.
Risk	A combination of the frequency of occurrence, probability of failure and severity of consequence.
Safety Critical Job	A Job which could influence the Major contributors (Maintenance, Modifications, Operational Errors, Corrosion, Mechanical degradation) to result in a Major Accident Hazard.

Safety Critical Task	This is a task that is carried out by someone in a safety critical job where sub standard performance couldinfluence the major contributors (maintenance, modifications, operational errors, corrosion, and mechanical degradation) to result in a Major Accident Hazard.
Safety Critical Work	Those activities, wherein sub-standard performance could contribute to a major accident
Staff	Staff is people who are directly employed by a company and on the company payroll, including those on a short term contract.
Standards	Standards are in two types: ▪ Generic standards with broad application to a variety of different work situations or equipment ▪ Specific standards are relevant to particular types of equipment or situation Standards describe requirements in terms of : ▪ Skills that are essential to demonstrate competent performance ▪ Knowledge and understanding that a person should have to support the required performance Performance criteria against which the performance of the person is assessed.
Sub-contractor	Sub-contractor in this guidance means an individual employed by a sub-contracting company that has a contract with a contracting company (sometimes called the main contractor) to carry out work. Contracting companies often use sub-contractors in two main areas; where specialist(s) are required (eg specialist welders) and where extra people are required to carry out the contract work.
Supervisor	Supervisor means a competent person who monitors a person's work, and takes responsibility for the work of a person who is not yet competent.
Task Analysis	Methods used to collect, record and analyse information about practicaltasks to helpunderstand what they are required to do and any changes that may be needed to improve human performance. Having identified the safety critical tasks, these tasks need to be clearly defined and understood. This is achieved by carrying out a suitable task analysis. This could be as simple as a walk through / talk through of the task writing down what should be done, where and when it should be done, who should be doing it, how to do it and why it is important (especially for safety). For more complex tasks a formal human factors task analysis tool may be required.

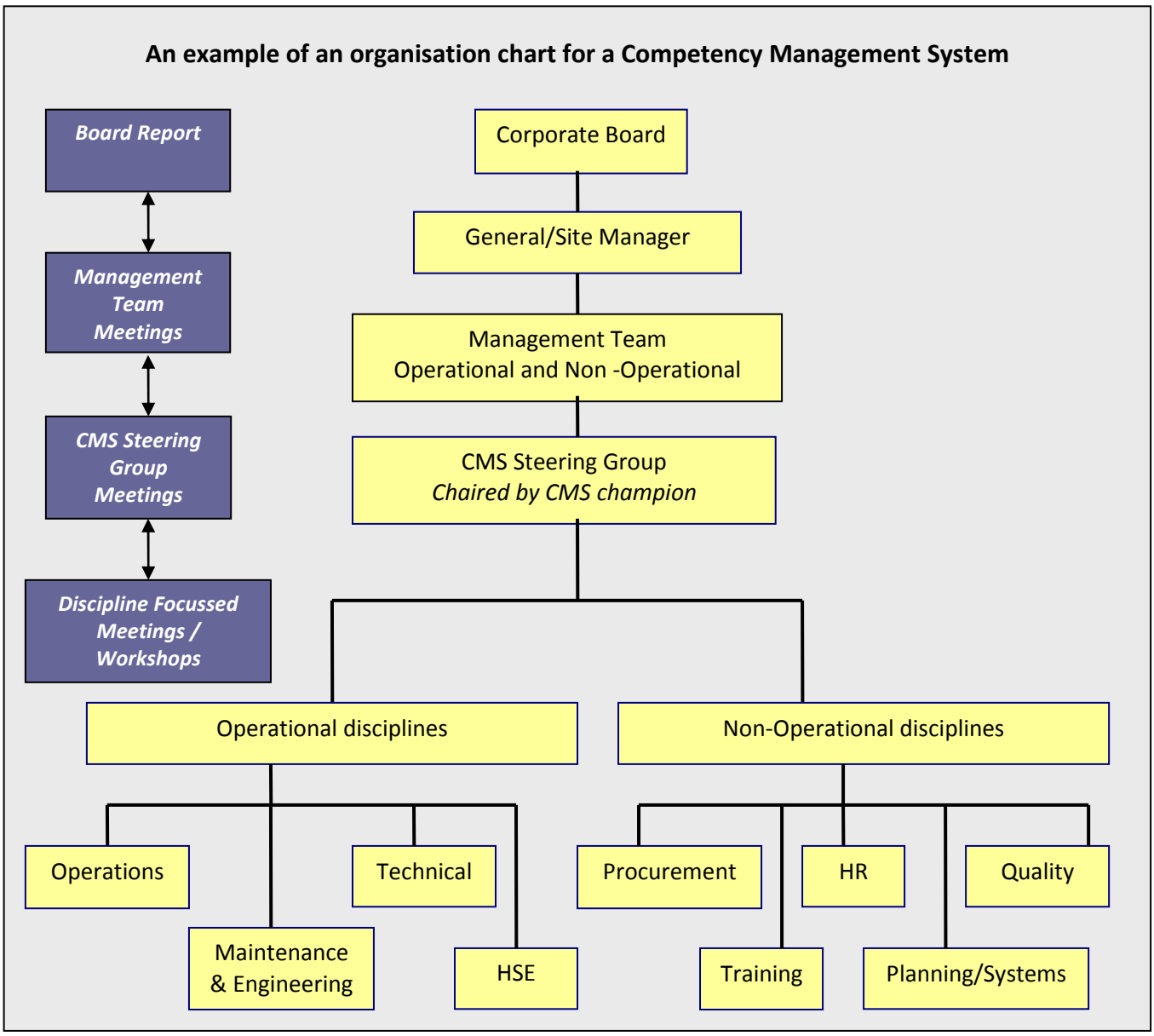
Team Competency Matrix	Document for each team, which details all HSE / compliance and technical, professional requirements for the jobs. Highlighted on this document are the minimum competency requirements per team.
Training	Training is the formal or informal instruction of a person on how to carry out a work activity. Training provides the knowledge humans need in order to carry out the safety critical tasks. It is this knowledge which will make the possibility of mistakes less likely. Detailed procedures which describe how a task is completed can form the basis of a training manual. However, for a complete training package, information on why certain things are important and an understanding of the associated major hazard potential are necessary.
Training Guides	A controlled document created for roles which details specific knowledge and understanding required to perform competently. Each training guide is supported by the generation of a workbook/portfolio.
Training Plan	Document incorporating all HSE, Job and development needs populated with timescales for completion.
Verification	The systematic monitoring of the assessment process in terms of how well the assessments are carried out, and how the assessment process is applied. Verification is mainly directed towards determining compliance with the agreed standards, rules and procedures.

8. Appendices

8.1 Competence management and links to other management systems

Competence Management may be linked to a number of other management systems; for example: recruitment, training, human resources, employee support, health, safety, environment and qualitymanagement, procurement, operations, maintenance, planning.

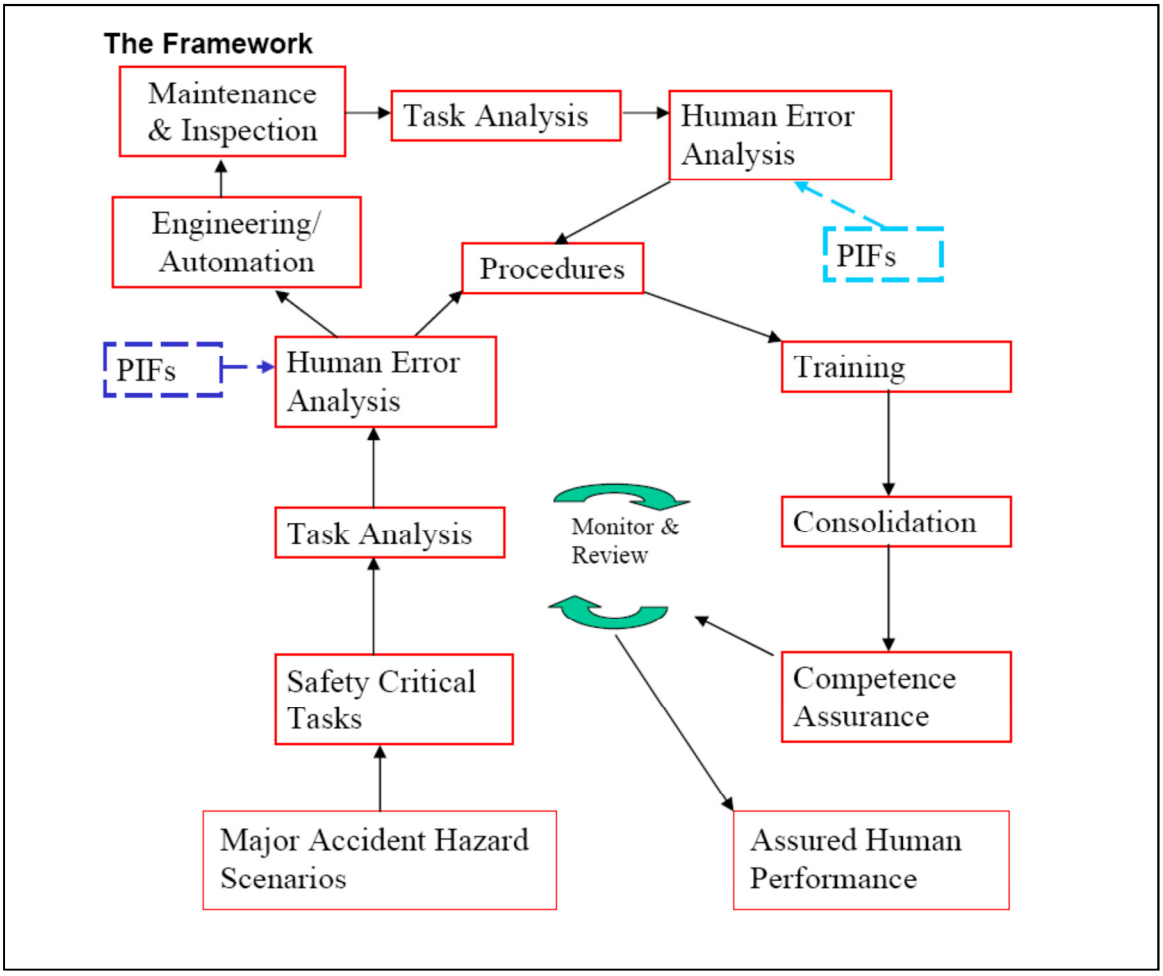
The CMS should inform and be informed by these other management systems, so that it becomes and integral part of the overall management system of the company.
As long as human factors cannot be designed out of a process, competence must sit at the heart of Process Safety Management.



8.2 A Human Factors Roadmap for the Management of Major Accident Hazards

(Excerpt from HSE guidance)

The following framework is intended to guide the reader through a practical approach for linking major accident hazards (MAH) to the assured performance of humans engaged on safety critical tasks associated with those hazards.The framework is presented as a human factors journey with key milestones. For each of the milestones there is a link to human factors topics which may be investigated by Seveso inspectors. Most of these topics are described in more detail in the UK Human Factors Inspectors Toolkit. http://www.hse.gov.uk/humanfactors/toolkit.htm.



Assured Human Performance

Having taken all the practical steps outlined above it should be possible to provide evidence to demonstrate the assured performance of humans engaged on safety critical tasks which may have an influence on the initiation or mitigation of a major accident. This is the main demonstration the duty holder has to make in their safety report for human factors. Having clearly defined procedures for carrying out task analysis, human error analysis, assessment of competence, etc allows the duty holder to demonstrate a structured approach. Having examples of how these procedures are applied to the range of processes on site that

contribute to the major hazard risks allows the duty holder to demonstrate a systematic approach. It is this structured, systematic approach to the management of human performance which should be clearly and concisely communicated within the site safety report to make the necessary demonstrations to the competent authority that the measures taken will prevent foreseeable failures which could lead to major accidents.

8.3 Cogent Gold Standards

Cogent Gold Standards

*Cogent, in conjunction with the Process Industries, has developed **Gold Standards.** These are CPD frameworks that describe the duties and responsibilities of a job profile in terms of four competence areas:*

- *Technical*
- *Business improvement*
- *Compliance*
- *Functional & behavioural*

These competences have been mapped to national qualifications underpinned by the National Occupational Standards; and to national training standards for internal training programmes.
Cogent has developed job standards for:

- *Process Operator Chemicals*
- *ProcessTechnician Chemicals*
- *First Line Supervisor Chemicals*

For further information visit www.cogent-prospectus.com

An example of a competency /role matrix based on Cogent Gold Standards			
	Process Operator Chemicals	**Process Technician Chemicals**	**First Line Supervisor Chemicals**
TECHNICAL			
Process Operations			
the individual can work safely to…			
prepare to start up a process	√	√	
start up a process	√	√	
monitor and maintain a process	√		
complete/shutdown a process	√	√	
control and monitor a process and resolve problems		√	
additionally an operator can…			
handover the process	√		
maintain product quality	√		
clean and prepare items of plant and equipment	√		
support the maintenance activities on the plant and equipment	√		
manage materials into and between production stages and separate & dispose of by-products and waste as appropriate	√		
additionally a technician can…			
respond to process problems		√	
plan to and maintain product quality		√	
support the maintenance activities on the plant and equipment		√	
handover the process		√	
the individual understands…			
how the process is started and shutdown			√
how the process is controlled and maintained			√
the operating procedures & how to manage safety critical process operations			√
handover at end of shift			√

	ProcessOperator Chemicals	Process Technician Chemicals	First Line Supervisor Chemicals
Process Technology			
the individual understands, for the job role, the relevant…			
science/technology theory and principles			√
analytical procedures & interpretation of results			√
the industrial applications of chemical science			√
how to use maths, IT and problem solving techniques			√
the individual has…			
the underpinning science and technology knowledge for the chemical sector & job role	√	√	
Manage Process Operations			
the individual can…			
develop and monitor plans and procedures			√
allocate personnel to maintain processing			√
respond to and solve operational problems			√
adapt plans and procedures			√
allocate personnel to prepare for/carry out maintenance			√
COMPLIANCE			
the supervisor is competent in...			
health, safety and environmental compliance in the process industry			√
additionally the individual understands…			
the reasons for and application of safety management systems			√
the implications and relevance of company policy, legislation and regulation on working practices			√
responsibilities for controlling workplace hazards and managing the health and safety of others			√
how to ensure compliance with legal, regulatory, ethical and social requirements			√
making plant safe for maintenance or in emergency shutdown			√
environmental & sustainability responsibilities			√
and can....			
recognise, identify and evaluate workplace and work-related risks			√
identify and implement appropriate risk control measures			√

develop and implement active monitoring systems, recording and analysing results			√

	ProcessOperator Chemicals	Process Technician Chemicals	FirstLine Supervisor Chemicals
COMPLIANCE			
the individual understands…			
Foundations of health and safety	√	√	
Responsibility for health and safety	√	√	
Risk assessment & Control	√	√	
Transport, Electrical & Fire safety	√	√	
Manual handling and repetitive activities	√	√	
Hazardous substances	√	√	
Working environment	√	√	
Process Safety			
Foundations of process safety	√	√	
Systems to prevent loss of containment	√	√	
Common risks and controls	√	√	
Plant integrity	√	√	
Emergency response	√	√	
Environmental Management			
Foundations of environmental management	√	√	
Control of emissions	√	√	
Environmental risk assessments (impact assessment)	√	√	
additionally the role may require competence in a number of specialist operations including....			
Working at height	√	√	
Ladder safety	√	√	
Fork Lift Truck operator basic training	√	√	
Confined spaces	√	√	

8.4 An overview of HierarchicalTask Analysis

The purpose of hierarchical task analysis is to produce a task description

Outline Method:

- Identify a goal to be achieved by the user
- Describe the goal in terms of the tasks & plans required to achieve goal
- Continue to break down each task until an appropriate stopping point is reached

HTA Terms:

- Goals
- Tasks
- Operations
- Stopping (P x C) rule: describing operation/task is unnecessary if the probability of inadequate performance multiplied by costs is acceptable

Representation of HTA:

- Tables
- Diagrams

Advantages:

- Economical
- Focus is on crucial aspects of task
- Context for other specific approaches

Disadvantages:

- This method requires the researcher to be a skilled user of the technique
- Must be carried out with cooperation of management, engineers & operating staff

An example of a simple HTA diagram

9 Further Information

Task Analysis

- The institute of petroleum human factors briefing notes no 11
  www.energyinst.org/filegrab/?ref=308&f=Human+Factors...Note...

- *A Guide To Task Analysis: The Task Analysis Working Group edited by B. Kirwan and L. K. Ainsworth. ISBN 0 7484 0057 5*

HSE: human factors and MAH

- Human factors: Inspectors human factors toolkit
  http://www.hse.gov.uk/humanfactors/toolkit.htm

- A Human Factors Roadmap for the Management of Major Accident Hazards
  http://www.hse.gov.uk/humanfactors/resources/hf-roadmap.pdf

Competence Assurance

- HSE core topics: Competence Assurance
  http://www.hse.gov.uk/humanfactors/topics/core1.pdf

- *Competence Assessment for the hazardous industries* – HSE Research report 086
  http://www.hse.gov.uk/research/rrpdf/rr086.pdf

- *Developing and maintaining staff competence* Railway Safety Publication 1 (Second edition)Office of Rail Regulation 2007
  www.rail-reg.gov.uk/upload/pdf/sf-dev-staff.pdf

Organisational Change and MAH

- Organisational change and major accident hazards - Chemical Information Sheet No CHIS7
  http://www.hse.gov.uk/pubns/chis7.pdf

Process Safety Indicators

- *Developing process safety indicators: A step-by-step guide for chemical and major hazardindustries*
  HSG254 HSE Books 2006 ISBN 978 0 7176 6180 0

Intelligent Customer

- *Contractorisation* Technical Assessment Guide T/AST/052 HSE 2002
  www.hse.gov.uk/foi/internalops/nsd/tech_asst_guides/tast052.pdf

- *Managing contractors: A guide for employers. An open learning booklet* HSG159 HSE Books 1997 ISBN 978 0 7176 1196 6

- *Health and safety management systems interfacing* Step Change in Safety 2003 http://stepchangeinsafety.net/stepchange/

Operating Procedures

- HSE Technical Measures Document that refers to Operating Procedures http://www.hse.gov.uk/comah/sragtech/techmeasoperatio.htm

Accreditation of Employer in house Training (ASET)

- NationalSkillsAcademy for Process Industries Accreditation of Employer in house Training (ASET) against the Cogent Gold Standard www.process.nsacademy.co.uk/products--services/aset.aspx

Cogent

- Cogent the UK's industry skills body for chemicals, pharmaceuticals, nuclear, oil and gas, petroleum and polymer businesses, also has a key role in meeting the skills needs of emerging technologies. www.cogent-ssc.com

ECITB

- The Engineering Construction Industry Training Board (ECITB) is the statutory organisation, national training provider and awarding body with responsibility for the training and development of the UK's engineering construction workforce. www.ecitb.org.uk

UKPIA

- United Kingdom Petroleum Industry Association (UKPIA), the trade association representing the main oil refining and marketing companies in the UK. www.ukpia.com

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Version 1 published July 2012